01. Electron Theory.

Question Number. 1. A neutron has.
Option A. the opposite charge to an Electron but half the weight of a proton.
Option B. the same charge as an Electron but half the mass.
Option C. no electrical charge but will add weight to the nucleus.
Correct Answer is. no electrical charge but will add weight to the nucleus.
Explanation. NIL.

Question Number. 2. The unit which consists of two or more different types of atoms is known as a.
Option A. particle of an element.
Option B. molecule of a compound.
Option C. molecule of an element.
Correct Answer is. molecule of a compound.
Explanation. NIL.

Question Number. 3. In what equipment is a photon radiated when an electron leaves a hole?
Option A. Photo-cell.
Option B. LED.
Option C. Photo diode.
Correct Answer is. LED.
Explanation. NIL.

Question Number. 4. A good electrical insulating material will contain.
Option A. Only a small number of electrons in the outer shell of each atom of the material.
Option B. strongly bound electrons in the atoms of the material.
Option C. Weakly bound 'free' electrons in the atoms of the material.
Correct Answer is. Strongly bound electrons in the atoms of the material.
Explanation. NIL.

Question Number. 5. The smallest particle that a substance can be split and show the same properties as the whole is known as.
Option A. an Element.
Option B. a Molecule.
Option C. an Atom.
Correct Answer is. an Atom.
Explanation. NIL.

Question Number. 6. What charge does the nucleus of an atom possess?
Option A. Positive.
Option B. Neutral.
Option C. Negative.
Correct Answer is. Positive.
Explanation. NIL.

Question Number. 7. What is the maximum number of electrons in shell N of an atom?
Option A. 18.
Option B. 32.
Option C. 16.
Correct Answer is. 32.
Explanation. Shell k = 2 electrons, shell L= 8 electrons, shell M = 18 electrons and shell N = 32 electrons (or use the 2n2 exclusion rule).

Question Number. 8. An oxygen molecule is made up of.
Option A. two oxygen atoms sharing neutrons.
Option B. two oxygen atoms sharing protons.
Option C. two oxygen atoms sharing electrons.
Correct Answer is. two oxygen atoms sharing electrons.
Explanation. NIL.

Question Number. 9. If electrons are added to an atom it becomes.
Option A. a neutral ion.
Option B. a positive ion.
Option C. a negative ion.
Correct Answer is. a negative ion.
Explanation. NIL.

Question Number. 10. An element whose atoms have fewer than 4 electrons in their valency shell are.
Option A. semiconductors.
Option B. good insulators.
Option C. good conductors.
Correct Answer is. good conductors.
Explanation. The further away from a 'complete' shell the better a conductor it is.

Question Number. 11. The charge on a proton is.
Option A. positive.
Option B. negative.

Option C. neutral.
Correct Answer is. positive.
Explanation. NIL.

Question Number. 12. What effect do the electrons of one atom have upon the electrons of another atom?
Option A. They have no effect on each other.
Option B. They repel each other.
Option C. They attract each other.
Correct Answer is. They repel each other.
Explanation. NIL.

Question Number. 13. What is a molecule?
Option A. The smallest part of an atom.
Option B. The smallest part of a compound.
Option C. The smallest part of an electron.
Correct Answer is. The smallest part of a compound.
Explanation. NIL.

Question Number. 14. An atom is.
Option A. the smallest part of an element that retains its characteristics.
Option B. the smallest part of a compound that can exist independently.
Option C. the smallest particle of matter.
Correct Answer is. the smallest part of an element that retains its characteristics.
Explanation. NIL.

Question Number. 15. A neutron is a particle which is.
Option A. is contained in the nucleus of all atoms.
Option B. orbits the nucleus of the atom.
Option C. is contained within the nucleus of most atoms.
Correct Answer is. is contained within the nucleus of most atoms.
Explanation. Most atoms' because hydrogen has no neutron.

Question Number. 16. The mass of an atom is contained mainly in the.
Option A. proton.
Option B. nucleus.
Option C. electron.
Correct Answer is. nucleus.
Explanation. The proton and the neutron are approximately the same mass (neutron very slightly heavier). The electron is just under 1/2000th of a proton or neutron.

Question Number. 17. When an atom loses or gains an electron it is called.

Option A. a molecule.
Option B. a current.
Option C. an ion.
Correct Answer is. an ion.
Explanation. NIL.

Question Number. 18. A good electrical insulator is a material which.
Option A. contains a large number of positive ions.
Option B. has its electrons tightly bound to their parent atoms.
Option C. has more protons than electrons.
Correct Answer is. has its electrons tightly bound to their parent atoms.
Explanation. NIL.

Question Number. 19. An electric current is.
Option A. an ordered flow of electrons.
Option B. a surplus of free electron.
Option C. an excitement of electrons in a metal.
Correct Answer is. an ordered flow of electrons.
Explanation. NIL.

Question Number. 20. An atom contains.
Option A. hydrogen.
Option B. molecules.
Option C. electrons.
Correct Answer is. electrons.
Explanation. NIL.

Question Number. 21. Germanium and silicon have how many electrons in their outer shell?
Option A. 6.
Option B. 4.
Option C. 2.
Correct Answer is. 4.
Explanation. All semiconductors (including carbon) has 4 electrons in their outer shell.

Question Number. 22. If a free electron is given to another atom, that atom is a.
Option A. valency atom.
Option B. negative ion.
Option C. positive ion.
Correct Answer is. negative ion.
Explanation. That atom will be negatively charged due to the additional electron.

Question Number. 23. The atomic number of an atom is determined by the number of.
Option A. protons.
Option B. electrons.
Option C. neutrons.
Correct Answer is. protons.
Explanation. Atomic number = number of protons. Mass number = number of protons + neutrons.

Question Number. 24. The valence electron is.
Option A. the electron in outer shell of atom.
Option B. the electron in inner shell of atom.
Option C. a positive electron.
Correct Answer is. the electron in outer shell of atom.
Explanation. The valence electrons is/are in the outer shell.

Question Number. 25. An atom with a deficiency in electrons has.
Option A. low resistance.
Option B. high resistance.
Option C. high impedance.
Correct Answer is. low resistance.
Explanation. An atom with a deficiency of electrons will be positively charged and able to accept electrons freely. Module 4 theory of holes as majority carriers.

Question Number. 26. An atom with less than 4 electrons in its outer shell has.
Option A. low electrical resistance.
Option B. no electrical resistance.
Option C. high electrical resistance.
Correct Answer is. low electrical resistance.
Explanation. Low electrical resistance, i.e. a good conductor.

Question Number. 27. Elements such as phosphorus with 5 electrons in their outer shell, when combined with pure silicon, is a.
Option A. isotopic.
Option B. acceptor.
Option C. donor.
Correct Answer is. donor.
Explanation. Phosphorus 'donates' an electron to the silicon crystal structure.

Question Number. 28. An hydrogen atom consist of a.
Option A. Proton, Neutron and an Electron.

Option B. Proton and an Electron only.
Option C. Neutron and a proton only.
Correct Answer is. Proton and an Electron only.
Explanation. Hydrogen has no Neutron.

Question Number. 29. For an atom to become a negative ion it must.
Option A. gain at least one electron.
Option B. have undergone ionization by the sun.
Option C. lose at least one electron.
Correct Answer is. gain at least one electron.
Explanation. Gaining at least one electron produces a negative ion.

Question Number. 30. What is the maximum number of electrons in shell M of an atom?
Option A. 18.
Option B. 6.
Option C. 16.
Correct Answer is. 18.
Explanation. Use Pauli's exclusion formula. M is the 3rd shell (n=3). 2*3*3 = 18.

Question Number. 31. A neutral atom with an atomic no. of 3 has how many electrons?
Option A. 1.
Option B. 3.
Option C. Dependent on type of atom.
Correct Answer is. 3.
Explanation. Atomic number = number of protons = number of electrons.

Question Number. 32. The nucleus of an atom is.
Option A. neutral.
Option B. positive charged.
Option C. negative charged.
Correct Answer is. positive charged.
Explanation. Nucleus is positively charged.

Question Number. 33. Electron orbits are called.
Option A. waves.
Option B. shells.
Option C. valences.
Correct Answer is. shells.
Explanation. shells, or energy levels.

Question Number. 34. A neutral atom gains electrons.
Option A. It gains a positive charge.
Option B. It gains a negative charge.
Option C. It remains neutral.
Correct Answer is. It gains a negative charge.
Explanation. NIL.

Question Number. 35. An oxygen atom has.
Option A. protons and electrons.
Option B. neutrons and protons.
Option C. protons, neutrons and electrons.
Correct Answer is. protons, neutrons and electrons.
Explanation. Jepperson, A+P Technician General Handbook, Chapter 2 Matter and Energy.

02. Static Electricity and Conduction.

Question Number. 1. A semi-conductor will have.
Option A. two electrons in the outer shell.
Option B. four electrons in the outer shell.
Option C. eight electrons in the outer shell.
Correct Answer is. four electrons in the outer shell.
Explanation. NIL.

Question Number. 2. Ion current is found in.
Option A. conductors and semi-conductors.
Option B. liquids and gasses.
Option C. semi-conductors.
Correct Answer is. liquids and gasses.
Explanation. NIL.

Question Number. 3. Electricity conducts through.
Option A. vacuum.
Option B. solids and liquids only.
Option C. solids only.
Correct Answer is. solids and liquids only.
Explanation. Electricity can conduct through a vacuum by thermionic emission.

Question Number. 4. An example of a good electrical insulator is.
Option A. aluminum.
Option B. glass.
Option C. mercury.

Correct Answer is. glass.
Explanation. You MUST know that surely!.

Question Number. 5. Static charges remaining in an aircraft are dissipated by.
Option A. earthling the aircraft as soon as possible.
Option B. the use of a conducting type nose wheel.
Option C. bonding the aircraft to a refuel tanker.
Correct Answer is. the use of a conducting type nose wheel.
Explanation. Usually, the nose wheel tire contains graphite, to dissipate the static electricity on landing.

Question Number. 6. An element could be considered to be a conductor if it has.
Option A. a small number of electrons in its outer orbit.
Option B. a large number of electrons in its outer orbit.
Option C. a large number of electrons.
Correct Answer is. a small number of electrons in its outer orbit.
Explanation. The lower the number of electrons in the outer shell, the more readily it will give them up.

Question Number. 7. A charged body is said to have.
Option A. a surplus or deficiency of electrons.
Option B. a deficiency of neutrons.
Option C. a surplus of protons.
Correct Answer is. a surplus or deficiency of electrons.
Explanation. If it has a surplus of electrons it is negatively charged. A deficiency of electrons makes it positively charged.

Question Number. 8. The risk of a fire due to static electricity is overcome.
Option A. by connecting all metal components by bonding.
Option B. by fitting static wicks and isolating the battery from inflammable gas sources.
Option C. by fitting static wicks and insulating all metal components.
Correct Answer is. by connecting all metal components by bonding.
Explanation. NIL.

Question Number. 9. The purpose of bonding is to.
Option A. ensure all components have been securely fitted.
Option B. stop different potentials developing with subsequent fire risks.
Option C. give generated static an easy return path to the generator.
Correct Answer is. stop different potentials developing with subsequent fire risks.
Explanation. NIL.

Question Number. 10. The various parts of an aircraft airframe are maintained at the same potential by.
Option A. the supply bus-bars.
Option B. bonding.
Option C. static discharge wicks.
Correct Answer is. bonding.
Explanation. NIL.

Question Number. 11. The resistance of the current return path through the aircraft is always considered negligible, provided the.
Option A. structure is adequately bonded.
Option B. voltage drop across the circuit is checked.
Option C. generator is properly grounded.
Correct Answer is. structure is adequately bonded.
Explanation. NIL.

Question Number. 12. If an insulated conductor is placed near to a negatively charged rod, the nearest end of the conductor becomes.
Option A. No change will occur.
Option B. negatively charged.
Option C. positively charged.
Correct Answer is. positively charged.
Explanation. The free electrons in the conductor will be repelled away from the rod, leaving that end positively charged.

Question Number. 13. The electromagnetic force between two charged bodies is.
Option A. inversely proportional to the distance between them.
Option B. inversely proportional to the square of the distance between them.
Option C. proportional to the distance between them.
Correct Answer is. inversely proportional to the square of the distance between them.
Explanation. NIL.

Question Number. 14. If a negatively charged conductor is placed next to an insulated rod.
Option A. the rod becomes negatively charged.
Option B. the rod has no charge.
Option C. the rod becomes positively charged.
Correct Answer is. the rod becomes positively charged.
Explanation. The negative charges on the rod are repelled by the charged conductor (regardless of its insulation).

03. Electrical Terminology.

Question Number. 1. If a photon radiating into an electronic device causes the production of an electron/hole pair, the device is known as a.
Option A. light emitting diode.
Option B. laser diode.
Option C. photodiode.
Correct Answer is. photodiode.
Explanation. NIL.

Question Number. 2. Faraday's Law States that.
Option A. the magnitude of the EMF is indirectly proportional to the rate of change of flux.
Option B. the magnitude of the EMF is directly proportional to the magnetic flux.
Option C. the magnitude of the EMF is directly proportional to the rate of change of flux.
Correct Answer is. the magnitude of the EMF is directly proportional to the rate of change of flux.
Explanation. NIL.

Question Number. 3. Which of the following is 1 Amp?
Option A. 1000 mA.
Option B. 1000 kA.
Option C. 1000 μA.
Correct Answer is. 1000 mA.
Explanation. NIL.

Question Number. 4. The term that describes the combined resistive forces in an AC circuit is.
Option A. resistance.
Option B. total resistance.
Option C. impedance.
Correct Answer is. impedance.
Explanation. NIL.

Question Number. 5. Ohm's law states that:.
Option A. emf. = current divided by resistance.
Option B. current = emf. divided by resistance.
Option C. resistance = current divided by emf.
Correct Answer is. current = emf. divided by resistance.
Explanation. NIL.

Question Number. 6. EMF in an electric circuit corresponds to what in a magnetic circuit.
Option A. MMF.
Option B. reluctance.
Option C. flux.
Correct Answer is. MMF.
Explanation. NIL.

Question Number. 7. In conventional current flow, what is Fleming's right hand rule used for?
Option A. Generators.
Option B. Motors.
Option C. Inductors.
Correct Answer is. Generators.
Explanation. NIL.

Question Number. 8. The SI unit of work is.
Option A. Kilogram meters-force.
Option B. Joules per meter.
Option C. Joules per second (Watts).
Correct Answer is. Kilogram meters-force.
Explanation. Work is measured in joules, which is Newton/meters or kilogram/meters force (since Newton’s are kilograms force).

Question Number. 9. A coulomb is.
Option A. one ampere * second.
Option B. one second per ampere.
Option C. one ampere per second.
Correct Answer is. one ampere * second.
Explanation. Current (amps) = charge (coulombs) per second. You do the transposition.

Question Number. 10. An electric current is a flow of.
Option A. electrons from a positively charged area to a negatively charged area.
Option B. electrons from a negatively charged area to a positively charged area.
Option C. protons from a positively charged area to a negatively charged area.
Correct Answer is. protons from a positively charged area to a negatively charged area. OR electrons from a negatively charged area to a positively charged area.
Explanation. Electrons flow from negative to positive.

Question Number. 11. A volt can be considered to be a.
Option A. unit of electrical power.

Option B. quantity of electrical energy.
Option C. unit of electrical pressure.
Correct Answer is. unit of electrical pressure.
Explanation. Electrical pressure' is sometimes used instead of voltage, due to its analogy to a head of pressure in fluids.

Question Number. 12. What is 3.25 volts in millivolts?
Option A. 3,250 millivolts.
Option B. 325,000 millivolts.
Option C. 3.25 millivolts.
Correct Answer is. 3,250 millivolts.
Explanation. NIL.

Question Number. 13. Electromotive force is measured in.
Option A. Watts.
Option B. Ohms.
Option C. Volts.
Correct Answer is. Volts.
Explanation. EMF is another term for voltage, or potential difference (PD) or electrical pressure, all measured in Volts.

Question Number. 14. Kirchhoff's law states.
Option A. the algebraic sum of all the voltages entering or leaving a series of components will be equal to zero.
Option B. the inverse sum of all the voltages entering or leaving a series of components will be equal to one.
Option C. the algebraic sum of all the currents entering or leaving a series of components will be equal to one.
Correct Answer is. the algebraic sum of all the currents entering or leaving a series of components will be equal to one. OR the algebraic sum of all the voltages entering or eaving a series of components will be equal to zero.
Explanation. NIL.

Question Number. 15. The basis for transformer operation in the use of alternating current is mutual.
Option A. inductance.
Option B. capacitance.
Option C. reactance.
Correct Answer is. inductance.
Explanation. NIL.

Question Number. 16. When two coils are linked by a common flux, a voltage can be induced in one by a changing current in the other. This process is known as.
Option A. self induction.
Option B. the magnetic effect.
Option C. mutual induction.
Correct Answer is. mutual induction.
Explanation. NIL.

Question Number. 17. When an electrical supply becomes 'open-circuit'.
Option A. the fuse or circuit breaker should isolate the circuit due to the increased current drawn.
Option B. the loss of continuity will prevent its component from functioning.
Option C. the component will operate normally but will not switch off.
Correct Answer is. the loss of continuity will prevent its component from functioning.
Explanation. Open circuit means 'no continuity'. Function stops.

Question Number. 18. The S.I. unit of magnetic flux density is the.
Option A. Henry.
Option B. Weber.
Option C. Tesla.
Correct Answer is. Tesla.
Explanation. NIL.

Question Number. 19. A 1µF capacitor is equivalent to.
Option A. 1,000,000 Farads.
Option B. 0.000,001 Farads.
Option C. 0.001 Farads.
Correct Answer is. 0.000,001 Farads.
Explanation. NIL.

Question Number. 20. The opposition offered by a coil to the flow of alternating current is called (disregarding resistance).
Option A. inductive reactance.
Option B. impedance.
Option C. reluctance.
Correct Answer is. inductive reactance.
Explanation. NIL.

Question Number. 21. A shunt is used with.
Option A. an ammeter.
Option B. a voltmeter.

Option C. an ohmmeter.
Correct Answer is. an ammeter.
Explanation. A shunt is used to change the working range of an ammeter, by 'shunting' around the ammeter, a major portion of the current being measured.

Question Number. 22. If a load in series has a current passing through it, the magnetic field can be worked out by using.
Option A. the corkscrew rule.
Option B. left hand rule.
Option C. right hand rule.
Correct Answer is. the corkscrew rule.
Explanation. NIL.

Question Number. 23. The unit for power is.
Option A. Joules per second.
Option B. N/m.
Option C. Volts/Amps.
Correct Answer is. Joules per second.
Explanation. Power = energy (joules) / time (seconds).

Question Number. 24. In conventional flow, the left hand rule applies to.
Option A. generators.
Option B. batteries.
Option C. motors.
Correct Answer is. motors.
Explanation. Remember MG - the British car manufacturers (MG left to right) - or remember gene RIGHT er.

Question Number. 25. When a conductor is cut by magnetic lines of force an EMF is induced. This is.
Option A. Lenz's Law.
Option B. Faraday's Law.
Option C. Kirchhoff's Law.
Correct Answer is. Faraday's Law.
Explanation. NIL.

Question Number. 26. The Watt can be expressed as.
Option A. Seconds per Joule.
Option B. Joules * seconds.
Option C. Joules per second.
Correct Answer is. Joules per second.
Explanation. Power = Energy(J) / Time(s).

Question Number. 28. To determine the direction of the magnetic field around a conductor you would use.
Option A. Fleming's right hand rule.
Option B. Fleming's left hand rule.
Option C. the corkscrew rule.
Correct Answer is. the corkscrew rule.
Explanation. NIL.

Question Number. 29. Switching on or off the current in one coil produces an emf in another coil adjacent to it. The two coils are said to have.
Option A. self-inductance.
Option B. auto inductance.
Option C. mutual inductance.
Correct Answer is. mutual inductance.
Explanation. NIL.

Question Number. 30. Self-induced emf in a coil supplied with a current varying at a uniform rate can be found by.
Option A. -L dØ / dt
Option B. -N dI / dt
Option C. -L dI / dt
Correct Answer is. -L dI / dt.
Explanation. NIL.

Question Number. 31. The property of a material to accept lines of flux is called.
Option A. retentivity.
Option B. reluctance.
Option C. permeability.
Correct Answer is. permeability.
Explanation. NIL.

Question Number. 32. Magneto motive force can be found by.
Option A. I * N.
Option B. Blv.
Option C. N/I.
Correct Answer is. I * N.
Explanation. MMF (symbol H) = amps * turns (units are ampere turns).

Question Number. 33. When a conductor is cut by magnetic lines of force an EMF is induced. This is.

Option A. Kirchhoff’s Law.
Option B. Faraday's Law.
Option C. Lenz's Law.
Correct Answer is. Faraday's Law.
Explanation. Faraday's Law is induced EMF is directly proportional to the rate of change of flux.

Question Number. 34. The direction of induced conventional current in a wire rotating in a magnetic field can be determined by.
Option A. cork screw rule.
Option B. Fleming's right hand rule.
Option C. Fleming's left hand rule.
Correct Answer is. Fleming's right hand rule.
Explanation. NIL.

Question Number. 35. How would you find the direction of the electron flow in an armature located in a magnetic field?
Option A. Flemings left hand rule.
Option B. Flemings right hand rule.
Option C. Maxwell’s corkscrew rule.
Correct Answer is. Flemings left hand rule.
Explanation. Assuming conventional current flow.

Question Number. 36. What is the SI unit of conductance?
Option A. Ohm.
Option B. Siemen.
Option C. Ohm-meter.
Correct Answer is. Siemen.
Explanation. Conductance is 1/R and is measured in Siemens.

Question Number. 37. What is the SI unit of resistivity?
Option A. Ohms.
Option B. Ohm meter.
Option C. Ohms/meter.
Correct Answer is. Ohm meter.
Explanation. Resistivity is ohm meter (transpose the resistance formula $R = \rho L / A$, and see what units it gives).

Question Number. 38. What is the formula for conductance? (R=Resistance).
Option A. R + 1.
Option B. 1/R.
Option C. 1-R.

Correct Answer is. 1/R.
Explanation. Conductance is the inverse of resistance.

Question Number. 39. In electrical circuit, Direct Current power is represented by the.
Option A. Ampere.
Option B. Watt.
Option C. Joule.
Correct Answer is. Watt.
Explanation. DC power is measured in Watts.

Question Number. 40. In S.I. units, work is denoted by.
Option A. Newton-meter which is Joules.
Option B. Joules/sec which is Watts.
Option C. Kilogram-force-meter/sec which is Metric Horsepower.
Correct Answer is. Newton-meter which is Joules.
Explanation. Work has the same unit as energy, i.e. Nm or Joule.

Question Number. 41. The unit of energy is the.
Option A. Joule.
Option B. Watt.
Option C. Coulomb.
Correct Answer is. Joule.
Explanation. Energy is measured in Joules.

Question Number. 42. Potential difference is another term for.
Option A. voltage.
Option B. charge.
Option C. energy.
Correct Answer is. voltage.
Explanation. Potential difference, electromotive force, electrical pressure, are all terms for voltage.

Question Number. 43. XL is the symbol of.
Option A. inductive reactance.
Option B. capacitive reactance.
Option C. impedance.
Correct Answer is. inductive reactance.
Explanation. 'L' is for inductance, 'X' is for reactance.

Question Number. 44. Using Ohm's law.
Option A. current is directly proportional to the resistance.

Option B. current is directly proportional to the EMF.
Option C. resistance is directly proportional to EMF.
Correct Answer is. current is directly proportional to the EMF.
Explanation. NIL.

Question Number. 45. One volt is induced into a circuit with a current varying at 1 amp per second. The circuit has.
Option A. 1 ampere turn.
Option B. 1 Tesla.
Option C. 1 Henry.
Correct Answer is. 1 Henry.
Explanation. 1 Henry = 1 Volt per Amp per Second.

Question Number. 46. The property of a conductor of electricity that limits or restricts the flow of electric current is.
Option A. limiter.
Option B. resistance.
Option C. fuse.
Correct Answer is. resistance.
Explanation. Aircraft Electricity and Electronics by Eismin, Chapter 6, pg 101.

Question Number. 47. Kirchhoff's law is applicable to.
Option A. parallel networks.
Option B. series networks.
Option C. closed loop networks.
Correct Answer is. closed loop networks.
Explanation. NIL.

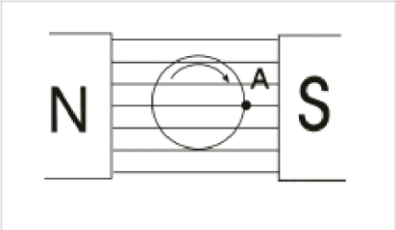
Question Number. 48. The SI unit of work is the.
Option A. Watt.
Option B. Newton Meter.
Option C. Joule.
Correct Answer is. Joule.
Explanation.

Question Number. 49. The EMF of a generator can be calculated from which law?
Option A. Faraday's law.
Option B. Kirchhoff's law.
Option C. Lenz's law.
Correct Answer is. Faraday's law.
Explanation. http://hyperphysics.phy-astr.gsu.edu/hbase/electric/farlaw.html

04. Generation of Electricity.

Question Number. 1. Thermocouple harnesses are made from the same materials as the thermocouple so that.
Option A. mini junctions are not formed.
Option B. the resistance is not increased beyond limits.
Option C. they will not corrode.
Correct Answer is. mini junctions are not formed.
Explanation. NIL.

Question Number. 2. Point A on the armature of the generator shown is producing.



Option A. minimum current.
Option B. zero current.
Option C. maximum current.
Correct Answer is. maximum current.
Explanation. NIL.

Question Number. 3. A piezoelectric device generates electricity through.
Option A. friction.
Option B. light.
Option C. pressure.
Correct Answer is. pressure.
Explanation. NIL.

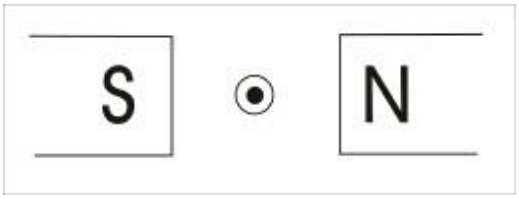
Question Number. 4. A photozoidal cell produces electricity when subjected to.
Option A. light.
Option B. pressure.
Option C. heat.
Correct Answer is. light.
Explanation. NIL.

Question Number. 5. A thermocouple indicator is basically a type of.
Option A. millivolt meter.
Option B. millivolt meter.
Option C. milliohm meter.
Correct Answer is. Millivolt meter.
Explanation. NIL.

Question Number. 6. A light/heat sensitive cell is a.
Option A. transistor.

Option B. diode.
Option C. transducer.
Correct Answer is. transducer.
Explanation. Any transducer turns one energy type into another energy type. In this case light or heat into electricity.

Question Number. 7. The diagram shows a current carrying conductor (A) in a magnetic field. The conductor will move.
Option A. upwards.
Option B. sideways.
Option C. downwards.
Correct Answer is. downwards.
Explanation. NIL.



Question Number. 8. A component that produces an output voltage due to incident light is called a.
Option A. liquid crystal.
Option B. solar cell.
Option C. light emitting diode.
Correct Answer is. solar cell.
Explanation. NIL.

Question Number. 9. The flux density of a magnetic field is 1.5T. The length of the conductor in the field is 2 m and the speed of the conductor is 10 m/s. The EMF induced is.
Option A. 0.3 V.
Option B. 7.5 V.
Option C. 30 V.
Correct Answer is. 30 V.
Explanation. EMF = Blv = 1.5 * 2 * 10 = 30V.

Question Number. 10. A conductor is placed in a magnetized coil. What will happen?
Option A. Nothing will happen unless the conductor is moved.
Option B. The conductor will move.
Option C. A force will be created.
Correct Answer is. Nothing will happen unless the conductor is moved.
Explanation. Faraday's Law.

uestion Number. 11. The maximum output voltage from a basic single loop generator is when the loop is.
Option A. rotating anti-clockwise relative to the direction of the magnetic flux.

Option B. cutting maximum lines of magnetic flux.
Option C. at 45o to the magnetic flux.
Correct Answer is. cutting maximum lines of magnetic flux.
Explanation. Aircraft Electricity and Electronics Eismin Page 83.

05. DC Sources of Electricity.

Question Number. 1. A 20 cell battery with each cell having an internal resistance of 0.1 ohms is charged with 2 leads having a total resistance of 0.1 ohms. The battery is charged with a current of 5 amps. What is the charging voltage ?
Option A. 0.5 volts.
Option B. 10.5 volts.
Option C. 0.005 volts.
Correct Answer is. 10.5 volts.
Explanation. Total battery internal resistance = 0.1 * 20 = 2 ohms, Total circuit resistance, including leads = 2 + 0.1 = 2.1 ohms, V = I * R = 5A * 2.1 ohms = 10.5V.

Question Number. 2. Two 10V, 20 Ah batteries are connected in parallel and connected across a 10 ohm load. How long could they supply normal current before the voltage begins to decay?
Option A. 40 hours.
Option B. 20 hours.
Option C. 4 hours.
Correct Answer is. 40 hours.
Explanation. Use Ohms law to work out the current (1A). Two batteries in parallel then rating is doubled (40 Ah).

Question Number. 3. A battery rated at 40 Ah will supply 200 mA for.
Option A. 200 hours.
Option B. 20 hours.
Option C. 5 hours.
Correct Answer is. 200 hours.
Explanation. 200 mA = 0.2 A. 40 Ah / 0.2 A = 200 hours.

Question Number. 4. A zinc-carbon battery life depends upon.
Option A. the amount of zinc.
Option B. the purity of the carbon rod.
Option C. the amount of the electrolyte paste.
Correct Answer is. the amount of zinc.
Explanation. The zinc is slowly eaten away in a zinc carbon battery (primary cell).

Question Number. 5. When checking the SG of the electrolyte in a lead acid battery, you should.
Option A. check any cell because they will all be the same.
Option B. check only the no. 1 cell because it is the master cell.
Option C. check all cells because they may be different.
Correct Answer is. check all cells because they may be different.
Explanation. NIL.

Question Number. 6. The PD at the terminals of an open circuit battery with a small internal resistance will be.
Option A. more than the EMF.
Option B. less than the EMF.
Option C. the same as the EMF.
Correct Answer is. the same as the EMF.
Explanation. EMF is the battery voltage (i.e. that which is written on the side of it) and the PD is the actual terminal voltage. If it is open circuit, no current flows to drop a voltage across the internal resistance so they are the same.

Question Number. 7. An accumulation of hydrogen on the plates of a battery is known as.
Option A. polarization.
Option B. ionization.
Option C. hydration.
Correct Answer is. polarization.
Explanation. NIL.

Question Number. 8. What part of a battery is covered in hydrogen during polarization?
Option A. Anode.
Option B. Both the anode and the cathode.
Option C. Cathode.
Correct Answer is. Anode.
Explanation. NIL.

Question Number. 9. Which of the following is most likely to cause thermal runaway in a nickel-cadmium battery?
Option A. A high internal resistance condition.
Option B. High current charging of the battery to more than 100 percent of its capacity.
Option C. Excessive current draw from the battery.

Correct Answer is. High current charging of the battery to more than 100 percent of its capacity.
Explanation. Thermal runaway usually occurs on charging.

Question Number.10. The method of ascertaining the voltage of a standard aircraft lead-acid battery is by checking.
Option A. the voltage with rated load switched ON.
Option B. the voltage on open circuit.
Option C. the voltage off load.
Correct Answer is. the voltage off load.
Explanation. If just checking the voltage (as opposed to a charge test) then the battery must be off load to prevent the internal resistance dropping the terminal voltage.

Question Number. 11. Two batteries 12V and 40 Ah each, are in series. What is the total capacity?
Option A. 12V 80 Ah.
Option B. 24V 40 Ah.
Option C. 24V 80Ah.
Correct Answer is. 24V 40 Ah.
Explanation. Batteries in series - voltage increases but capacity remains the same (vice versa if they were in parallel).

Question Number. 12. If a battery has got low internal resistance, then the.
Option A. no load voltage will be the same as on load voltage.
Option B. on load voltage will be greater than no load voltage.
Option C. no load voltage will be greater than on load voltage.
Correct Answer is. no load voltage will be greater than on load voltage.
Explanation. The internal resistance will always drop the voltage and reduce the terminal voltage. It is the same whether it is high or low internal resistance - just a matter of 'how much'.

Question Number. 13. Conventional current flow inside a battery is from.
Option A. either anode to cathode or cathode to anode, depending on the active elements.
Option B. cathode to anode.
Option C. anode to cathode.
Correct Answer is. anode to cathode.
Explanation. The cathode is positive. Conventional current flows from positive to negative on the external circuit, but to close the circuit must flow negative to positive INSIDE the battery.

Question Number. 14. In a voltaic cell, what is the build-up on the cathode called?
Option A. Hydration.
Option B. Polarization.
Option C. Sulphation.
Correct Answer is. Sulphation.
Explanation. Polarization is build-up of hydrogen on the ANODE. Sulphation however, is build-up of lead-sulphate on BOTH anode and cathode.

Question Number. 15. Two 12V 40 amp hour batteries connected in parallel will produce.
Option A. 24V 80 ah.
Option B. 12V 80 ah.
Option C. 24V 40 ah.
Correct Answer is. 12V 80 ah.
Explanation. NIL.

Question Number. 16. A 24-volt source is required to furnish 48 watts to a parallel circuit consisting of four resistors of equal value. What is the voltage drop across each resistor?
Option A. 12 volts.
Option B. 24 volts.
Option C. 3 volts.
Correct Answer is. 24 volts.
Explanation. Resistors ion parallel, voltage across each one is the same and equal to the source voltage (if nothing else is in series with them).

Question Number. 17. The method of ascertaining the voltage of a standard aircraft lead-acid battery is by checking.
Option A. the voltage on open circuit.
Option B. the voltage off load.
Option C. the voltage with rated load switched ON.
Correct Answer is. the voltage off load.
Explanation. Assuming it is just a voltage check (and not a charge test) then it must be off load when carrying out the test. Otherwise the internal resistance will drop the voltage by an amount which varies according to the external load.

Question Number. 18. Two similar 12v batteries connected in parallel will produce.
Option A. 24v emf with the same capacity as each battery.
Option B. 12V emf with twice the capacity of each battery.
Option C. 24V emf with twice the capacity of each battery
Correct Answer is. 12V emf with twice the capacity of each battery.

Explanation. Batteries in parallel - voltage remains the same but the current rating is increased.

Question Number.19. The voltage of a secondary cell is.
Option A. determined by the active materials on the plates.
Option B. determined by the number of plates.
Option C. determined by the area of the plates.
Correct Answer is. determined by the active materials on the plates.
Explanation. Voltage of a battery is determined by what the plates are made from, and how many plates are in series. However, a 'cell' is not a battery and can only ever have two plates.

Question Number. 20. What is the ampere-hour rating of a storage battery that is designed to deliver 45 amperes for 2.5 hours?
Option A. 112.5 ampere-hour.
Option B. 90.0 ampere-hour.
Option C. 45.0 ampere-hour.
Correct Answer is. 112.5 ampere-hour.
Explanation. Ampere/ hours means amps * hours.

Question Number. 21. If a NiCad battery is not to be used immediately it should be stored.
Option A. dry.
Option B. fully charged.
Option C. fully dissipated.
Correct Answer is. fully dissipated.
Explanation. Ni-cad batteries must be stored fully discharged. Often with a metal bar across their terminals to ensure they are fully dissipated.

Question Number. 22. In a mercury cell the steel casing is.
Option A. the negative terminal.
Option B. neither.
Option C. the positive terminal.
Correct Answer is. the positive terminal.
Explanation. The 'outer can' is in contact with the zinc anode, which is positive.

Question Number. 23. To improve the life of a dry cell it would be manufactured with.
Option A. more electrolyte paste.
Option B. more zinc.
Option C. a pure carbon positive rod.
Correct Answer is. more zinc.

Explanation. The zinc (negative electrode or cathode) gets eaten away.

Question Number. 24. In a simple voltaic cell the collection of ions on the cathode causes.
Option A. polarization.
Option B. Sulphation.
Option C. hydration.
Correct Answer is. Sulphation.
Explanation. The formation of lead sulphate on both plates of a lead acid battery is called SULPHATION.

Question Number. 25. The electrolyte in a NiCad battery would rise if the battery was.
Option A. remaining at constant voltage.
Option B. charging.
Option C. discharging.
Correct Answer is. charging.
Explanation. The physical level of electrolyte drops a as Ni-Cad battery discharges.

Question Number. 26. Two 2 volt 10AH cells are connected in series, the output voltage and the capacity would be.
Option A. 4 volt 10 AH.
Option B. 4 volt 20 AH.
Option C. 2 volt, 20 AH.
Correct Answer is. 4 volt 10 AH.
Explanation. Batteries in series - voltage doubles, but the rating stays the same.

Question Number. 27. The electrolyte in a NiCad battery is.
Option A. potassium hydroxide.
Option B. nickel hydroxide.
Option C. cadmium hydroxide.
Correct Answer is. potassium hydroxide.
Explanation. NIL.

Question Number. 28. In a leclanche cell the plates are made of.
Option A. mercury and lithium.
Option B. nickel and cadmium.
Option C. zinc and carbon.
Correct Answer is. zinc and carbon.
Explanation. NIL.

Question Number. 29. In a simple voltaic cell, polarization reduces output voltage because of the.
Option A.build up of hydrogen on the cathode.
Option B. transfer of material between the anode and the cathode.
Option C. build up of hydrogen on the anode.
Correct Answer is. build up of hydrogen on the anode.
Explanation. NIL.

Question Number. 30. When the temperature of the electrolyte in a battery increases, the SG.
Option A. remains the same.
Option B. goes up.
Option C. goes down.
Correct Answer is. goes down.
Explanation. Volume rises with temperature, but mass does not. SG is a measure of the electrolyte density (which is mass / volume).

Question Number. 31. The Daniel Cell electrodes are.
Option A. copper and zinc.
Option B. carbon and zinc.
Option C. zinc and manganese dioxide.
Correct Answer is. copper and zinc.
Explanation. The Daniel Cell was an improvement on the first ever cell made by Voltaire. Both used copper and zinc electrodes.

Question Number. 32. In a thermocouple, where is voltage measured?
Option A. At both junctions.
Option B. At the hot junction.
Option C. At the cold junction.
Correct Answer is. At the cold junction.
Explanation. The voltmeter measures the voltmeter across the cold junction of a thermocouple.

Question Number. 33. Mercury cells are covered with a metal cover.
Option A. as a protective cover.
Option B. as a negative terminal.
Option C. as a positive terminal.
Correct Answer is. as a positive terminal.
Explanation. The outer cover (or case) of a mercury cell is the positive terminal - Have a look at your watch or calculator battery to verify.

Question Number. 34. The capacity of a battery is measured in.

Option A. volts.
Option B. ampere-hours.
Option C. cubic centimeters.
Correct Answer is. ampere-hours.
Explanation. Battery capacity is in ampere hours.

Question Number. 35. A battery's internal resistance is determined by (OCV = Open Circuit Voltage, CCV = Closed Circuit Voltage).
Option A. IR = (OCV – CCV)/ i.
Option B. IR = (OCV + CCV) / i.
Option C. IR = (OCV - CCV) / V.
Correct Answer is. IR = (OCV – CCV)/ i.
Explanation. Internal resistance (IR) has no effect on output voltage when Open Circuit. So Open Circuit Voltage (ocv) is higher than Closed Circuit Voltage (ccv). Using ohm's law (R=V/I), IR = (ocv) - ccv) all divided by current.

Question Number. 36. There are more negative than positive plates in a lead acid battery because.
Option A. it is necessary for chemical action to take place.
Option B. it reduces the internal resistance of the cell.
Option C. the positive plates are prone to warping if the chemical action is taking place only on one side.
Correct Answer is. the positive plates are prone to warping if the chemical action is taking place only on one side.
Explanation. A lead acid battery normally has one more negative plate than positive plate because the positive plates are prone to warping if the chemical action is taking place only on one side.

Question Number. 37. What is the approximate internal resistance of a Leclanche cell?
Option A. 0.02 ohms - 4 ohms.
Option B. 6 ohms - 10 ohms.
Option C. 20 ohms - 30 ohms.
Correct Answer is. 0.02 ohms - 4 ohms.
Explanation. A leclanche cell is just another name for the zinc-carbon cell. Its IR is more like 0.4 - 4 ohms. Some good info on the types of cells and their IRs at External
website…

Question Number. 38. An aircraft battery on charge from the aircraft generators causes.

Option A. battery voltage to increases to nominal voltage and the charge current decreases.
Option B. internal resistance of the battery to decrease in sympathy with the decreasing charging current.
Option C. battery voltage to decrease to zero until it is fully charged.
Correct Answer is. battery voltage to decrease to zero until it is fully charged.
Explanation. As the battery voltage increases, the current charging it decreases.

Question Number. 39. What effect does hydrogen have in a battery cell?
Option A. Sulphation.
Option B. Nothing.
Option C. Polarization.
Correct Answer is. Polarization.
Explanation. Hydrogen, if allowed to form on the anode, reduces the battery output. This is polarization.

Question Number. 40. To generate electricity with a fuel cell, you need a constant supply of.
Option A. Nitrogen & Sunlight.
Option B. Oxygen & Hydrogen.
Option C. Kerosene & Heat.
Correct Answer is. Oxygen & Hydrogen.
Explanation. http://www.fuelcells.org/whatis.htm

Question Number. 41. A ni-cad battery found to be below normal capacity should.
Option A. have its electrolyte adjusted.
Option B. be removed and used for ground use only.
Option C. be re-charged with a freshening charge.
Correct Answer is. be re-charged with a freshening charge.
Explanation. See Jespersen's Aircraft Batteries.

Question Number. 42. In cold weather, to prevent the electrolyte freezing, a battery must be kept.
Option A. fully charged.
Option B. does not matter.
Option C. fully discharged.
Correct Answer is. fully charged.
Explanation. Checkout www.amplepower.com/primer/winter/.

Question Number. 43. The internal resistance of a battery off load compared to on load is.
Option A. the same.

Option B. increased.
Option C. decreased.
Correct Answer is. the same.
Explanation. Internal resistance is constant, regardless of load.

Question Number. 44. Two 12V, 40Ah cells in series gives.
Option A. 24V 80Ah.
Option B. 12V 40Ah.
Option C. 24V 40Ah.
Correct Answer is. 24V 40Ah.
Explanation. Cells in series, voltage doubles, Amp hour rating remains the same.

Question Number. 45. A 24V 40AH battery discharges at 200mA. How long will it last?
Option A. 400 hours.
Option B. 300 hours.
Option C. 200 hours.
Correct Answer is. 200 hours.
Explanation. 200mA goes into 1A-5 times. 5 * 40 = 200 hours.

Question Number. 46. The electrolyte level of a ni-cad battery.
Option A. falls during charge.
Option B. falls during discharge.
Option C. rises during discharge.
Correct Answer is. falls during discharge.
Explanation. The electrolyte level of a NiCad battery falls during discharge (but the s.g. remains constant).

Question Number. 47. When light energies a component, what is the component?
Option A. Light emitting diode.
Option B. Photodiode.
Option C. Laser diode.
Correct Answer is. Photodiode.
Explanation. NIL.

Question Number. 48. Formation of white crystals of potassium carbonate on a properly serviced Ni-cd battery indicates.
Option A. over charged.
Option B. full charged.
Option C.under charged.
Correct Answer is. over charged.

Explanation. NIL.

Question Number. 49. Thermal runaway causes.
Option A. violent gassing only.
Option B. violent gassing, boiling of electrolyte and melting of plates and casing.
Option C. no gassing, but boiling of electrolyte and melting of plates and casing.
Correct Answer is. violent gassing, boiling of electrolyte and melting of plates and casing.
Explanation. NIL.

Question Number. 50. A primary cell.
Option A. can not recharged.
Option B. can be recharged but only a few times.
Option C. can be recharged.
Correct Answer is. can not recharged.
Explanation. NIL.

Question Number. 51. If the insulation resistance of a lead/acid battery is down, it indicates.
Option A. case leakage.
Option B. leakage between positive and negative terminals.
Option C. inter cell leakage.
Correct Answer is. case leakage.
Explanation. NIL.

Question Number. 52. When the battery is connected to the aircraft, which terminal should you connect first?
Option A. Any.
Option B. Positive.
Option C. Negative.
Correct Answer is. Positive.
Explanation. Aircraft Electricity and Electronics Eismin Page 43.

Question Number. 53. An ammeter in a battery charging system is for the purpose of indicating the.
Option A. rate of current used to charge the battery.
Option B. amperage available for use.
Option C. total amperes being used in the aero plane.
Correct Answer is. rate of current used to charge the battery.
Explanation. Whilst charging (as the question says) the ammeter shows current flow TO the battery.

Question Number. 54. For how many hours will a 140AH battery deliver 15A?
Option A. 9.33 hours.
Option B. 27.25 hours.
Option C. 15.15 hours.
Correct Answer is. 9.33 hours.
Explanation. 15 * H = 140, H = 9.33 hrs.

Question Number. 55. What part of a nickel-cadmium cell helps to prevent thermal runaway?
Option A. The separator.
Option B. The negative plate.
Option C. The positive plate.
Correct Answer is. The separator.
Explanation. Aircraft Electricity and Electronics Eismin Page 47 2nd para.

Question Number. 56. When charging current is applied to a nickel-cadmium battery, the cells emit gas only.
Option A. when the electrolyte level is low.
Option B. if the cells are defective.
Option C. toward the end of the charging cycle.
Correct Answer is. toward the end of the charging cycle.
Explanation. EEL/1-3 4.5.5.

Question Number. 57. What is the internal resistance of a battery?
Option A. The resistance measured across the two terminals.
Option B. The resistance measured when the battery is half charged.
Option C. The resistance present inside the battery while connected to a load.
Correct Answer is. The resistance present inside the battery while connected to a load.
Explanation. Aircraft Electricity and Electronics page 33.

06. DC Circuits.

Question Number. 1. A potential difference of 50 volts produces a current of 10 milli amperes through a resistance of.
Option A. 500 ohms.
Option B. 5 ohms.
Option C. 5,000 ohms.
Correct Answer is. 5,000 ohms.
Explanation. PD = 50V, I = 0.01A, R = ?, R=PD/I.

Question Number. 2. A conductor with a positive Q (charge) of 4C has 12.56 x 1018 electrons added to it. It will have a Q =.
Option A. 6.
Option B. 2.
Option C. zero.
Correct Answer is. 6.
Explanation. A charge of 1 Coulomb (C) is 6.28 * 1018. Hence 4 + 2 = 6 C.

Question Number. 3. The power dissipated by a load of known resistance connected across a known potential difference can be calculated by.
Option A. dividing the square of the potential difference by the value of the load resistance.
Option B. multiplying the square of the potential difference by the value of the load resistance.
Option C. working out the current flowing in the circuit by using ohms law and multiplying the result by the resistance.
Correct Answer is. working out the current flowing in the circuit by using ohms law and multiplying the result by the resistance. OR dividing the square of the potential difference by the value of the load resistance.
Explanation. NIL.

Question Number. 4. A current of 5A flows for 2 minutes. How many coulombs passed a point in the circuit?
Option A. 2.5.
Option B. 600.
Option C. 100.
Correct Answer is. 600.
Explanation. Q = IT, Q = 5 * 120 = 600C.

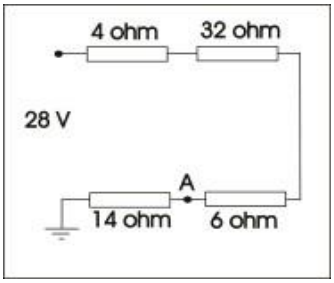
Question Number. 5. A circuit has a current flow of 6A. If the voltage is trebled, the new current will be.
Option A. 6A.
Option B. 18A.
Option C. 2A.
Correct Answer is. 18A.
Explanation. NIL.

Question Number. 6. A 10V battery supplies a resistive load of 10 ohms for 1 minute. What is the work done?
Option A. 60J.
Option B. 600J.

Option C. 10J.
Correct Answer is. 600J.
Explanation. Work out power. Then Energy = Power * Time (time must be in seconds).

Question Number. 7. A galvanometer measures.
Option A. millivolts.
Option B. megohms.
Option C. milliamps.
Correct Answer is. milliamps.
Explanation. A galvanometer measures milliamps.

Question Number. 8. The voltage at point A is.



Option A. 28 V.
Option B. 21 V.
Option C. 7 V.
Correct Answer is. 7 V.
Explanation. NIL.

Question Number. 9. A loss of electrical insulation results in.
Option A. an open circuit between the supply and earth.
Option B. a short circuit between the supply and earth.
Option C. an open circuit in the supply.
Correct Answer is. a short circuit between the supply and earth.
Explanation. NIL.

Question Number. 10. A 3, 5 and 2 ohms resistance is connected in series with a 10 V battery. The voltage across the 2 ohms resistor is.
Option A. 2 V.
Option B. 10V.
Option C. 4 V.
Correct Answer is. 2 V.
Explanation. Each resistor takes its relative share of the voltage drop. Total resistance is 10 ohms, so the 2 ohm resistor takes 2/10ths of the voltage.

Question Number. 11. What is the PD of a circuit which has a 40 mA current and a 1 kilohm resistance?
Option A. 40 V.
Option B. 400 V.
Option C. 4 V.

Correct Answer is. 40 V.
Explanation. V = I x R. mA * kohms cancel each others' prefix.

Question Number. 12. Three branches in a circuit have currents entering of 3A, 4A and 5A. A forth branch has 10 A leaving. A fifth branch must have.
Option A. 22A leaving.
Option B. 2A leaving.
Option C. 2A entering.
Correct Answer is. 2A leaving.
Explanation. Basic Kirchhoff's current law. Sum of currents entering = sum of currents leaving.

Question Number. 13. In a circuit containing three resistors of equal value connected in parallel, one resistor goes open circuit. The current in the other two resistors will.
Option A. decrease.
Option B. increase.
Option C. remain the same.
Correct Answer is. remain the same.
Explanation. NIL.

Question Number. 14. 20 amperes flow for 20 seconds. How many coulombs have flowed?
Option A. 1.
Option B. 20.
Option C. 400.
Correct Answer is. 400.
Explanation. Q = It.

Question Number. 15. If the resistance of an electrical circuit is increased.
Option A. the current will increase.
Option B. the voltage will increase.
Option C. the current will decrease.
Correct Answer is. the current will decrease.
Explanation. NIL.

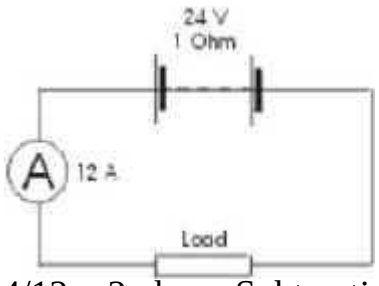
Question Number. 16. If 2 coulombs flowed through a circuit in 2 seconds, the circuit would have.
Option A. 1 amp.
Option B. 2 volts PD.
Option C. 4 amps.
Correct Answer is. 1 amp.

Explanation. Q = It so I = Q/t.

Question Number. 17. If the voltage across a resistor is doubled.
Option A. the current is doubled.
Option B. the current is halved.
Option C. the resistance is halved.
Correct Answer is. the current is doubled.
Explanation. NIL.

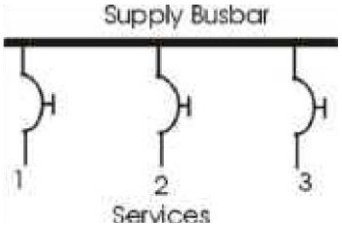
Question Number. 18. The total current flowing in a circuit of 200 lamps in parallel, each of a resistance of 400 ohm and connected across an input of 100 volts is.
Option A. 25 amps.
Option B. 50 amps.
Option C. 40 amps.
Correct Answer is. 50 amps.
Explanation. Total resistance is 400 / 200 = 2 ohms. Ohms law for current I = V/R = 100/2 = 50 amps.

Question Number. 19. In the circuit shown the 24 volt battery has an internal resistance of 1 ohm and the ammeter indicates a current of 12 amperes. The value of the load resistance is.



Option A. 2 ohms.
Option B. 1 ohm.
Option C. 6 ohms.
Correct Answer is. 1 ohm.
Explanation. Find the total resistance R = V/I = 24/12 = 2 ohms. Subtracting internal resistance leaves 1 ohm.

Question Number. 20. If service No. 1 is isolated from the supply bus bar shown there will be.



Option A. an increase in supply voltage.
Option B. a decrease in total current consumption.
Option C. a decrease in supply voltage.
Correct Answer is. a decrease in total current consumption.
Explanation. Shutting down a service on an aircraft (by pulling the circuit breaker for example), increases the total resistance and reduces the current consumption.

Question Number. 21. If the cross-sectional area of a conductor is doubled, with voltage constant, the current will.
Option A. remain constant.
Option B. double.
Option C. halve.
Correct Answer is. double.
Explanation. Get the formula for resistance of a conductor - and apply ohms law to it.

Question Number. 22. If two resistors of 5 and 10 ohm respectively are connected in series and the current in the 5 ohm resistor is 1A. what is the current in the 10 ohm resistor?
Option A. 1 amp.
Option B. It cannot be found without knowing the applied voltage.
Option C. 1/3 amp.
Correct Answer is. 1 amp.
Explanation. Resistors in series - current is the same in each one.

Question Number. 23. The voltage in a series circuit.
Option A. is different in each component.
Option B. is the same in each component.
Option C. is less than it would be in a parallel circuit.
Correct Answer is. is different in each component.
Explanation. NIL.

Question Number. 24. If voltage is 100V, resistance is 25 ohms, what is the current?
Option A. 4 amperes.
Option B. 0.4 amperes.
Option C. 2500 amperes.
Correct Answer is. 4 amperes.
Explanation. Ohms Law I = V/R.

Question Number. 25. A short circuit between the supply and earth.
Option A. is not dangerous as the current drawn will be low.
Option B. does not matter if the circuit uses the aircraft earth as a return.
Option C. could be very dangerous as the current drawn will be very high.
Correct Answer is. could be very dangerous as the current drawn will be very high.
Explanation. In a short circuit, the resistance is zero. By ohms law, I = V/R. If R = 0, I = V/0 so what is I (it is not zero!!!).

Question Number. 26. A circuit consists of 3 ohm, 5 ohm and 12 ohm resistors in series. The current flowing in the 5 ohm resistor is 10 amps. What is the applied voltage?
Option A. 10 V.
Option B. 100 V.
Option C. 200 V.
Correct Answer is. 200 V.
Explanation. NIL.

Question Number. 27. Two resistors are connected in series and have an emf of V volts across them. If the voltages across the resistances are V1 and V2 then by Kirchhoff's law.
Option A. V2 = V1 + V.
Option B. V1 = V2 + V.
Option C. V = V1 + V2.
Correct Answer is. V = V1 + V2.
Explanation. NIL.

Question Number. 28. A voltmeter is connected.
Option A. in parallel.
Option B. in series or parallel.
Option C. in series.
Correct Answer is. in parallel.
Explanation. Voltmeters are connected 'across' the component (i.e. in parallel with it. Ammeters are connected in series.

Question Number. 29. Since electrical supplies taken from a bus-bar are in parallel, isolating some of the services would.
Option A. reduce the current consumption from the bus-bar.
Option B. increase the current consumption from the bus-bar.
Option C. not affect the current consumption, it would reduce the voltage.
Correct Answer is. reduce the current consumption from the bus-bar.
Explanation. Isolating some of the services increases the resistance of the total circuit similar to removing a resistor from a parallel circuit. So total current consumption reduces.

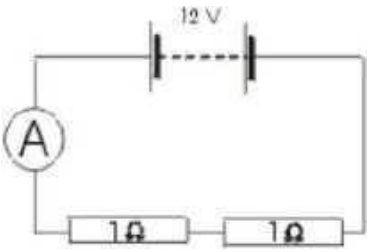
Question Number. 30. The current flowing through a circuit can be increased to four times its original value by.
Option A. doubling the applied voltage and halving the resistance.
Option B. doubling the resistance and doubling the applied voltage.
Option C. halving the applied voltage and halving the resistance.
Correct Answer is. doubling the applied voltage and halving the resistance.

Explanation. NIL.

Question Number. 31. In a circuit containing three resistors of equal value connected in series and one of the resistors short circuits, the effect is for the current in the other two resistors to.
Option A. decrease.
Option B. increase.
Option C. remain the same.
Correct Answer is. increase.
Explanation. Reducing one resistor to zero ohms (short circuit) means the source emf is now applied to the two remaining resistors, and causes a greater current flow through them.

Question Number. 32. In a series resistive circuit.
Option A. the total voltage is equal to the sum of the individual voltages.
Option B. the total voltage is the same as the highest individual.
Option C. the total voltage equals the difference between the individual voltages.
Correct Answer is. the total voltage is equal to the sum of the individual voltages.
Explanation. NIL.

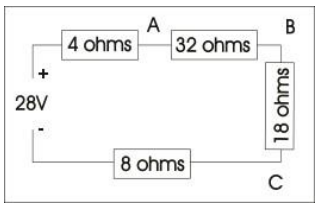
Question Number. 33. The reading on the ammeter in the circuit shown is.



Option A. 3A.
Option B. 12A.
Option C. 6A.
Correct Answer is. 6A.
Explanation. Total resistance = 2 ohms. I = V/R = 12/2 = 6 A.

Question Number. 34. An ammeter is connected into a circuit in.
Option A. series.
Option B. shunt.
Option C. parallel.
Correct Answer is. series.
Explanation. ammeter is always put into a circuit in series with the component it is measuring the current through.

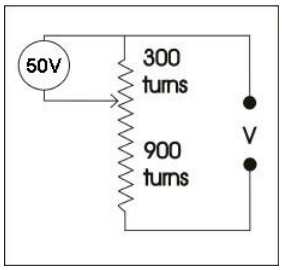
Question Number. 35. What is the voltage at A?



Option A. 26V.
Option B. 2V.
Option C. 28V.

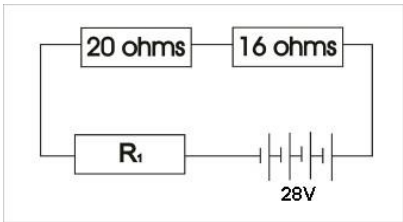
Correct Answer is. 26V.
Explanation. 4 ohm resistor will drop 4/62ths of the 28V supply (i.e. 1.8V). So there will be approximately 26V left.

Question Number. 36. The source voltage in the circuit shown is.



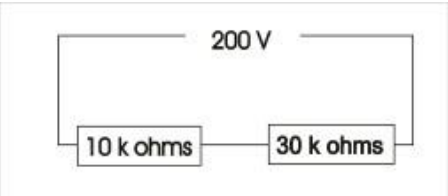
Option A. 200V.
Option B. 50V.
Option C. 150V.
Correct Answer is. 200V.
Explanation. This is a standard potentiometer. It splits the voltage by the same ratio as the number of turns. So 50V is 300/1200ths of the source voltage (50 = 3/12V). Transpose for V.

Question Number. 37. Referring to the drawing, if the volts dropped across the 20 ohm resistor is 10 volts, the resistance of R1 is.



Option A. 2 ohms.
Option B. 16 ohms.
Option C. 20 ohms.
Correct Answer is. 20 ohms.
Explanation. Find the current through the 20 ohm resistor (I = V/R = 10/20 = 0.5). The same current goes through all parts of a series circuit. Next find total circuit resistance (R = V/I = 28/0.5 = 56 ohms). Subtract 20 and 16 from 56.

Question Number. 38. The current in the circuit shown is.

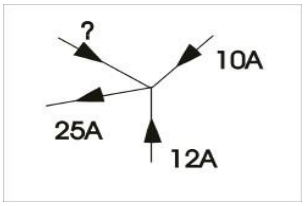


Option A. 5 mA.
Option B. 0.2 A.
Option C. 5 A.
Correct Answer is. 5 mA.
Explanation. Total R = 40 k ohms. I = V/R = 200/40,000 = 0.005A = 5mA. (don't forget the 'k' means times by 1000).

Question Number. 39. In the following circuit, the input at P is 4 amps and at Q is 5 amps. What is the voltage across the 6 ohm resistor?
Option A. 54V.
Option B. 6V.
Option C. 1.5V.
Correct Answer is. 54V.

Explanation. V = I * R = 9 * 6 = 54V. A combination of Kirchhoff's current law and
Ohm's Law.

Question Number. 40. The unknown current in the network below is.



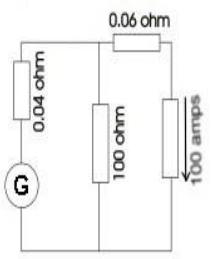
Option A. 22A.
Option B. 3A.
Option C. 47A.
Correct Answer is. 3A.
Explanation. Kirchhoff's current law.

Question Number. 41. In a balanced Wheatstone bridge, across the center of the bridge there is.
Option A. current and voltage at maximum.
Option B. no current flow.
Option C. no voltage present at either end.
Correct Answer is. no current flow.
Explanation. The ammeter reads zero when it is balanced.

Question Number. 42. A 24V battery has an internal resistance of 1 ohm. When connected to a load, 12 amps flows. The value of the load is.
Option A. 12 ohms.
Option B. 1/2 ohm.
Option C. 1 ohm.
Correct Answer is. 1 ohm.
Explanation. Total R = V/I = 24/12 = 2 ohms. Subtract the internal resistance to get the external resistance (i.e. the load).

Question Number. 43. A parallel circuit with any number of 2 terminal connections.
Option A. the individual voltage drops is equal to the emf.
Option B. has the same current throughout.
Option C. the resistance is dependent on current.
Correct Answer is. the individual voltage drops is equal to the emf.
Explanation. Parallel circuit - the voltage drops across each branch is the source voltage (regardless of the resistance in the branches).

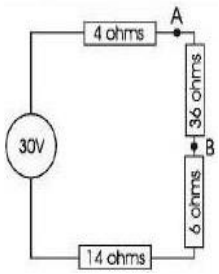
Question Number. 44. The diagram shows a 200V long shunt generator. What is the voltage across the series resistor.



Option A. 10V.
Option B. 6V.
Option C. 30V.
Correct Answer is. 6V.
Explanation. The 0.04 and 100 ohm resistor are the field windings of the generator, so the 100 amps goes through the 0.06 ohm resistor. V = I * R = 100 * 0.06 = 6V.

Question Number. 45. To find the internal resistance of a battery in a circuit of known current.
Option A. use the formula R = V * I.
Option B. find the lost volts of the circuit.
Option C. find the emf of the circuit.
Correct Answer is. find the lost volts of the circuit.
Explanation. Find the difference between the Voltage On-load and the Voltage Off-load (the volts 'lost' across the internal resistance), then use R = V/I (Ohm's Law).

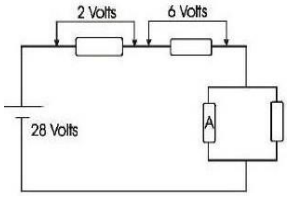
Question Number. 46. For the diagram shown find the voltage at point B.



Option A. 7V.
Option B. 26V.
Option C. 10V.
Correct Answer is. 10V.
Explanation. Each resistor drops its own proportion of the voltage. Total resistance is 60 ohms. Voltage dropped by 4 ohm resistor is 4/60 * 30. Voltage dropped by 36 ohm resistor is 36/60 * 30. Total dropped by point B is 40/60 * 30 = 20V. Therefore, remaining voltage at B = 10V.

Question Number. 47. In a series circuit with 3 resistors, the current is.
Option A. lower than the smallest.
Option B. the total of all 3 using ohms law to find the current.
Option C. even in all 3.
Correct Answer is. even in all 3.
Explanation. The current is the same in all components in a series circuit.

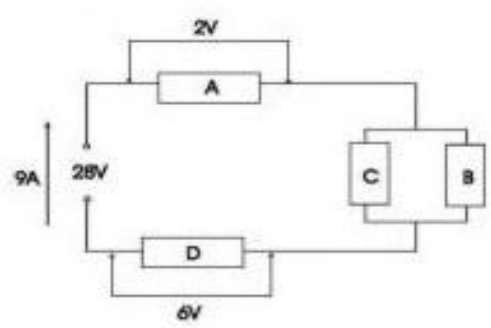
Question Number. 48. What is the voltage dropped across resistor 'A'?



Option A. 2 V.
Option B. 20 V.
Option C. 10 V.

Correct Answer is. 20 V.
Explanation. 28-(2 + 6) = 20 V (voltage across both the parallel resistors is the same 20 V).

Question Number. 49. What is the current through resistor C?



Option A. 4.5A.
Option B. 18A.
Option C. 9A.
Correct Answer is. 4.5A.
Explanation. You need to know what the ohmic value of resistor C is to know the current through it, or at least the relative value of C compared to D - as the 9A current splits through C and D. It is 9A/2 (4.5A) only if C and D are the same. Besides, it cannot ever be 9A or 18A.

Question Number. 50. Which is not thermally operated?
Option A. A limiting resistor.
Option B. A current limiter.
Option C. A fuse.
Correct Answer is. A limiting resistor.
Explanation. NIL.

Question Number. 51. In a Desynn indicator system, the rotor is.
Option A. an electromagnet.
Option B. a permanent magnet.
Option C. an AC magnet.
Correct Answer is. a permanent magnet.
Explanation. NIL.

Question Number. 52. A load that is subject to a potential difference with a current running through it will.
Option A. have a magnetic field around it with the magnitude and direction of the field determined by the corkscrew rule.
Option B. dissipate power in the form of heat.
Option C. will move in a direction shown by the right hand rule.
Correct Answer is. dissipate power in the form of heat.
Explanation. NIL.

07a. Resistance/Resistor.

Question Number. 1. The resistance of a material is.
Option A. independent of the material type.
Option B. the same as its conductance.
Option C. the reciprocal of its conductance.
Correct Answer is. the reciprocal of its conductance.
Explanation. NIL.

Question Number. 2. Resistance is measured using what unit of temperature?
Option A. Absolute.
Option B. Centigrade.
Option C. Fahrenheit.
Correct Answer is. Absolute.
Explanation. NIL.

Question Number. 3. A resistor has 4 bands on it coloured blue, yellow, yellow, gold. It's value is.
Option A. 640 kΩ ± 5%.
Option B. 6.4 mΩ ± 10%.
Option C. 64 kΩ ± 5%.
Correct Answer is. 640 kΩ ± 5%.
Explanation. NIL.

Question Number. 4. The electron flow through a conductor will be decreased the most if the cross sectional area.
Option A. is decreased and the length is increased.
Option B. and the length are both decreased.
Option C. and the length are both increased.
Correct Answer is. is decreased and the length is increased.
Explanation. NIL.

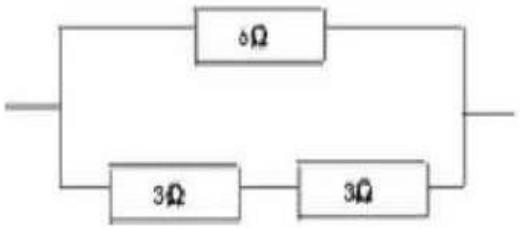
Question Number. 5. Small resistors too small or misshapen for the application of color are marked instead using.
Option A. an abbreviated resistance value.
Option B. a letter code.
Option C. a dot code.
Correct Answer is. a letter code.
Explanation. NIL.

Question Number. 6. Total resistance in a parallel resistor circuit, of R1 and R2 is.
Option A. RT = 1/R1 + 1/R2.

Option B. 1/RT = (R1 * R2) ÷ (R1 + R2).
Option C. 1/RT = 1/R1 + 1/R2.
Correct Answer is. 1/RT = 1/R1 + 1/R2.
Explanation. NIL.

Question Number. 7. If the resistance of a resistor which is in series with two other resistors is doubled.
Option A. the current in that resistance is doubled.
Option B. the volts drop across that resistor increases.
Option C. the current in that resistance is halved.
Correct Answer is. the volts drop across that resistor increases.
Explanation. The current will reduce, but not halved, since it depends on how big the other two resistors are in relation to it. It will however take a greater share of the voltage drop in the circuit.

Question Number. 8. The total resistance of the circuit shown is.



Option A. 3 Ohms.
Option B. 1.33 Ohms.
Option C. 12 Ohms.
Correct Answer is. 3 Ohms.
Explanation. Series 3 + 3 = 6 ohms. Then, two 6 ohm resistors in parallel, total is half = 3 ohms.

Question Number. 9. Potentiometers are used as a.
Option A. variable voltage source.
Option B. variable resistor.
Option C. variable current source.
Correct Answer is. variable resistor.
Explanation. Potentiometers are not a 'source' of voltage.

Question Number. 10. In a Wheatstone Bridge, the ammeter reads zero, and the variable resistor is adjusted to 5 ohms. Resistor P has a value of 10 ohms and Q has a value of 100 ohms. What is the value of the unknown resistor?
Option A. 5 ohms.
Option B. 0.5 ohms.
Option C. 50 ohms.
Correct Answer is. 0.5 ohms.
Explanation. R = Rv * P/Q.

Question Number. 11. In general, increasing the cross sectional area of an electrical cable.
Option A. increases its resistance.
Option B. enables it to carry more voltage.
Option C. enables it to carry more current.
Correct Answer is. enables it to carry more current.
Explanation. Get the formula for resistance of a cable. If you increase the cross sectional area, its resistance will decrease and it can carry more current. 'Carrying voltage' is not technically correct terminology, and besides, Any size cable can 'carry' any size voltage, but it is the current which will destroy it.

Question Number. 12. Six resistors each of 6 ohms would be.
Option A. 1 ohm in series.
Option B. 1 ohm in parallel.
Option C. 36 ohms in parallel.
Correct Answer is. 1 ohm in parallel.
Explanation. Get the formulas for resistors in parallel and resistors in series. Or, remember that resistors in series, total is greater than the largest, and resistors in parallel, total is less than the smallest.

Question Number. 13. A potentiometer varies.
Option A. resistance.
Option B. current.
Option C. voltage.
Correct Answer is. voltage.
Explanation. A potentiometer is basically a variable voltage splitter.

Question Number. 14. The formula for resistance in series is.
Option A. RT = R1 + R2 + R3 .....Rn.
Option B. RT = R1 * R2 * R3 .....Rn.
Option C. 1/RT = 1/(R1 * R2 * R3 .....Rn).
Correct Answer is. RT = R1 + R2 + R3 .....Rn.
Explanation. NIL.

Question Number. 15. What is the combined value of resistances of 4 ohm and 6 ohm connected in parallel?
Option A. 0.24 ohm.
Option B. 2.4 ohm.
Option C. 24 ohm.
Correct Answer is. 2.4 ohm.
Explanation. Resistors in parallel, the total resistance will be less than the smallest (but only slightly less).

Question Number. 16. If a number of resistors are connected in parallel, the total resistance is.
Option A. smaller than the lowest.
Option B. the same as the lowest.
Option C. greater than the lowest.
Correct Answer is. smaller than the lowest.
Explanation. Resistors in parallel. Total resistance is smaller than the lowest single resistor.

Question Number. 17. The resistance to electrical flow in a wire depends on.
Option A. the diameter, length, material of wire and temperature.
Option B. the material only - copper or aluminium.
Option C. the length and material of the wire only.
Correct Answer is. the diameter, length, material of wire and temperature.
Explanation. Get the formula for resistance of a conductor, and don't forget that most materials have a positive temperature coefficient.

Question Number. 18. When resistors are in parallel the total current is equal to.
Option A. the current through one resistor.
Option B. the sum of the currents.
Option C. the reciprocal of all the currents.
Correct Answer is. the sum of the currents.
Explanation. NIL.

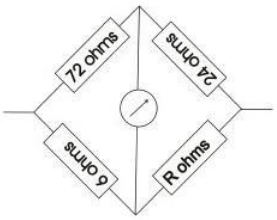
Question Number. 19. Which of these will cause the resistance of a conductor to decrease?
Option A. Decrease the length or the cross-sectional area.
Option B. Increase the length or decrease the cross-sectional area.
Option C. Decrease the length or increase the cross-sectional area.
Correct Answer is. Decrease the length or increase the cross-sectional area.
Explanation. Get the formula for resistance of a conductor.

Question Number. 20. If 2 resistors, one red, yellow, black, gold and the other violet, blue, black, silver were replaced by a single resistor. Ignoring tolerance, what would the colour coding be?
Option A. Brown, black, brown.
Option B. Black, brown, black.
Option C. Brown, black, black.
Correct Answer is. Brown, black, brown.

Explanation. The red/yellow/black resistor is 24 ohms (get a colour code chart). The violet/blue/black resistor is 76 ohms. Total is 100 ohms. A 100 ohm resistor is brown/black/brown.

Question Number. 21. A 47 kilohm resistor has the following colour code:.
Option A. Yellow, Violet, Orange.
Option B. Red, Orange, Yellow.
Option C. Orange, Violet, Red.
Correct Answer is. Yellow, Violet, Orange.
Explanation. NIL.

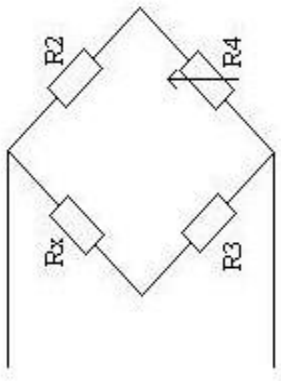
Question Number. 22. The bridge circuit shown will be balanced when the value of the unknown resistor R is.



Option A. 2 ohms.
Option B. 18 ohms.
Option C. 14 ohms.
Correct Answer is. 2 ohms.
Explanation. 72 / 24 = 6 / R, R = 2 ohms.

Question Number. 23. A 300 ohm resistor would have a colour code of.
Option A. orange, brown, black.
Option B. orange, orange, brown.
Option C. orange, black brown.
Correct Answer is. orange, black brown.
Explanation. NIL.

Question Number. 24. In this circuit, Rx is equal to.

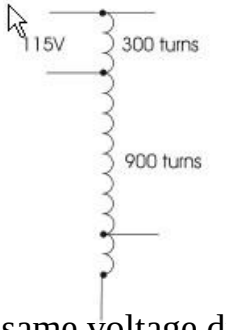


Option A. R2 * R4 ÷ R3.
Option B. R3 * R4 ÷ R2.
Option C. R3 * R2 ÷ R4.
Correct Answer is. R3 * R2 ÷ R4.
Explanation. Assuming the diagram is incomplete (no cross branch with a zeroed ammeter as per a Wheatstone bridge) Take Rx/R3 = R2/R4 and transpose.

Question Number. 25. In a parallel circuit containing resistors.
Option A. the sum of the voltage drops equals applied voltage.
Option B. the voltage is the same in all parts of the circuit.

Option C. resistance is determined by value of current flow.
Correct Answer is. the voltage is the same in all parts of the circuit.
Explanation. In a parallel circuit, the voltage across each resistor is the same.

Question Number. 26. Five different value resistors all have the same voltage dropped across them. How are the resistors connected?



Option A. In Series/Parallel.
Option B. In Series.
Option C. In Parallel.
Correct Answer is. In Parallel.
Explanation. Resistors in parallel with each other all have the same voltage drop.

Question Number. 27. Conductance of a circuit is 2 milliMhos. What is its resistance?
Option A. 5000 Ohms.
Option B. 500 Ohms.
Option C. 5 Megohms.
Correct Answer is. 500 Ohms.
Explanation. Conductance is the ease at which current flows. It is the inverse of resistance. (The unit 'Mho' is 'Ohm' backwards). Conductance = 2/1000 Mhos. Therefore Resistance = 1000/2 Ohms.

Question Number. 28. When light hits a photodiode, its resistance.
Option A. stays the same.
Option B. increases.
Option C. decreases.
Correct Answer is. decreases.
Explanation. Resistance decreases with light intensity.

Question Number. 29. A 2 Megohm resistor can be written.
Option A. 2M0F.
Option B. 20MF.
Option C. M20F.
Correct Answer is. 2M0F.
Explanation. Sometimes the multiplier, like M (for meg), or K (for kilo) or R (for 1) is put in place of the decimal point. The last letter is the tolerance. See Forum for more info.

Question Number. 30. In a Wheatstone bridge at balance the galvanometer reads zero.
Option A. amps.
Option B. ohms.
Option C. volts.
Correct Answer is. amps.
Explanation. NIL.

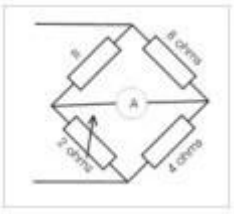
Question Number. 31. The unit for resistivity is the.
Option A. ohms/square meter.
Option B. ohms/meter.
Option C. ohm.meter.
Correct Answer is. ohm.meter.
Explanation. NIL. http://en.wikipedia.org/wiki/Electrical_resistance

Question Number. 32. A 47 Kilohm resistor with a 10% tolerance has the following color code:.
Option A. Yellow, Violet, Orange, Silver.
Option B. Orange, Violet, Red, Gold.
Option C. Red, Orange, Yellow, Silver.
Correct Answer is. Yellow, Violet, Orange, Silver.
Explanation. Aircraft Electricity and Electronics Eismin Page 100.

Question Number. 33. The total resistance in a circuit is greater than the least resistor. This is true for a.
Option A. series and parallel circuit.
Option B. series circuit only.
Option C. parallel circuit only.
Correct Answer is. series circuit only.
Explanation. NIL.

07b. Resistance/Resistor.

Question Number. 1. The unknown resistance R in the Wheatstone bridge shown is.



Option A. 4 ohms.
Option B. 16 ohms.
Option C. 1 ohm.
Correct Answer is. 4 ohms.
Explanation. R = 2 * 8/4. Read up on Wheatstone bridges.

Question Number. 2. This is a symbol for.

Option A. a visual display rectifier.
Option B. a variable differential resistor.
Option C. a voltage dependent resistor.
Correct Answer is. a voltage dependent resistor.
Explanation. VDR = Voltage Dependent Resistor.

Question Number. 3. A potentiometer has which of the following properties?
Option A. Wire wound.
Option B. 3 terminals.
Option C. Preset values.
Correct Answer is. 3 terminals.
Explanation. NIL.

Question Number. 4. An increase in operating temperature in most electrical devices carrying current results in.
Option A. a decrease in resistance and an increase in current.
Option B. no effect on the resistance and current.
Option C. an increase in resistance and a decrease in current.
Correct Answer is. an increase in resistance and a decrease in current.
Explanation. Most conductors have a 'positive temperature coefficient'. The exceptions are semiconductors.

Question Number. 5. Copper is an inferior conductor to aluminium when comparing.
Option A. CSA with CSA.
Option B. weight for weight.
Option C. load for load.
Correct Answer is. weight for weight.
Explanation. Copper is a better inductor but aluminium is much lighter. CSA = cross sectional area (not Child Support Agency).

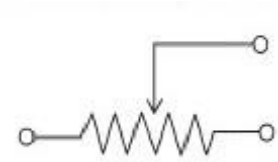
Question Number. 6. What happens to the resistance of a copper conductor when the temperature increases?
Option A. It decreases.
Option B. It increases.
Option C. It remains the same.
Correct Answer is. It increases.
Explanation. All materials excepts semiconductors have a positive temperature coefficient.

Question Number. 7. Carbon has a.
Option A. temperature coefficient of zero.
Option B. positive temperature coefficient.
Option C. negative temperature coefficient.
Correct Answer is. negative temperature coefficient.
Explanation. Carbon is a semiconductor, so its resistance reduces with temperature.

Question Number. 8. The 5th coloured band on a resistor represents the.
Option A. reliability or temperature coefficient.
Option B. tolerance.
Option C. multiplier.
Correct Answer is. tolerance.
Explanation. NIL.

Question Number. 9. If the temperature of a pure metal is reduced to absolute zero, its resistance will be.
Option A. unaffected.
Option B. practically zero.
Option C. infinity.
Correct Answer is. practically zero.
Explanation. NIL.

Question Number. 10. What is represented by this diagram?

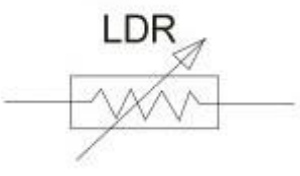


Option A. Thermistor.
Option B. Rheostat.
Option C. Potentiometer.
Correct Answer is. Potentiometer.
Explanation. A potentiometer has 3 connections, a rheostat has only 2.

Question Number. 11. If a resistor is too small or misshapen to fit the colour code bands, how else is it's value indicated?
Option A. Dots.
Option B. Number code.
Option C. Letter code.
Correct Answer is. Letter code.
Explanation. NIL.

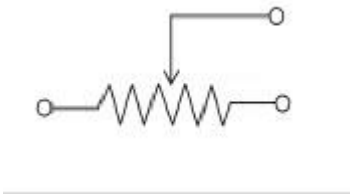
Question Number. 12. This is a diagram of a.

Option A. Light Dependant Resistor.



Option B. Laser Diode Rectifier.
Option C. Logarithmic Differential Resistor.
Correct Answer is. Light Dependant Resistor.
Explanation. NIL.

Question Number. 13. This is a diagram of a.



Option A. Variable Voltage source.
Option B. Variable Current source.
Option C. Variable Resistor.
Correct Answer is. Variable Resistor.
Explanation. A potentiometer is not a voltage or current 'source'.

Question Number. 14. Resistors required to carry a comparatively high current and dissipate high power are usually of.
Option A. Wire wound metal type.
Option B. Carbon compound type.
Option C. Wire wound ceramic type.
Correct Answer is. Wire wound ceramic type.
Explanation. Aircraft Electricity and Electronics by Eismin, Chapter 6, pg 101.

Question Number. 15. A thyristor.
Option A. if energized on, will switch on a circuit.
Option B. has a positive temperature coefficient.
Option C. if energized on, will switch off a circuit.
Correct Answer is. if energized on, will switch on a circuit.
Explanation. An SCR is an example of a thyristor.

Question Number. 16. The temperature of a pure metal can greatly affect the resistance of it. What temperature scale is used?
Option A. Absolute.
Option B. Centigrade.
Option C. Fahrenheit.
Correct Answer is. Centigrade.
Explanation. NIL.

08. Power.

Question Number. 1. A 10 V battery supplies a resistive load of 10 ohms for 1 minute. What is the power supplied?
Option A. 100 W.
Option B. 10 VA.

Option C. 10 W.
Correct Answer is. 10 W.
Explanation. Power = I2R (time is not required). Resistive load only, so answer is in Watts.

Question Number. 2. A resistor dissipates 80 Watts. If it runs for 4 hours 15 minutes, how much energy is dissipated in total?
Option A. 20.4 kJ.
Option B. 1.224 MJ.
Option C. 191.25 J.
Correct Answer is. 1.224 MJ.
Explanation. Energy = Power * Time. Time must be in seconds. There are 3600 seconds in 1 hour - not 60.

Question Number. 3. The earth lead of a 24 V equipment is 0.5 ohm resistance and carries 80 A. How much power does it dissipate?
Option A. 1.92 kW.
Option B. 1.152 kW.
Option C. 3.2 kW.
Correct Answer is. 3.2 kW.
Explanation. Power = I2R. Since it is an earth lead it will not have the full 24V on it, so disregard voltage.

Question Number. 4. What is the power dissipated in a 500 ohm resistor with a 3A flow?
Option A. 4.5 kW.
Option B. 1.5 kW.
Option C. 750 kW.
Correct Answer is. 4.5 kW.
Explanation. Power = I2R.

Question Number. 5. A DC circuit containing a total resistance of 100 ohms has a current flow of 250 mA. The power dissipated in the circuit is.
Option A. 0.4 watts.
Option B. 5 watts.
Option C. 6.25 watts.
Correct Answer is. 6.25 watts.
Explanation. Power = I2R.

Question Number. 6. Power is the rate of doing work. It is measured in.
Option A. joules/second.
Option B. joules * seconds.

Option C. watts/second.
Correct Answer is. joules/second.
Explanation. NIL.

Question Number. 7. The power in a circuit when voltage and resistance is given can be found by.
Option A. V*R.
Option B. V*V*R.
Option C. V*V / R.
Correct Answer is. V*V / R.
Explanation. Power = V2 /R.

Question Number. 8. A 500 ohm resistor carries a 3 amp current. What is the power dissipated?
Option A. 500 W.
Option B. 5 kW.
Option C. 4.5 kW.
Correct Answer is. 4.5 kW.
Explanation. Power = I2 R.

Question Number. 9. A 3 ohm resistor dissipates 27 Watts. How much current flows through it?
Option A. 9 A.
Option B. 0.15 A.
Option C. 3 A.
Correct Answer is. 3 A.
Explanation. power = I2 R. Transpose for I.";.

Question Number. 10. A 48-volt source is required to furnish 192 watts to a parallel circuit consisting of three resistors of equal value. What is the value of each resistor?
Option A. 4 ohm.
Option B. 36 ohm.
Option C. 12 ohm.
Correct Answer is. 36 ohm.
Explanation. Each resistor dissipates 192/3 = 64 Watts. Voltage is the same across all resistors in parallel = 48 Volts. Power = V-squared/R. Work out R.

Question Number. 11. A piece of equipment is rated at 750 watts and the applied voltage is 30 volts. The value of the protection fuse should be.
Option A. 20 amps.
Option B. 15 amps.

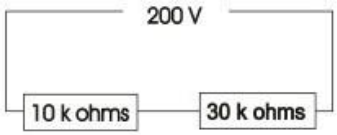
Option C. 30 amps.
Correct Answer is. 30 amps.
Explanation. Power = amps * volts. Find the amperage from that. Then choose the fuse of the nearest size up.

Question Number. 12. How much power must a 24-volt generator furnish to a system which contains the following series loads? 5 ohm, 3 ohm and 12 ohm.
Option A. 402 watts.
Option B. 28.8 watts.
Option C. 450 watts.
Correct Answer is. 28.8 watts.
Explanation. NIL.

Question Number. 13. A direct current of 12 milliamperes flows through a circuit which has a resistance of 1000 ohms. The power dissipated by the circuit is.
Option A. 144 milliwatts.
Option B. 12 watts.
Option C. 12 milliwatts.
Correct Answer is. 144 milliwatts.
Explanation. Power = I2 R. Watch the prefix 'milli'. 'Milli' means divide by 1000. Square it and you must divide by 1,000,000.

Question Number. 14. In a power circuit, the purpose of an inductor is.
Option A. to dampen voltage surges.
Option B. to dampen current surges.
Option C. to dampen power surges.
Correct Answer is. to dampen power surges.
Explanation. NIL.

Question Number. 15. In the circuit shown, the power developed across the 10 kilo ohm resistor is.
Option A. 250 mW.
Option B. 250 W.
Option C. 50 mW.



Correct Answer is. 250 mW.
Explanation. Power = I2 R = 0.005 * 0.005 * 10,000 = 0.000,025 * 10,000 = 0.25W = 250mW.

Question Number. 16. A single phase circuit has an input voltage of 100V. The current is 10A and the circuit has a power factor of 0.5. The true power is.
Option A.50W.
Option B.1000W.

Option C. 500W.
Correct Answer is. 500W.
Explanation. Apparent Power = IV = 100 * 10 = 1000 VA. True Power = PF * Apparent Power = 0.5 * 1000 = 500W.

Question Number. 17. Power in a DC circuit is found by.
Option A. multiplying the voltage by itself and dividing by the current.
Option B. multiplying current by resistance.
Option C. multiplying the resistance by the current squared.
Correct Answer is. multiplying the resistance by the current squared. **Explanation.** NIL.

Question Number. 18. If the energy supplied to a circuit for 4hrs 15 minutes at 800 j/sec what would be the energy consumed?
Option A. 3400 KW Hrs.
Option B. 3.4 KW Hrs.
Option C. 340 KW Hrs.
Correct Answer is. 3.4 KW Hrs.
Explanation. 4 hours 15 minutes = 4 1/4 hours. Energy = power * time = 800 * 4 1/4 = 3400 = 3.4 kW hrs.

Question Number. 19. A heater which consumes 800 Kilojoules/sec is on for 4hrs 15min. The energy consumed is.
Option A. 340 kWh.
Option B. 3.4 kWh.
Option C. 3400 kWh.
Correct Answer is. 3400 kWh.
Explanation. kJ/s = kW. 800 * 4.25 = 3400 kWh.

Question Number. 20. A voltage of 250V causes a current of 30mA. What is the wattage?
Option A. 7.5W.
Option B. 7500W.
Option C. 0.225W.
Correct Answer is. 7.5W.
Explanation. Power = IV = 30/1000 * 250 = 7.5W.

Question Number. 21. Which requires the most electrical power during operation?
Option A.A 12-volt motor requiring 8 amperes.
Option B. Four 30-watt lamps in a 12-volt parallel circuit.
Option C. Two lights requiring 3 amperes each in a 24volt parallel system.
Correct Answer is. Two lights requiring 3 amperes each in a 24volt parallel system.

Explanation. a is 12*8=96W, b is 30*4 = 120W, c is 3*24*2=144W.

Question Number. 22. The power dissipated in a circuit with a known potential difference and resistance is calculated by.
Option A. multiplying the square of the potential difference by the resistance.
Option B. dividing the square of the potential difference by the resistance.
Option C. finding the current and multiplying the answer by the resistance.
Correct Answer is. finding the current and multiplying the answer by the resistance. OR dividing the square of the potential difference by the resistance.
Explanation. NIL.

Question Number. 23. The power expended in a given circuit is.
Option A. inversely proportional to cube-root of the current.
Option B. proportional to the square-root of the voltage.
Option C. proportional to the square of the voltage.
Correct Answer is. proportional to the square of the voltage.
Explanation. NIL.

09. Capacitance/capacitor.

Question Number. 1. A capacitor is fully charged after 25 seconds to a battery voltage of 20 Volts. The battery is replaced with a short circuit. What will be the voltage across the capacitor after one time constant?
Option A. 0 volts.
Option B. 7.36 volts.
Option C. 12.64 volts.
Correct Answer is. 7.36 volts.
Explanation. The capacitor is discharging - so it discharges 63.2% in one time constant - so what is left?

Question Number. 2. The voltage rating of a capacitor is.
Option A. the max voltage that can be constantly applied.
Option B. the min voltage required to charge.
Option C. the normal operating voltage.
Correct Answer is. the max voltage that can be constantly applied.
Explanation. Exceed the voltage at which the capacitor is rated, and you destroy the capacitor.

Question Number. 3. The relative permittivity of a capacitor is.
Option A.the permittivity of the dielectric.
Option B. the relative permittivity of the dielectric in relation to a vacuum.
Option C. the permittivity of dielectric in relation to dry air.

Correct Answer is. the relative permittivity of the dielectric in relation to a vacuum.
Explanation. 'Relative' means relative to 'free space' (a 'vacuum' in other words).

Question Number. 4. When checking a capacitor with an ohmmeter, if the reading shows charging but the final reading is less than normal then the possible fault is a.
Option A. leaking dielectric capacitor.
Option B. short circuit dielectric.
Option C. open circuit dielectric.
Correct Answer is. leaking dielectric capacitor.
Explanation. NIL.

Question Number. 5. Three capacitors 10 microfarads, 10 nanofarads and 10 millifarads are connected in parallel. What is the total capacitance?
Option A. 10.01001 millifarads.
Option B. 111 millifarads.
Option C. 1.001001 millifarads.
Correct Answer is. 10.01001millifarads.
Explanation. The biggest capacitor of the three is the 10 milliFarad. The other two are fractions of one milliFarad. So the answer must be 10.**** milliFarad (no sums required).

Question Number. 6. If a 1milliFarad capacitor has a potential difference across it of 5V, what is the energy stored?
Option A. 12.5 Joules.
Option B. 12.5 milliJoules.
Option C. 25 mJoules.
Correct Answer is. 12.5 mJoules.
Explanation. Energy stored in a capacitor = 1/2 C V-squared (only the V is squared).

Question Number. 7. A capacitor with double the area and double the dielectric thickness will have.
Option A. double the capacitance.
Option B. the same capacitance.
Option C. half the capacitance.
Correct Answer is. the same capacitance.
Explanation. Get the formula for capacitance of a capacitor.

Question Number. 8. An electrolytic capacitor is used where.
Option A. minimum losses are essential.
Option B. there is a polarized input.

Option C. high frequency AC is used.
Correct Answer is. there is a polarized input.
Explanation. Wiring an electrolytic capacitor wrong polarity will destroy it. AC will therefore destroy it. Current must be DC (i.e. polarised) and the right way.

Question Number. 9. What must you do to make a 3 F capacitor circuit into a 2 F circuit?
Option A. Put a 2 F capacitor in parallel.
Option B. Put a 6 F capacitor in series.
Option C. Put a 1 F capacitor in series.
Correct Answer is. Put a 6 F capacitor in series.
Explanation. To reduce the capacitance of a circuit you must place a capacitor in series (formula is same as resistors in parallel). You do the maths to see which one it is.

Question Number. 10. The time required to fully charge a 1 μ(micro)F capacitor in series with a 100k ohm resistor is.
Option A. 100 seconds.
Option B. 100 milliseconds.
Option C. 500 milliseconds.
Correct Answer is. 500 milliseconds.
Explanation. Time-constant (=RC) is 100 ms. Time-constant is time to reach 63.2% of full charge. Time to fully charge = 5 * TC = 500 ms.

Question Number. 11. A 50 μ(micro) Farad capacitor is fed with a current of 25 milliAmpere. How long will it take to charge it to 100Volts?
Option A. 1 second.
Option B. 0.2 seconds.
Option C. 12 minutes.
Correct Answer is. 1 second.
Explanation. Work out the resistance in the circuit first (R=V/I) (4000 ohms). Then work out the time constant (TC=RC). Time to charge = 5RC.

Question Number. 12. In a circuit C = 25 microfarads and the current flow is 40 microamps for 4 seconds. What is the voltage?
Option A. 6.4Volts.
Option B. 3.2Volts.
Option C. 12.8Volts.
Correct Answer is. 6.4Volts.
Explanation. Since Q = VC and Q = It, then VC = It right? So V = It/C. Watch those unit prefixes.

Question Number. 13. Three 12 µ(micro)F capacitors are in series. The total capacitance is.
Option A. 12 µ(micro)F.
Option B. 4 µ(micro)F.
Option C. 36 µ(micro)F.
Correct Answer is. 4 µ(micro)F.
Explanation. Capacitors in series - total capacitance reduces. equal capacitors and total will be 1/3rd of one.

Question Number. 14. The time constant of a capacitor is the time.
Option A. the current to reach 63.2% of maximum.
Option B. for the emf to reach 63.2% of maximum.
Option C. to reach maximum current.
Correct Answer is. for the emf to reach 63.2% of maximum.
Explanation.

Question Number. 15. The amount of electricity a capacitor can store is directly proportional to the.
Option A. plate area and inversely proportional to the distance between the plates.
Option B. distance between the plates and inversely proportional to the plate area.
Option C. plate area and is not affected by the distance between the plates.
Correct Answer is. plate area and is not affected by the distance between the plates. OR plate area and inversely proportional to the distance between the plates.
Explanation. Get the formula for the capacitance of a capacitor.

Question Number. 16. The capacitance of a capacitor is dependent upon.
Option A. the rate of change of current in the circuit.
Option B. the type of material separating the plates.
Option C. the charge on it.
Correct Answer is. the type of material separating the plates.
Explanation. The capacitance of a capacitor is only dependent upon its physical properties (size and material) and not what you apply to it.

Question Number. 17. When different rated capacitors are connected in parallel in a circuit, the total capacitance is.
Option A. less than the capacitance of the lowest rated capacitor.
Option B. equal to the capacitance of the highest rated capacitor.
Option C. equal to the sum of all the capacitances.
Correct Answer is. equal to the sum of all the capacitances.
Explanation. Get the formula for capacitors in parallel (it is like resistors in series).

Question Number. 18. One Picofarad is.

Option A. 1 * 1012 farad.
Option B. 1 * 10-6 farad.
Option C. 1 * 10-12 farad.
Correct Answer is. 1 * 10-12 farad.
Explanation. NIL.

Question Number. 19. The switch on a DC circuit containing a fully charged capacitor is opened. The voltage across the capacitor.
Option A. drops immediately to zero.
Option B. starts to fall exponentially to zero.
Option C. remains equal to the original charging voltage supply.
Correct Answer is. remains equal to the original charging voltage supply.
Explanation. If there is no external circuit, the charge can go nowhere.

Question Number. 20. The current in a DC circuit containing a fully charged capacitor is.
Option A. zero.
Option B. is dependent upon the size of the capacitance of the capacitor.
Option C. maximum.
Correct Answer is. zero.
Explanation. If the capacitor is fully charged, it is equal and opposite to the source voltage, so no current flows.

Question Number. 21. A capacitor is a barrier to.
Option A. both.
Option B. A.C.
Option C. D.C.
Correct Answer is. D.C.
Explanation. NIL.

Question Number. 22. What is the total capacitance of a parallel circuit containing three capacitors with capacitance of 0.25microfarad, 0.03microfarad, and 0.12microfarad, respectively?
Option A. 0.4 µ(micro)F.
Option B. 0.04 µ(micro)F.
Option C. 0.04 piko Farad.
Correct Answer is. 0.4 µ(micro)F.
Explanation. Capacitors in parallel, the same formula as resistors in series - i.e. just add them all up.

Question Number. 23. When two capacitors are connected in series.

Option A. the charge stored on each is inversely proportional to the voltage across it.
Option B. the charge stored on each is the same.
Option C. the charge stored on each is directly proportional to its capacitance.
Correct Answer is. the charge stored on each is the same.
Explanation. If they were not the same, there would be a current flow between them, until they equalised out.

Question Number. 24. The charge on a capacitor is expressed as.
Option A. the ratio Q/V.
Option B. the product Q * V.
Option C. the product C * V.
Correct Answer is. the product C * V.
Explanation. Remember Q = VC.

Question Number. 25. When handling a high voltage capacitor in an electrical circuit, be sure it.
Option A. has a full charge before removing it from the circuit.
Option B. is fully discharged before removing it from the circuit.
Option C. has at least a residual charge before removing it from the circuit.
Correct Answer is. is fully discharged before removing it from the circuit.
Explanation. Charged capacitors can be lethal, even when charged to say, 1 volt.

Question Number. 26. The dielectric constant of a capacitor is a measurement of.
Option A. the electrical resistance of the capacitor dielectric.
Option B. the electrostatic energy storing capacity of the capacitor dielectric.
Option C. the electrical repulsion of electrons within the dielectric material.
Correct Answer is. the electrostatic energy storing capacity of the capacitor dielectric.
Explanation. NIL.

Question Number. 27. Three 12 microfarad capacitors in parallel. The overall circuit capacitance is.
Option A. 4 microfarads.
Option B. 1 microfarads.
Option C. 36 microfarads.
Correct Answer is. 36 microfarads.
Explanation. Capacitors in parallel - just add them up.

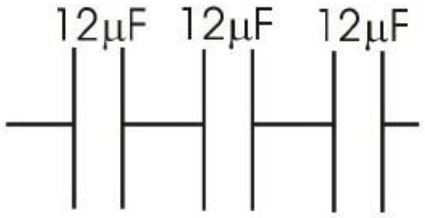
Question Number. 28. A circuit has 1 megohm and 8 microfarads. What is the time constant?
Option A. 8 seconds.

Option B. 1 second.
Option C. 40 seconds.
Correct Answer is. 8 seconds.
Explanation. Time constant = RC. The mega and the micro cancel.

Question Number. 29. A capacitor rating is.
Option A. the voltage it will charge to.
Option B. the maximum continuous voltage it can take.
Option C. the voltage it will rupture at.
Correct Answer is. the maximum continuous voltage it can take.
Explanation. NIL.

Question Number. 30. The multiplier colour coding on a capacitor is in.
Option A. picofarads.
Option B. farads.
Option C. microfarads.
Correct Answer is. picofarads.
Explanation. NIL.

Question Number. 31. The total capacitance of the circuit shown is.



Option A. 36μ(micro)F.
Option B. 4μ(micro)F.
Option C. 3μ(micro)F.
Correct Answer is. 4μ(micro)F.
Explanation. Total capacitance (of capacitors in series) = 12/3 = 4 microfarads.

Question Number. 32. When a capacitor is charged from a DC supply, the voltage/time curve is.
Option A. logarithmic.
Option B. linear.
Option C. exponential.
Correct Answer is. exponential.
Explanation. NIL.

Question Number. 33. An electrolytic capacitor is used because it has a.
Option A. small physical size for low leakage current.
Option B. large physical size for a large capacity.
Option C. small physical size for a large capacity.
Correct Answer is. small physical size for a large capacity.

Explanation. NIL.

Question Number. 34. An electrolytic capacitor would be used in circuits supplying.
Option A. heavy loads.
Option B. light loads.
Option C. heavy / light loads.
Correct Answer is. heavy / light loads.
Explanation. Electrolytic capacitors are used in circuits of all sizes.

Question Number. 35. A 20 Picofarad capacitor with a 1 Megohm resistor takes how long to charge?
Option A. 100 microseconds.
Option B. 20 milliseconds.
Option C. 0.1 second.
Correct Answer is. 100 microseconds.
Explanation. Time constant (TC) = RC = 20/1,000,000,000,000 * 1,000,000 = 20/1,000,000 = 20 microseconds. But fully charged is 5 * TC = 100 microseconds.

Question Number. 36. The discharge curve of a capacitor is.
Option A. Exponential.
Option B. Logarithmic.
Option C. Linear.
Correct Answer is. Exponential.
Explanation. The capacitor discharge curve is an exponential decay, however, the charge curve is logarithmic (the inverse of exponential).

Question Number. 37. What is the value of a monolithic capacitor with 103 on it?
Option A. 1000pf.
Option B. 10,000pf.
Option C. 100,000pf.
Correct Answer is. 10,000pf.
Explanation. 103 means 10 followed by 3 zeros. Capacitors are always measured in picofarads.

Question Number. 38. What is the formula for working out the capacitance of a capacitor if K = dielectric constant, A = area of the plates, d = distance plates apart?
Option A. c = K*A/d.
Option B. c = d/K*A.
Option C. c = K*d/A.
Correct Answer is. c = K*A/d.
Explanation. C = K*A/d.

Question Number. 39. Total capacitance of 3 capacitors each 12milliFarad in a parallel circuit.
Option A. 36milliFarad.
Option B. 12milliFarad.
Option C. 6mf.
Correct Answer is. 36milliFarad.
Explanation. Total C = = C1 + C2 + C3 (capacitors in parallel).

Question Number. 40. A combination of 1 megohm and 8 microfarad would give a time constant of.
Option A. 40 seconds.
Option B. 400 ms.
Option C. 8 seconds.
Correct Answer is. 8 seconds.
Explanation. 1,000,000 * 8/1,000,000 = 8 seconds. Note: Time Constant is asked for, not 'time to charge'.

Question Number. 41. Generally, what is the voltage across a fully charged capacitor?
Option A. Less than circuit voltage.
Option B. Same as circuit voltage.
Option C. More than circuit voltage.
Correct Answer is. Same as circuit voltage.
Explanation. The answer to this question depends upon how accurate you want to go. Normal theory is that a fully charged capacitor has an equal (and opposite) voltage to the supply. However, a capacitor is never fully charged (something in the order of 99.999999% charged).

Question Number. 42. When would you use an electrolytic capacitor?
Option A. On a balanced circuit.
Option B. Low output compared to size required.
Option C. Large output compared to size required.
Correct Answer is. Large output compared to size required.
Explanation. NIL.

Question Number. 43. A capacitor has Brown, Black and Orange bands. It's value is.
Option A. 10 picofarads.
Option B. 10 nanofarads.
Option C. 100 picofarads.
Correct Answer is. 10 nanofarads.

Explanation. Brown = 1, Black = 0, Orange = x1000. Total is 10,000 picofarads (always picofarads with capacitors) = 10 nanofarads.

Question Number. 44. Voltage measured between the plates of a capacitor will be generally.
Option A. can dangerously higher than applied voltage.
Option B. the same as applied voltage.
Option C. less than applied voltage.
Correct Answer is. the same as applied voltage.
Explanation. Technically the voltage on a charged capacitor never reaches the applied voltage. It gets to 99.99999% (and more).

Question Number. 45. Dielectric constant of a capacitor is.
Option A. max V that can be applied to a capacitor.
Option B. electrostatic storing capability of the dielectric.
Option C. max I stored in the capacitor.
Correct Answer is. electrostatic storing capability of the dielectric.
Explanation. The dielectric stores electrical energy.

Question Number. 46. One microfarad is.
Option A. 1 * 10-12 farads.
Option B. 1 * 1012 farads.
Option C. 1 * 10-6 farads.
Correct Answer is. 1 * 10-6 farads.
Explanation. Jepperson, A+P Technician General Handbook, Chapter 1, page 22.

Question Number. 47. A circuit with a capacitor has 6 volts applied to it with a charge of 2400 pico-coulombs. What would the charge be if the applied voltage was 1.5 volts ?
Option A. 2400 * 10-12 coulombs.
Option B. 600 * 10-9 coulombs.
Option C. 600 * 10-12 coulombs.
Correct Answer is. 600 * 10-12 coulombs.
Explanation. Q = CV, so direct relationship of charge to voltage. 1.5V is 1/4 of 6V, so charge is 1/4 of 2400 picocoulombs. Note this is more of a question on pico and nano and whether you know the difference.

Question Number. 48. In a capacitor, the dielectric strength is measured in.
Option A. Farads per meter.
Option B. Volts per meter.
Option C. Coulombs per m2.
Correct Answer is. Farads per meter.

Explanation.

Question Number. 49. Three capacitors connected in series, each having a value of 12 picofarads, calculate the total capacitance.
Option A. 36 picofarads.
Option B. 4 picofarads.
Option C. 12 picofarads.
Correct Answer is. 4 picofarads.
Explanation. 12/3 = 4.

10a. Magnetism.

Question Number. 1. Magnetic inclination is the least at the.
Option A. poles.
Option B. equator.
Option C. isoclines.
Correct Answer is. equator.
Explanation. 'Inclination' is the same as 'dip'. Dip is greatest at the poles and least at the equator.

Question Number. 2. Ferromagnetic materials can be magnetized.
Option A. below a certain temperature.
Option B. above a certain temperature.
Option C. within a band of temperatures.
Correct Answer is. below a certain temperature.
Explanation. Read up on the 'Curie Point'.

Question Number. 3. Glass is an example of a.
Option A. coercive material.
Option B. paramagnetic material.
Option C. diamagnetic material.
Correct Answer is. diamagnetic material.
Explanation. Glass is diamagnetic.

Question Number. 4. A solenoid of 10 turns per meter carries a current of 5A. If the current is reduced to 2.5A, how many turns would be required to maintain the same magnetic field?
Option A. 20.
Option B. 50.
Option C. 5.
Correct Answer is. 20.
Explanation. Flux = N*I, so halve the current you must double the windings.

Question Number. 5. Which of the following materials is easiest to magnetize?
Option A. High grade steel.
Option B. Soft iron.
Option C. Cast iron.
Correct Answer is. Soft iron.
Explanation. NIL.

Question Number. 6. To find which end of an electromagnet is the north pole, use the.
Option A. Fleming's Left Hand Rule.
Option B. Right Hand Clasp Rule.
Option C. Cork Screw Rule.
Correct Answer is. Right Hand Clasp Rule.
Explanation. NIL.

Question Number. 7. The earth's magnetic field is greatest at the.
Option A. magnetic equator.
Option B. geographic poles.
Option C. magnetic poles.
Correct Answer is. magnetic poles.
Explanation. Flux density is greatest at the magnetic poles, where all the flux lines converge.

Question Number. 8. The lines of magnetic flux from a magnet will.
Option A. attract each other.
Option B. repel each other.
Option C. have no effect upon each other.
Correct Answer is. repel each other.
Explanation. NIL.

Question Number. 9. Of the following which pair of materials would most readily become magnetized?
Option A. Iron and steel.
Option B. Copper and steel.
Option C. Nickel and bronze.
Correct Answer is. Iron and steel.
Explanation. NIL.

Question Number. 10. The core material used for an electromagnet is soft iron because.
Option A. its magnetism is not easily destroyed.

Option B. it retains most of its flux density when demagnetized.
Option C. it demagnetizes easily.
Correct Answer is. it demagnetizes easily.
Explanation. NIL.

Question Number. 11. If the North pole of a magnet is brought nearer to the North pole of another magnet.
Option A. attraction between them will be increased.
Option B. repulsion between them will be reduced.
Option C. repulsion between them will be increased.
Correct Answer is. repulsion between them will be increased.
Explanation. NIL.

Question Number. 12. Where is the magnetic dip least?
Option A. Poles.
Option B. Isoclinals.
Option C. Equator.
Correct Answer is. Equator.
Explanation. Magnetic dip is another name for inclination. It is least at the equator, and maximum (90 degrees)at the magnetic poles.

Question Number. 13. When a number of ferrite pieces are grouped together, they.
Option A. are semi-permanent magnets when DC is passed through them.
Option B. electromagnets.
Option C. can be used to store binary code.
Correct Answer is. can be used to store binary code.
Explanation. Magnetic tape uses tiny ferrite particles coated onto a plastic tape.

Question Number. 14. Ampere turns is calculated by the number of turns.
Option A. multiplied by current.
Option B. divided by current.
Option C. multiplied by magnetic flux.
Correct Answer is. multiplied by current.
Explanation. Ampere turns means AMPS * TURNS.

Question Number. 15. The unit of flux is the.
Option A. Ampere turns / meter.
Option B. Weber.
Option C. Ampere turns.
Correct Answer is. Weber.
Explanation. NIL.

Question Number. 16. Lines of magnetic flux pass from.
Option A. South to North.
Option B. East to West.
Option C. North to South.
Correct Answer is. North to South.
Explanation. NIL.

Question Number. 17. Why is ferrite used in memory circuits?
Option A. High reluctance.
Option B. Low permeability.
Option C. High remanence.
Correct Answer is. High remanence.
Explanation. NIL.

Question Number. 18. Magnetic lines are flowing parallel. They will.
Option A. have no effect on each other.
Option B. attract each other.
Option C. repel each other.
Correct Answer is. repel each other.
Explanation. Assuming this means parallel AND in the same direction, they will repel each other. Like the magnetic fields around two wires, carrying current in opposite directions.

Question Number. 19. The horizontal component of the earth's magnetic field is most strongly felt at.
Option A. equator.
Option B. 45 degrees latitude.
Option C. poles.
Correct Answer is. equator.
Explanation. NIL.

Question Number. 20. Two parallel lines of magnetic flux in the same polarity.
Option A. repel each other.
Option B. have no effect on each other.
Option C. attract each other.
Correct Answer is. repel each other.
Explanation. NIL.

Question Number. 21. Magnetic fields around two parallel conductors carrying current in the same directions will.
Option A. repel.
Option B. attract.

Option C. will attract or repel depending on the type of current.
Correct Answer is. attract.
Explanation. NIL.
http://sol.sci.uop.edu/~jfalward/magneticforcesfields/magneticforcesfields.html

Question Number. 22. Magnetic field on a solenoid is.
Option A. the same both inside and outside the coil.
Option B. weakest outside the coil.
Option C. strongest outside the coil.
Correct Answer is. weakest outside the coil.
Explanation. NIL.

10b. Magnetism.

Question Number. 1. Which of the following is absolute permeability?
Option A. µ(micro)r.
Option B. µo(micro node).
Option C. µ(micro).
Correct Answer is. µ(micro). Explanation µ(micro) = µo(micro node)*µ(micro)r.

Question Number. 2. The symbol for flux density is.
Option A. H(capital).
Option B. ø(phy).
Option C. B(capital).
Correct Answer is. B(capital).
Explanation. NIL.

Question Number. 3. A paramagnetic material has a relative permeability of.
Option A. zero.
Option B. less than unity.
Option C. greater than unity.
Correct Answer is. greater than unity.
Explanation. A paramagnetic material has a greater permeability than free space (vacuum). so its relative permeability is greater than 1.

Question Number. 4. Through which material will magnetic lines of force pass the most readily?
Option A. Copper.
Option B. Iron.
Option C. Aluminum.
Correct Answer is. Iron.
Explanation. Iron (especially soft iron) has the greatest permeability.

Question Number. 5. Permanent magnets have.
Option A. high reluctance, high coercive force.
Option B. low reluctance, high coercive force.
Option C. high reluctance, low coercive force.
Correct Answer is. high reluctance, high coercive force.
Explanation. NIL.

Question Number. 6. The term used to denote the strength of a magnetic field is.
Option A. retentivity.
Option B. hysteresis.
Option C. flux density.
Correct Answer is. flux density. Explanation Flux density is the number of flux lines per unit cross sectional area.

Question Number. 7. A soft iron core is used in an ELECTRO magnet because.
Option A. it has LOW permeability and HIGH coercivity.
Option B. it has HIGH permeability and LOW coercivity.
Option C. it has HIGH permeability and HIGH coercivity.
Correct Answer is. it has HIGH permeability and LOW coercivity.
Explanation. NIL.

Question Number. 8. A non-magnetic metal.
Option A. has high retentivity.
Option B. has no permeability.
Option C. is a poor conductor.
Correct Answer is. has no permeability.
Explanation. NIL.

Question Number. 9. What is the effect of inserting an iron core into a current carrying coil?
Option A. The flux density of the original magnetic field remains constant.
Option B. The core tends to move from a stronger to a weaker part of the field.
Option C. The flux density of the original magnetic field produced by the coil is increased.
Correct Answer is. The flux density of the original magnetic field produced by the coil is increased.
Explanation. NIL.

Question Number. 10. Flux density will.
Option A. increase linearly with coercive force.
Option B. decrease linearly with magnetic flux.

Option C. increase linearly with magnetic flux.
Correct Answer is. increase linearly with magnetic flux.
Explanation. Flux density = magnetic flux lines per unit cross sectional area.

Question Number. 11. Storage of magnets should be.
Option A. in a non magnetic pox.
Option B. in pairs with keeper plates.
Option C. in pairs end to end.
Correct Answer is. in pairs with keeper plates.
Explanation. Bar magnets are stored in pairs (end-to-end) and with keeper plates. (See forum for explanation).

Question Number. 12. The hysteresis loop for a magnetic material is on a graph with.
Option A. current against flux density.
Option B. flux density against magnetising force.
Option C. total flux against flux density.
Correct Answer is. flux density against magnetising force.
Explanation. The hysteresis curve is MMF against B.

Question Number. 13. A material with a narrow hysteresis loop.
Option A. cannot be magnetised.
Option B. will have high retentivity.
Option C. will have low retentivity.
Correct Answer is. will have low retentivity.
Explanation. NIL.

Question Number. 14. If a bar magnet is cut in half.
Option A. the magnet is destroyed.
Option B. two bar magnets are formed.
Option C. one bar magnet and one non-magnet is formed.
Correct Answer is. two bar magnets are formed.
Explanation. NIL.

Question Number. 15. Copper is a.
Option A. ferromagnetic material.
Option B. paramagnetic materials.
Option C. diamagnetic material.
Correct Answer is. diamagnetic material.
Explanation. NIL.

Question Number. 16. The MMF of a coil fed with 2 amps and having 10 turns is.

Option A. 5 ampere turns.
Option B. 20 amperes / turn.
Option C. 20 ampere turns.
Correct Answer is. 20 ampere turns.
Explanation. MMF (symbol H) is amps * turns. Unit is Ampere Turns.

Question Number. 17. An example of a paramagnetic material is.
Option A. silver.
Option B. iron.
Option C. glass.
Correct Answer is. iron.
Explanation. Iron is a paramagnetic (ferromagnetic actually), the other 2 are diamagnetic (LBP notes are wrong about glass).

Question Number. 18. Vibration in a magnet causes.
Option A. flux to stay the same.
Option B. flux to decrease.
Option C. flux to increase.
Correct Answer is. flux to decrease.
Explanation. A good way to destroy a magnet is to drop it or subject it to high frequency vibrations.

Question Number. 19. Permeability of a material can be found by.
Option A. flux density / MMF.
Option B. MMF * flux density.
Option C. MMF / flux density.
Correct Answer is. flux density / MMF.
Explanation. Permeability = B/H (Reluctance = H/B, similar to resistance R = V/I).

Question Number. 20. When magnetizing a piece of material, magnetic strength will rise.
Option A. non-linearly with magnetic force.
Option B. linearly with coercive force.
Option C. linearly with magnetic force.
Correct Answer is. non-linearly with magnetic force.
Explanation. Magnetic force is MMF (or H in Henries). It is not linear because of magnetic saturation.

Question Number. 21. A material exposed to heat will.
Option A. have no effect on magnetism.
Option B. be easier to magnetise.

Option C. be harder to magnetise.
Correct Answer is. be harder to magnetise.
Explanation. The 'curie' temperature is the temperature above which the material cannot be magnetised.

Question Number. 22. If cobalt has a permeability of 4800 it is a.
Option A. ferromagnetic.
Option B. paramagnetic.
Option C. diamagnetic.
Correct Answer is. ferromagnetic.
Explanation. Cobalt is a hard ferromagnetic silver-white element.
http://en.wikipedia.org/wiki/Cobalt

Question Number. 23. Cobalt has a permeability.
Option A. greater than unity.
Option B. less than unity.
Option C. same as unity.
Correct Answer is. greater than unity.
Explanation. NIL. http://en.wikipedia.org/wiki/Cobalt

Question Number. 24. Magnetic flux.
Option A. exist in all space around the magnet.
Option B. is more concentrated at the centre of bar magnet.
Option C. occupies the space around the magnet with equal flux density.
Correct Answer is. exist in all space around the magnet.
Explanation. NIL.

Question Number. 25. The ability of a circuit to produce a magnetic flux under the influence of a MMF.
Option A. permeance.
Option B. permeability.
Option C. permanence.
Correct Answer is. permeability.
Explanation. Aircraft Electrical System. Pallett 3rd Edition appendix one page 196.

Question Number. 26. Magnetic flux saturation takes place when.
Option A. the magnetised medium will accept no further lines of flux.
Option B. the magnetic field drops to zero.
Option C. the magnetic field starts to reduce with increased magnetising force.
Correct Answer is. the magnetised medium will accept no further lines of flux.
Explanation. See a B-H diagram.

Question Number. 27. Cables are shielded to prevent 'H' magnetic interference in wires with the following material.
Option A. Copper braiding.
Option B. Ferromagnetic material.
Option C. Diamagnetic material.
Correct Answer is. Copper braiding.
Explanation. Aircraft Electricity and Electronics, Eismin 5th edition Page 78.

Question Number. 28. Spontaneous magnetism is associated with.
Option A. diamagnetic materials.
Option B. ferromagnetic materials.
Option C. paramagnetic materials.
Correct Answer is. Ferromagnetic materials.
Explanation. NIL. http://www.geo.umn.edu/orgs/irm/hg2m/hg2m_b/hg2m_b.html.

11. Inductance/inductor.

Question Number. 1. Two inductive coils are placed in close proximity with each other at 90 degrees. The number of flux linkages is.
Option A. 0.
Option B. maximum negative.
Option C. maximum positive.
Correct Answer is. 0.
Explanation. The coils must be parallel for maximum flux linkages (coupling factor). Coupling factor reduces as angular difference increases to.

Question Number. 2. What is the mutual inductance if two coils of 10mH and 500mH have 90% of the flux transferred from one to the other?
Option A. 459mH.
Option B. 4.5mH.
Option C. 63mH.
Correct Answer is. 63mH.
Explanation. Total inductance = 0.9 * root * 10 * 500 = 63.

Question Number. 3. An inductor has 1,000 turns of wire and a cross sectional area of 0.001m2. If the core has a permeability of 0.000,001 and the coil is 0.1m. What is the value of the inductor?
Option A. 100microH.
Option B. 100mH.
Option C. 10mH.
Correct Answer is. 10mH.

Explanation. 0.000001*1000*0.001/0.1 = 0.01 = 10 mH.

Question Number. 4. Three inductors 10 mH, 5 mH and 20 mH are connected in parallel. What is the total inductance?
Option A. Without knowing the coupling factor the total inductance cannot be found.
Option B. 2.86mH.
Option C. 35mH.
Correct Answer is. 2.86mH.
Explanation. In parallel, the total inductance is lower than the lowest single inductance.

Question Number. 5. If the current reaches a maximum through an inductor of 2A in 15 seconds, what is the current after 3 seconds?
Option A. 1.26A.
Option B. 0.63A.
Option C. 1A.
Correct Answer is. 1.26A.
Explanation. 1 time constant = 15/5 = 3s. 100% charge = 2A, so 1 time constant (63.2%) = 1.26A.

Question Number. 6. The time constant of an inductor is.
Option A. L/R.
Option B. L2 /R.
Option C. LR.
Correct Answer is. L/R.
Explanation. NIL.

Question Number. 7. If the rate of change of current is halved, mutual inductance will.
Option A. stay the same.
Option B. halve.
Option C. double.
Correct Answer is. stay the same.
Explanation. Get the formula for mutual inductance. Rate of change of current (i.e. frequency) is not in it.

Question Number. 8. Why are the iron cores of most induction coils laminated?
Option A. To reduce the effects of eddy currents.
Option B. To reduce the core reluctance.
Option C. To increase the core permeability.
Correct Answer is. To reduce the effects of eddy currents.

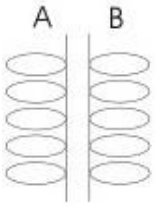
Explanation. NIL.

Question Number. 9. When more than two inductors of different inductance are connected in parallel in a circuit, the total inductance is.
Option A. equal to the sum of the individual inductance.
Option B. equal to the inductance of the highest rated inductor.
Option C. less than the inductance of the lowest rated inductor.
Correct Answer is. less than the inductance of the lowest rated inductor.
Explanation. Adding inductors in parallel is the same formula as resistors in parallel (i.e. adding an inductor actually decreases the inductance).

Question Number. 10. The time constant in an inductive circuit is the time required for the current to reach.
Option A. 70.7% of maximum value.
Option B. 63.2% of maximum value.
Option C. 63.7% of maximum value.
Correct Answer is. 63.2% of maximum value.
Explanation. NIL.

Question Number. 11. An AC inductive circuit has an inductance 0f 10 mH and a frequency input of 1000Hz. The opposition to current flow is approximately.
Option A. 63 ohms.
Option B. 63,000 ohms.
Option C. 630 ohms.
Correct Answer is. 63 ohms.
Explanation. Inductive reactance is 2pi * f * L = 6.28 * 1000 * 10/1000 = 62.8 ohms.

Question Number. 12. Rotating coil B through 90° will.



Option A. increase the EMF induced into B.
Option B. increase the EMF induced into A.
Option C. decrease the EMF induced into B.
Correct Answer is. decrease the EMF induced into B.
Explanation. Coupling factor is maximum when the coils are parallel. It is zero if they are at 90° to each other.

Question Number. 13. An inductor of resistance 5 kΩ and inductance 2mH is connected to a DC circuit. The time constant is.
Option A. 400 ns.
Option B. 10 seconds.

Option C. 40 ms.
Correct Answer is. 400 ns.
Explanation. Time constant = L/R = 2mH/5000 = 0.000,000,4 seconds = 400 ns.

Question Number. 14. When switching off the supply, the back EMF in a collapsing field in an inductor.
Option A. can be multiple times bigger than forward EMF.
Option B. never exceeds forward EMF.
Option C. is equal to forward EMF.
Correct Answer is. can be multiple times bigger than forward EMF.
Explanation. The size of the back-emf depends upon how fast the magnetic field is collapsing. That is how your car ignition turns 12V into several thousand volts.

Question Number. 15. An induced current in a coil.
Option A. opposes the EMF producing it.
Option B. does not affect the EMF producing it.
Option C. aids the EMF producing it.
Correct Answer is. opposes the EMF producing it.
Explanation. The induced current in a coil (inductor) opposes the current which produces it.

Question Number. 16. 1 Volt is produced when a current of 1 Amp per second is varied in a coil'. This is a definition of.
Option A. 1 Ampere per meter.
Option B. 1 Henry.
Option C. 1 Coulomb per second.
Correct Answer is. 1 Henry.
Explanation. Lens' Law BEMF = -L dI/dt Aircraft Electrical Systems Pallet's 3rd Edition Appendix 1 page 195.

Question Number. 17. Two inductor coils in very close proximity; if one of the coils is rotated 90 degrees slowly away from the other the mutual inductance.
Option A. decreases.
Option B.remains the same.
Option C.increases.
Correct Answer is. decreases.
Explanation. Coupling factor (mutual inductance) decreases to zero at 90 degrees.

Question Number. 18. An inductor is said to be saturated when.
Option A. the current is at a maximum.
Option B. the current through it is zero.
Option C. it will no longer accept lines of flux.

Correct Answer is. it will no longer accept lines of flux.
Explanation. NIL.

12. DC Motor/Generator Theory.

Question Number. 1. In a DC motor, the stator's magnetic field, due to armature reaction, moves.
Option A. in the same direction of rotation of the armature.
Option B. in the opposite direction of rotation of the armature.
Option C. into alignment with the GNA.
Correct Answer is. in the opposite direction of rotation of the armature.
Explanation. NIL.

Question Number. 2. A small air gap between magnetic poles results.
Option A. in a weaker field than a large air gap, for the same magnetising force.
Option B. in a stronger field than a large air gap, for the same magnetising force.
Option C. in the same field as a large air gap, for the same magnetising force.
Correct Answer is. in the same field as a large air gap, for the same magnetising force.
Explanation. Magnetic field (number of flux lines) is the same regardless of distance between poles. However, the field density (flux density) will increase with a smaller air gap.

Question Number. 3. The electromagnetic brake coil in an actuator would be energized.
Option A. only at the instant of starting and stopping.
Option B. all the time in flight.
Option C. only when the actuator is running.
Correct Answer is. only when the actuator is running.
Explanation. NIL.

Question Number. 4. In a shunt wound direct current motor with a constant voltage field supply, the torque developed by the motor is.
Option A.independent of load.
Option B. directly proportional to armature current.
Option C. inversely proportional to the armature current.
Correct Answer is. directly proportional to armature current.
Explanation. NIL.

Question Number. 5. Decreasing the field current in a shunt motor will.
Option A. decrease speed and increase torque.
Option B. increase speed and increase torque.

Option C. increase speed and decrease torque.
Correct Answer is. increase speed and increase torque.
Explanation. Decreasing the field current in a shunt motor will reduce the back emf in the armature so the armature current will increase giving a rise in torque and the RPM will increase as a consequence.

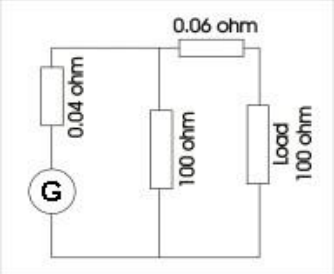
Question Number. 6. To calculate generator output you need to know the.
Option A. armature speed and number of series conductors.
Option B. armature speed and field strength.
Option C. armature speed and number of parallel conductors.
Correct Answer is. armature speed and field strength.
Explanation. NIL.

Question Number. 7. In a shunt motor, if you reverse both field current and the armature current, the motor will.
Option A. stop.
Option B. change direction.
Option C. continue to run in the same direction.
Correct Answer is. continue to run in the same direction.
Explanation. Prove it with Fleming's left hand rule.

Question Number. 8. A starter generator has a.
Option A. low resistance series field and a low resistance shunt field.
Option B. low resistance series field and a high resistance shunt field.
Option C. high resistance series field and a low resistance shunt field.
Correct Answer is. low resistance series field and a high resistance shunt field.
Explanation. NIL.

Question Number. 9. If the brake coil on an actuator motor goes open circuit, the actuator will.
Option A. run slower.
Option B.stop.
Option C.over-ride its mechanical stops.
Correct Answer is. stop.
Explanation. The brake coil is wired in series with the actuator motor coil. It withdraws a spring loaded lock to release the actuator when current is applied.

Question Number. 10. The diagram shows a 200 V long shunt generator. What is the voltage dropped across the series resistor?



Option A. 0.12 V.
Option B. 0.2 V.
Option C. 200 V.
Correct Answer is. 0.12 V.
Explanation. Don't let the field configuration confuse you. The 0.04 and 100 ohm resistors are part of the generator and can be ignored. Just consider the 0.06 ohm (the series resistor) and the load resistor. Calculate current (about 2A) then calculate voltage across 0.06 ohm resistor.

Question Number. 11. If a generator speed is halved and the field strength is doubled, the voltage output will be.
Option A. unchanged.
Option B. doubled.
Option C. halved.
Correct Answer is. unchanged.
Explanation. NIL.

Question Number. 12. How can the direction of rotation of a DC electric motor be changed?
Option A. reverse the electrical connections to either the field or armature windings.
Option B. rotate the positive brush one commutator segment.
Option C. interchange the wires which connect the motor to the external power source.
Correct Answer is. reverse the electrical connections to either the field or armature windings.
Explanation. NIL.

Question Number. 13. The only practical method of maintaining a constant voltage output from an aircraft generator under varying conditions of speed and load is to vary the.
Option A. speed at which the armature rotates.
Option B. strength of the magnetic field.
Option C. number of conductors in the armature.
Correct Answer is. strength of the magnetic field.
Explanation. NIL.

Question Number. 14. Electric motors are often classified according to the method of connecting the field coils and armature. Aircraft engine starter motors are generally of which type?
Option A. Compound.
Option B. Shunt (parallel).

Option C. Series.
Correct Answer is. Series.
Explanation. Series motors have the highest starting torque.

Question Number. 15. If a heavy mechanical load is removed from a series motor.
Option A. the speed will increase and the armature current will increase.
Option B. the speed will increase and the armature current will decrease.
Option C. the speed will decrease and the armature current will decrease.
Correct Answer is. the speed will increase and the armature current will decrease.
Explanation. Speed increases and increases the back emf which decreases the armature current.

Question Number. 16. If the correct supply were connected to a DC shunt motor which had lost its residual magnetism it would.
Option A. run in the reverse direction.
Option B. fail to run.
Option C. run normally.
Correct Answer is. run normally.
Explanation. Its a motor, not a generator!.

Question Number. 17. One purpose of a growler test is to determine the presence of:.
Option A. a shorted armature.
Option B. a broken field lead.
Option C. an out-of-round commutator.
Correct Answer is. a shorted armature.
Explanation. NIL.

Question Number. 18. The purpose of an end-travel microswitch in a linear actuator is to.
Option A. remain open and closes at end travel only.
Option B. remain open during normal operation and only close if the actuator overruns its stops.
Option C.remain closed and opens at end travel only.
Correct Answer is.remain closed and opens at end travel only.
Explanation. See Pallett - Aircraft Electrical Systems, pg 140.

Question Number. 19. Linear actuators used in aircraft are of.
Option A. split field series wound type.
Option B. compound wound type.
Option C. split field shunt wound type.
Correct Answer is. split field series wound type.

Explanation. See Pallett - Aircraft Electrical Systems, pg 141.

Question Number. 20. If a generator sparks, a possible reason is.
Option A. the brush springs are loose.
Option B. magnetic flux deflecting the EMF.
Option C. the brushes have been placed around the magnetic coil.
Correct Answer is. the brush springs are loose.
Explanation. NIL.

Question Number. 21. If the field strength of a generator is doubled, and the speed is doubled, the output EMF will.
Option A. stay the same.
Option B. double.
Option C. quadruple.
Correct Answer is. quadruple.
Explanation. NIL.

Question Number. 22. In a DC motor the pole pairs are.
Option A. connected to the brush gear.
Option B. part of the armature.
Option C. embedded within the field coils.
Correct Answer is. embedded within the field coils.
Explanation. NIL.

Question Number. 23. A series wound DC motor, the field has.
Option A. few turns of thin wire.
Option B. many turns of thin wire.
Option C. few turns of thick wire.
Correct Answer is. few turns of thick wire.
Explanation. NIL.

Question Number.24. Doubling the running time of an electrical machine would.
Option A. double the current used.
Option B. double the joules used.
Option C. double the watts used.
Correct Answer is. double the joules used.
Explanation. Power (watts) is the rate of using energy (Joules). So doubling running time will not change the power. Current is the rate of charge flow - so more charge (coulombs) will be used but not at a faster or slower 'rate'.

Question Number. 25. On a linear actuator, the field cutoff coil will be energized when.

Option A. only as the actuator commences movement.
Option B. the actuator is not running.
Option C. the actuator is running.
Correct Answer is. the actuator is running.
Explanation. Field cutoff coil is believed to be the brake coil.

Question Number. 26. An electric motor produces a force of 5 N at a distance of 0.2m from the center of rotation and rotates at a speed of 100 revs/sec. The motors output is.
Option A. 100 horsepower.
Option B. 628.4 watts.
Option C. 314.2 watts.
Correct Answer is. 628.4 watts.
Explanation. Power in a motor = torque * 2pi * revs/sec. Torque = force * radius.

Question Number. 27. Starter motors are usually.
Option A. series wound.
Option B. compound wound.
Option C. shunt wound.
Correct Answer is. series wound.
Explanation. Series wound motors have the greatest starting torque.

Question Number. 28. Generator brushes are normally made of.
Option A. steel.
Option B. carbon.
Option C. brass.
Correct Answer is. carbon.
Explanation. NIL.

Question Number.29. As the generator load is increased (within its rated capacity), the voltage will.
Option A. remain constant and the amperage output will decrease.
Option B. decrease and the amperage output will increase.
Option C. remain constant and the amperage output will increase.
Correct Answer is. remain constant and the amperage output will increase.
Explanation. The voltage regulator keeps the generator voltage output the same. Current will increase as the load resistance drops.

Question Number. 30. The voltage output of a generator is controlled by.
Option A. varying the current of the output.
Option B. varying the resistance of the output.
Option C. varying the current of the field.

Correct Answer is. varying the current of the field.
Explanation. NIL.

Question Number. 31. The current flowing in the armature of a DC motor is equal to.
Option A. (applied volts-generated volts) / armature resistance.
Option B. (applied volts-generated volts) * armature resistance.
Option C. applied volts + generated volts / armature resistance.
Correct Answer is. (applied volts-generated volts) / armature resistance.
Explanation. Ohms law I = V/R. Voltage in the armature is the applied voltage - back emf (generated voltage).

Question Number. 32. What device is used to convert alternating current, which has been induced into the loops of the rotating armature of a DC generator into direct current as it leaves the generator?
Option A. An inverter.
Option B. A commutator.
Option C. A rectifier.
Correct Answer is. A commutator.
Explanation. NIL.

Question Number. 33. Which of the following is not one of the purposes of interpoles in a generator?
Option A. Overcome armature reaction.
Option B. Reduce arcing at the brushes.
Option C. Reduce field strength.
Correct Answer is. Reduce field strength.
Explanation. NOT' one of the purposes. The purpose of interpoles is to overcome (in fact 'prevent') armature reaction. Armature reaction is partially responsible for arcing at the brushes.

Question Number. 34. To reverse the direction of a series motor.
Option A. the direction of the current through the field and the armature is reversed.
Option B. the direction of the current through the field is reversed.
Option C. a second series field is fitted.
Correct Answer is. a second series field is fitted.
Explanation. NIL.

Question Number. 35. The current consumed by a DC starter motor will.
Option A. remain relatively constant over the starting speed range.

Option B. decrease as the engine speed increases.
Option C. increase as the engine speed increases.
Correct Answer is. decrease as the engine speed increases.
Explanation. NIL.

Question Number. 36. How are generators rated?
Option A. Impedance at rated voltage.
Option B. Amperes at rated voltage.
Option C. Watts at rated voltage.
Correct Answer is. Watts at rated voltage.
Explanation. NIL.

Question Number. 37. Due to armature reaction in a DC motor.
Option A. the leading pole tips are magnetically weakened.
Option B. the trailing pole tips are magnetically weakened.
Option C. the magnetic flux is restored by moving the MNA towards the GNA.
Correct Answer is. the trailing pole tips are magnetically weakened.
Explanation. NIL.

Question Number. 38. Some electric motors have two sets of field winding wound in opposite directions so that the.
Option A. speed of the motor can be more closely controlled.
Option B. motor can be operated in either direction.
Option C. power output of the motor can be more closely controlled.
Correct Answer is. motor can be operated in either direction.
Explanation. Specifically series motors.

Question Number. 39. What polarity do interpoles take in a DC motor?
Option A. Either, provided they lay on the MNA.
Option B. The same as the next main pole ahead in the direction of rotation.
Option C. The same as the next main pole behind in the direction of rotation.
Correct Answer is. The same as the next main pole behind in the direction of rotation.
Explanation. The interpole must pull back the magnetic field. In a motor, the magnetic field deflects in the opposite direction to the armature.

Question Number. 40. What is the principal advantage of the series-wound DC motor?
Option A. Suitable for constant speed use.
Option B. High starting torque.
Option C. Low starting torque.

Correct Answer is. High starting torque.
Explanation. NIL.

Question Number. 41. Interpole windings fitted to DC series wound generators are.
Option A. in series with the armature.
Option B. in series with the field.
Option C. in parallel with the armature.
Correct Answer is. in series with the armature.
Explanation. Interpole windings are always in series with the armature, so they carry the same current as the armature.

Question Number. 42. What polarity do interpoles take in a DC generator?
Option A. the same as the next main pole behind in the direction of rotation.
Option B. either, providing they lay on M.N.A.
Option C. the same as the next main pole ahead in the direction of rotation.
Correct Answer is. the same as the next main pole behind in the direction of rotation.
Explanation. On a generator, the field is deflected in the same direction as the armature rotates. The interpoles must drag back the field.

Question Number. 43. The method most often used in overcoming the effect of armature reaction is through the use of.
Option A. shaded poles.
Option B. interpoles.
Option C. drum-wound armatures in combination with a negatively connected series field.
Correct Answer is. interpoles.
Explanation. NIL.

Question Number. 44. The starting current of a series-wound DC motor, in passing through both the field and armature windings produces a.
Option A. speed slightly higher when unloaded.
Option B. high starting torque.
Option C. low starting torque.
Correct Answer is. high starting torque.
Explanation. At low speed (i.e starting) there is a very high current in the armature (due to no back-emf). Since the field is in series with the armature, the same high current flows in it, resulting in a very high torque.

Question Number. 45. To increase the speed of a shunt motor a resistance is placed.
Option A. in parallel with the field.

Option B. in series with the field.
Option C. in series with the armature.
Correct Answer is. in series with the field.
Explanation. An apparent anomaly. Increasing the field resistance decreases the field strength which reduces the back-emf in the armature. Armature current therefore increases and its speed increases.

Question Number. 46. A 200 volt motor is taking 10 amperes armature current, the armature resistance is 0.1 ohm. The Back-EMF under these conditions will be.
Option A. 201 volts.
Option B. 199 volts.
Option C. 1 volt.
Correct Answer is. 199 volts.
Explanation. NIL.

Question Number. 47. What is a method used for restoring generator field residual magnetism?
Option A. Energize the armature.
Option B. Flash the fields.
Option C. Reseat the brushes.
Correct Answer is. Flash the fields.
Explanation. NIL.

Question Number. 48. A high surge of current is required when a DC electric motor is first started. As the speed of the motor increase.
Option A. the counter emf decreases proportionally.
Option B. the applied emf increases proportionally.
Option C. the counter emf builds up and opposes the applied emf, thus reducing the current flow through the armature.
Correct Answer is. the counter emf builds up and opposes the applied emf, thus reducing the current flow through the armature.
Explanation. NIL.

Question Number. 49. Aircraft generators are cooled by.
Option A. fuel cooling radiators.
Option B. oil cooling radiators around the main body.
Option C. ram air.
Correct Answer is. ram air.
Explanation. NIL.

Question Number. 50. On a combined DC starter - generator system.

Option A. the voltage regulator is connected to the shunt field after the start cycle is completed.
Option B. the voltage regulator controls the start sequence during engine starting.
Option C. the series coil is open circuit during the engine start sequence. **Correct Answer is.** the voltage regulator is connected to the shunt field after the start cycle is completed.
Explanation. NIL.

Question Number. 51. If the field current to a shunt wound DC motor is decreased when operating at a constant load, the motor speed will.
Option A. reduce.
Option B. not change.
Option C. increase.
Correct Answer is. increase.
Explanation. This may seem strange, but decreasing the field strength of a shunt motor will decrease the back emf of the armature and hence increase the current through the armature. This in turn increases the armature speed.

Question Number. 52. If a motor is spinning at 50 cycles per second, how long is 1 cycle of the output?
Option A. 50 seconds.
Option B. 0.83 seconds.
Option C. 0.02 seconds.
Correct Answer is. 0.02 seconds.
Explanation. Time period = 1/frequency.

Question Number. 53. In a an DC motor, the rotation of the MNA.
Option A.is opposite to the rotation of the armature.
Option B. is slightly less speed than the rotation of the armature.
Option C. is the same as the rotation of the armature.
Correct Answer is. is opposite to the rotation of the armature.
Explanation. The field in a motor reacts to the armature current by 'distorting' in the opposite direction to the armature - called armature reaction.

Question Number. 54. In a wave wound generator with 4 poles, what would be the minimum number of brushes?
Option A. 4.
Option B. 2.
Option C. 8.
Correct Answer is. 2.
Explanation. NIL.

Question Number. 55. A wire is rotated through a magnetic field. To give DC it must be connected to.
Option A. a commutator.
Option B. slip rings.
Option C. a rectifier.
Correct Answer is. a commutator.
Explanation. A commutator turns AC to DC in a generator.

Question Number. 56. If the supply to a DC shunt motor was reversed.
Option A. it would rotate in the same direction.
Option B. it would fail to run.
Option C. it would rotate in the opposite direction.
Correct Answer is. it would rotate in the same direction.
Explanation. NIL.

Question Number. 57. A series motor draws a high current on start, and then the current reduces. This is due to.
Option A. the resistance of the field and the armature in series.
Option B. the resistance of the field and armature in parallel.
Option C. the back EMF.
Correct Answer is. the back EMF.
Explanation. NIL.

Question Number. 58. Interpoles in a DC generator are connected.
Option A. in series with the armature.
Option B. in series with the field.
Option C.in parallel with the armature.
Correct Answer is. in series with the armature.
Explanation. NIL.

Question Number. 59. In a DC generator, the effect of armature reaction may be reduced by moving the brush gear.
Option A. in the direction of armature rotation towards the MNA.
Option B. from MNA to GNA.
Option C. against the direction of armature rotation towards the MNA.
Correct Answer is. in the direction of armature rotation towards the MNA.
Explanation. The MNA leads the GNS in a generator. The brushes should be put on the MNA.

Question Number. 60. The windings embedded in the pole faces of a DC generator are.
Option A. commutating coils.

Option B. interpoles.
Option C. compensating windings.
Correct Answer is. compensating windings.
Explanation. NIL.

Question Number. 61. A 6 pole wave-wound generator has.
Option A. 3 brushes.
Option B. 2 brushes.
Option C. 6 brushes.
Correct Answer is. 2 brushes.
Explanation. A wave-wound generator needs only 2 brushes regardless of the number of poles, but some may have more for increased efficiency.

Question Number. 62. Armature reaction in a DC generator causes.
Option A. MNA to move in the opposite direction of rotation.
Option B. MNA to move in the direction of rotation.
Option C. GNA to move in the direction of rotation.
Correct Answer is. MNA to move in the direction of rotation.
Explanation. NIL.

Question Number. 63. In a DC motor, back-EMF rises if the motor.
Option A. speed falls.
Option B. speed faload rises.
Option C. speed rises.
Correct Answer is. speed rises.
Explanation. B-EMF is due to generator action in the motor.

Question Number. 64. A DC generator armature has 6 poles and is lap wound. The number of brushes required are.
Option A. 2.
Option B. 3.
Option C. 6.
Correct Answer is. 6.
Explanation. 6 poles is 3 pairs. Lap wound generators require 1 pair of brushes for each pair of poles.

Question Number. 65. Reactive sparking is reduced by.
Option A. interpoles.
Option B. compensating windings.
Option C. auxiliary windings.
Correct Answer is. interpoles.

Explanation. Interpoles 'reduce' armature reaction (which causes reactive sparking). Compensating windings 'prevent' armature reaction.

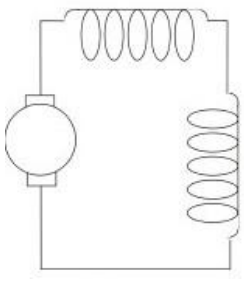
Question Number. 66. The back-EMF in a DC motor is.
Option A. equal to the applied EMF.
Option B. less than the applied EMF.
Option C. greater than the applied EMF.
Correct Answer is. less than the applied EMF.
Explanation. NIL.

Question Number. 67. The flux density of a magnetic field is 1.5T. The length of the conductor in the field is 2 m and the current flowing through the conductor is 5 amps.
The force on the conductor is.
Option A. 0.6 Newtons.
Option B. 15 Newtons.
Option C. 3.75 Newtons.
Correct Answer is. 15 Newtons.
Explanation. F = BIl = 1.5 * 5 * 2 = 15N.

Question Number. 68. A DC shunt motor has 28 volts applied. The current taken from the armature of 2 ohms resistance is 1 amp. The Back-EMF is.
Option A. 26 V.
Option B. 30 V.
Option C. 27 V.
Correct Answer is. 26 V.
Explanation. Total V = I * R = 1 * 2 = 2V. So 26V B-EMF must be generated by the generator action.

Question Number. 69. In a motor, armature reaction causes the MNA to move.
Option A. against the direction of rotation.
Option B. in the direction of rotation.
Option C. to the GNA.
Correct Answer is. against the direction of rotation.
Explanation. NIL.

Question Number. 70. The diagram shown is a.



Option A. shunt wound machine.
Option B. short shunt compound wound machine.
Option C. long shunt compound wound machine.
Correct Answer is. long shunt compound wound machine.
Explanation. NIL.

Question Number. 71. In a generator system, a stabilizing winding is used.
Option A. in series with the field to prevent oscillations.
Option B. to control output current.
Option C. to prevent voltage overshoot.
Correct Answer is. to prevent voltage overshoot.
Explanation. See CAIP EEL/1-2. The stabilizing winding picks up a 'rate of change' from the output of an AC brushless generator and damps out voltage overshoot and prevents system oscillation. The pickup is an induction coil wound around the output so is NOT wired in series.

Question Number. 72. What part of a DC motor would you find the poles?
Option A. brushes.
Option B. rotor.
Option C. stator.
Correct Answer is. stator.
Explanation. The poles are a part of the field - which is the stator on a DC motor.

Question Number. 73. The main advantage of a starter-generator over conventional units is.
Option A. it can produce a greater power output.
Option B. for the same power output there is a weight reduction and the starter drive remains engaged.
Option C. for the same power output there is a weight reduction and the drive is constantly engaged.
Correct Answer is. for the same power output there is a weight reduction and the starter drive remains engaged. OR for the same power output there is a weight reduction and the drive is constantly engaged.
Explanation. NIL.

Question Number. 74. An A.C. shunt wound motor sometimes uses a volts dropping resistor. The resistor would be.
Option A. in series with the field.
Option B. in series with the supply.
Option C. in series with the armature.
Correct Answer is. in series with the supply.

Explanation. Must be referring to a universal motor (AC shunt wound?) The volts dropping resistor is placed in series with the supply.

Question Number. 75. Commutator ripple can be reduced by.
Option A. increasing generator frequency.
Option B. the use of a ripple filter.
Option C. a resistor in series with the armature.
Correct Answer is. the use of a ripple filter.
Explanation. A ripple filter is made of a capacitor in parallel with the generator output and an inductor in series with the generator output.

Question Number. 76. In a DC motor the interpoles are part of the.
Option A. rotor assembly.
Option B. stator assembly.
Option C. field.
Correct Answer is. field.
Explanation. Interpoles are a part of the Field. Rotor and Stator are terms for AC motors.

Question Number. 77. Armature reaction is.
Option A. the MMF opposing rotation.
Option B. due to dirty or worn commutator.
Option C. reactive sparking.
Correct Answer is. the MMF opposing rotation.
Explanation. The MMF is the ampere-turns of the armature, producing a magnetic field in the armature, which opposes the main field and causes it to distort (in direction of motion of the armature).

Question Number. 78. A shunt motor.
Option A. is constant speed.
Option B. has high starting torque.
Option C. gives constant torque with variations in speed.
Correct Answer is. is constant speed.
Explanation. DC Shunt motors are 'constant speed' motors, but starting torque is small.

Question Number. 79. In a DC shunt motor, if the field resistance is increased what happens to the back EMF?
Option A. decreases.
Option B. remains the same.
Option C. increases.
Correct Answer is. decreases.

Explanation. The back EMF decreases with an increase in the field resistance. The armature current would increase and the motor speed would increase.

Question Number. 80. To increase the voltage output of a generator you can.
Option A. decrease speed.
Option B. It is not speed dependant.
Option C. increase speed.
Correct Answer is. increase speed.
Explanation. Increasing the speed makes the armature cut the magnetic field faster, inducing a greater voltage.

Question Number. 81. Generator voltage is.
Option A. dependant on speed of rotation.
Option B. independent of speed of rotation.
Option C. not dependant on speed of rotation.
Correct Answer is. dependant on speed of rotation.
Explanation. The faster the generator turns, the more voltage it produces. Besides, 'Independent' and 'not dependant' mean the same thing.

Question Number. 82. The output from a generator to a commutator is.
Option A. pulsed DC.
Option B. DC.
Option C. AC.
Correct Answer is. AC.
Explanation. Output of all generators (before the commutator) is AC.

Question Number. 83. What is the main disadvantage of a starter generator?
Option A. Heavier than like for like.
Option B. Will not supply output at low rpm.
Option C. Can only be used on piston engines.
Correct Answer is. Will not supply output at low rpm.
Explanation. At low RPM, starter-generator is still in motor configuration.

Question Number. 84. Back-EMF is the greatest when a motor is.
Option A. at operating speed.
Option B. under heavy load.
Option C. just starting to rotate.
Correct Answer is. at operating speed.
Explanation. Back EMF is greatest when motor is at high speed.

Question Number. 85. When a conductor carrying a current and placed in a magnetic field it experiences.
Option A. an electrostatic force.
Option B. an electromagnetic force.
Option C. a magnetic force.
Correct Answer is. an electromagnetic force.
Explanation. The force is generated by interaction of two magnetic fields.

Question Number. 86. The type of motor used in a linear actuator is.
Option A. parallel (shunt wound).
Option B. compound.
Option C. series.
Correct Answer is. series.
Explanation. Aircraft Electrical Systems Pallett Page 140.

Question Number. 87. If the speed of a coil in a magnetic field is doubled and the field strength is doubled the output will.
Option A. quadruple.
Option B. stay the same.
Option C. halve.
Correct Answer is. quadruple.
Explanation. Voltage = Blv. Double B (field strength) and double v (velocity) and Voltage will quadruple.

Question Number. 88. How many brushes are used in an 8 pole wave wound machine.
Option A. 6.
Option B. 8.
Option C. 2.
Correct Answer is. 2.
Explanation. Any wave wound DC generator usually has only 1 pair of brushes.

Question Number. 89. In the shunt generator the field is supplied by.
Option A. the load.
Option B. the armature.
Option C. a separate supply.
Correct Answer is. the armature.
Explanation. NIL.

Question Number. 90. Increasing the speed of an aircraft generator results in an automatic.
Option A. field circuit resistance decrease.

Option B. armature circuit resistance increase.
Option C. field circuit resistance increase.
Correct Answer is. field circuit resistance increase.
Explanation. NIL.

Question Number. 91. Which generators are usually used on aircraft?
Option A. Shunt.
Option B. Compound.
Option C. Series.
Correct Answer is. Shunt.
Explanation. NIL.

Question Number. 92. In a cumulative compound wound generator the.
Option A. the series and shunt fields assist each other.
Option B. the series and shunt fields oppose each other.
Option C. the voltage falls suddenly with an increase in load.
Correct Answer is. the series and shunt fields assist each other.
Explanation. NIL.

Question Number. 93. The shunt wound generator is controlled by a variable resistance in.
Option A. parallel with the field.
Option B. series with the armature.
Option C. series with the field.
Correct Answer is. series with the field.
Explanation. NIL.

Question Number. 94. The series wound generator's terminal voltage will, when below saturation.
Option A. increase with an increase in load.
Option B. decrease with an increase in load.
Option C. decrease with a decrease in rotational speed.
Correct Answer is. decrease with an increase in load.
Explanation. NIL.

Question Number. 95. The shunt wound generator is normally started.
Option A. on load.
Option B. Either of the above.
Option C. off load.
Correct Answer is. off load.
Explanation. NIL.

Question Number. 96. How do you reduce ripple on the output of a DC generator?
Option A. Increase the speed of the armature and add more turns.
Option B. Decrease the speed of the armature and add more series windings.
Option C. Increase the commutator segments and connect each to a separate parallel winding.
Correct Answer is. Decrease the speed of the armature and add more series windings.
OR Increase the commutator segments and connect each to a separate parallel winding.
Explanation. This amounts to increasing the separate armature windings which will increase the ripple frequency but decrease their amplitude.

Question Number. 97. Armature reaction in a DC motor causes the neutral axis to shift in.
Option A. the direction in the direction of armature rotation.
Option B. the direction opposite to the direction of armature rotation.
Option C. either direction depending on current flow.
Correct Answer is. the direction opposite to the direction of armature rotation.
Explanation. Aircraft Electricity and Electronics by Eismin, Chapter 10, pg 194.

Question Number. 98. An indication of good commutation on a DC machine would be.
Option A. high armature currents.
Option B. little or no sparking at the commutator.
Option C. silent operation of the machine.
Correct Answer is. little or no sparking at the commutator.
Explanation. NIL.

Question Number. 99. If compound DC generators are operated in parallel they must.
Option A. all rotate at the same speed.
Option B. have an equalising or load sharing loop.
Option C. all use the same voltage.
Correct Answer is. have an equalising or load sharing loop.
Explanation. Eismin - Aircraft Electricity & Electronics - page 199.

Question Number. 100. The windings embedded in the pole faces of a generator are.
Option A. commutating coils.
Option B. interpoles.
Option C. compensating coils.

Correct Answer is. compensating coils.
Explanation. Eismin - Aircraft Electricity & Electronics - page 195.

Question Number. 101. Prolonged reactive sparking in a DC generator could damage the.
Option A. armature.
Option B. commutator.
Option C. pole pieces.
Correct Answer is. commutator.
Explanation. Aircraft Electricity and Electronics Eismin Page 197.

Question Number. 102. The poles of a DC generator are laminated to.
Option A. reduce eddy current losses.
Option B. reduce flux losses.
Option C. reduce hysteresis losses.
Correct Answer is. reduce hysteresis losses.
Explanation. Aircraft Electricity and Electronics Eismin Page 186.

Question Number. 103. One advantage of a DC motor over an AC motor is.
Option A. the direction of rotation of the rotor can be changed.
Option B. less voltage is required in DC than AC.
Option C. the DC motor will use less current.
Correct Answer is. the DC motor will use less current.
Explanation. Due to the generated back emf, a DC motor will use less current.

Question Number. 104. In a shunt wound direct current motor the torque is.
Option A. inversely proportional to the current in the armature.
Option B. independent of load.
Option C. proportional to the current in the armature.
Correct Answer is. proportional to the current in the armature.
Explanation. NIL.

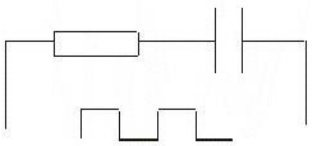
13. AC Theory.

Question Number. 1. Convention requires that in a symmetrical 3 phase system, the.
Option A. red voltage is taken as the reference phase.
Option B. yellow voltage phase leads the red phase by 120 degrees.
Option C. red voltage phase leads the blue phase by 120 degrees.
Correct Answer is. red voltage is taken as the reference phase.
Explanation. NIL.

Question Number. 2. What is the phase difference in a circuit with 100V, drawing 0.5 amps, consuming 50 Watts?
Option A. 0°.
Option B. 45°.
Option C. 90°.
Correct Answer is. 0°.
Explanation. When power is in Watts, it is all true power - there is no apparent power.

Question Number. 3. The power factor of a circuit containing an imbalance of inductive and capacitive reactance is.
Option A. greater than unity.
Option B. unity.
Option C. less than unity.
Correct Answer is. less than unity.
Explanation. NIL.

Question Number. 4. If you apply this waveform to this circuit, what is the output across the capacitor?



Option A. Pulsed negative.
Option B. Pulsed positive.
Option C. Zero.
Correct Answer is. Pulsed positive.
Explanation. With the output taken across the capacitor, this is a basic integrator - so the output is.

Question Number. 5. What value is the same as the equivalent D.C. heating effect?
Option A. Peak.
Option B. Average.
Option C. Root Mean Square.
Correct Answer is. Root Mean Square.
Explanation. NIL.

Question Number. 6. What shape is the waveform when the input pulse and the time base are unequal?
Option A. Saw tooth.
Option B. Square.
Option C. Rectangular.
Correct Answer is. Rectangular.
Explanation. NIL.

Question Number. 7. A sine wave has 5 amps RMS value. What is the peak value?
Option A. 7.07 amps.
Option B. 6.37 amps.
Option C. 10 amps.
Correct Answer is. 7.07 amps.
Explanation. Peak = 1.414 * RMS (also remember that 5 is half of 10).

Question Number. 8. What is the wave shape of the x-axis input of a traversing oscilloscope image?
Option A. Rectangular.
Option B. Triangular.
Option C. Square.
Correct Answer is. Triangular.
Explanation. NIL.

Question Number. 9. In a purely resistive AC circuit, the current vector is.
Option A. +90° out of phase with the voltage vector.
Option B. in phase with the voltage vector.
Option C. -90° out of phase with the voltage vector.
Correct Answer is. in phase with the voltage vector.
Explanation. Purely resistive - current and voltage must be in phase.

Question Number. 10. When comparing the average values of an AC generator output, to the peak values.
Option A. average voltage = 0.707 * peak voltage.
Option B. average voltage = 0.63 * peak voltage.
Option C. average voltage = same as the peak voltage.
Correct Answer is. average voltage = 0.63 * peak voltage.
Explanation. Don't get confused with RMS value.

Question Number. 11. A parallel circuit at resonance has.
Option A. maximum impedance.
Option B. zero impedance.
Option C. minimum impedance.
Correct Answer is. maximum impedance.
Explanation. A 'series' circuit at resonance has zero impedance. A 'parallel' circuit at resonance has maximum impedance.

Question Number. 12. A 10 ohm resistor has a 14.14 V peak drop across it. What power is dissipated?

Option A. 10 W.
Option B. 19.99 W.
Option C. 1.414 W.
Correct Answer is. 10 W.
Explanation. Since it mentions peak, it is AC. Always use RMS voltage when calculating power. RMS voltage = peak voltage / 1.414 (more than coincidence that 14.14 / 1.414 = 10). Power = V2/ R.

Question Number. is. 13. If a 1 ohm circuit produces a 50 W output, the phase angle
Option A. 45°.
Option B. 0°.
Option C. 90°.
Correct Answer is. 0°.
Explanation. Going by the power being quoted in Watts (rather than VA) the circuit is purely resistive and therefore the phase angle is 0 degrees.

Question Number. 14. What does a rectifier do?
Option A. Changes alternating current into direct current.
Option B. Reduces voltage.
Option C. Changes direct current into alternating current.
Correct Answer is. Changes alternating current into direct current.
Explanation. NIL.

Question Number. 15. The ratio between apparent power and true power is the.
Option A. power rating.
Option B. power factor.
Option C. efficiency.
Correct Answer is. power factor.
Explanation. Power factor = true power / apparent power.

Question Number. 16. One advantage of using AC electrical power in aircraft is.
Option A. the greater ease in stepping the voltage up or down.
Option B. AC electrical motors can be reversed while DC motors cannot.
Option C. the effective voltage is 1.41 times the maximum instantaneous voltage; therefore, less power input is required.
Correct Answer is. AC electrical motors can be reversed while DC motors cannot. OR the greater ease in stepping the voltage up or down.
Explanation. NIL.

Question Number. 17. Unless otherwise specified, any values given for current or voltage in an AC circuit are assumed to be.
Option A. effective values.
Option B. instantaneous values.
Option C. maximum values.
Correct Answer is. effective values.
Explanation. Effective values' is another term for RMS because it is the same heating 'effect' as DC.

Question Number. 18. Which aircraft circuit would be most likely to use frequency wild 200V AC?
Option A. Hydraulic pump.
Option B. Windscreen heating.
Option C. Standby compass.
Correct Answer is. Windscreen heating.
Explanation. Frequency wild can only be used on resistive circuits (such as heating and lighting).

Question Number. 19. In an AC circuit how is the value of true power calculated?
Option A. By voltmeter readings multiplied by ammeter readings.
Option B. By volts multiplied by amps multiplied by power factor.
Option C. By watt meter readings multiplied by power factor.
Correct Answer is. By volts multiplied by amps multiplied by power factor.
Explanation. NIL.

Question Number. 20. One of the chief advantages of alternating current is that it can be transmitted at a high voltage with a low power loss; the voltage can then be changed to any desired value of.
Option A. DC by means of transformers.
Option B. DC by means of inverters.
Option C. AC by means of transformers.
Correct Answer is. AC by means of transformers.
Explanation. NIL.

Question Number. 21. How many amperes will a 28-volt generator be required to supply to a circuit containing five lamps in parallel, three of which have a resistance of 6 ohms each and two of which have a resistance of 5 ohms each?
Option A. 1 ampere.
Option B. 25.23 amperes.

Option C. 1.11 amperes.
Correct Answer is. 25.23 amperes.
Explanation. resistance, then use ohms law (I=V/R) to find the total current. It is a tricky calculation to do without a calculator, so round the total resistance up (to 1 ohms) then choose the nearest answer for I.

Question Number. 22. Frequency (Hz) is the number of cycles per.
Option A. minute.
Option B. second.
Option C. revolution.
Correct Answer is. second.
Explanation. NIL.

Question Number. 23. The frequency of a power wave in an AC resistance circuit is.
Option A. half the frequency for voltage and current.
Option B. the same as the frequency for voltage and current.
Option C. twice the frequency for voltage and current.
Correct Answer is. twice the frequency for voltage and current.
Explanation. Look at a diagram of a power wave.

Question Number. 24. In an AC circuit, the effective voltage is.
Option A. less than the maximum instantaneous voltage.
Option B. equal to the maximum instantaneous voltage.
Option C. greater than the maximum instantaneous voltage.
Correct Answer is. less than the maximum instantaneous voltage.
Explanation. Effective voltage is another term for RMS voltage, due to it being equal to the DC heating effect.

Question Number. 25. Which wave form is stepped positive and negative with unequal length sides?
Option A. Rectangular wave.
Option B. Trapezoidal wave.
Option C. Saw tooth wave.
Correct Answer is. Trapezoidal wave.
Explanation. A trapezoidal waveform ALWAYS has unequal (vertical) sides. However, a sawtooth wave could also be considered to have unequal length sides (but does not necessarily have).

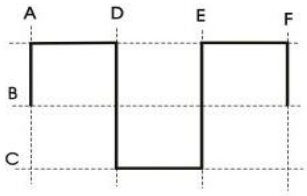
Question Number. 26. The value of an AC sine wave that will give an equivalent heating effect in a DC resistor is the.
Option A. peak value.

Option B. RMS value.
Option C. average value.
Correct Answer is. RMS value.
Explanation. NIL.

Question Number. 27. The peak factor for a sine wave is.
Option A. 1.11.
Option B. 0.707.
Option C. 1.414.
Correct Answer is. 1.414.
Explanation. Peak factor (sometimes called 'crest factor') is calculated by peak value/RMS value. For a sine wave it is 1.414.

Question Number. 28. An integrated step input at unequal time base produces.
Option A. a sine wave.
Option B. a square wave.
Option C. a saw tooth wave.
Correct Answer is. a saw tooth wave.
Explanation. Integrating a step input produces a 'ramp' or sawtooth waveform.

Question Number. 29. The mark-to-space ratio of the waveform shown is.



Option A. A to D / D to E.
Option B. D to E / D to C.
Option C. A to B / B to C.
Correct Answer is. A to D / D to E.
Explanation. Mark-to-space is the ratio of the duration of the square wave's positive amplitude (represented by a mark) to its negative amplitude (represented by a space).

Question Number. 30. Form Factor for a sine wave AC output is.
Option A. 1.1.
Option B. 1.414.
Option C. 0.707.
Correct Answer is. 1.1.
Explanation. Form Factor = RMS / Average = 0.707 / 0.63 (for a sine wave).

Question Number. 31. A sine wave of RMS value 7.07 volts has a peak to peak value of.
Option A. 20.0 volts.
Option B. 10.0 volts.
Option C. 0.707 volts.

Correct Answer is. 20.0 volts.
Explanation. Peak = RMS * 1.414 7.07 * 1.414 = 10V Peak-to-peak = 2 * peak = 20V.

Question Number. 32. The true power in an AC circuit is given by.
Option A. volts * amps.
Option B. PF * volts * amps.
Option C. voltmeter reading * PF.
Correct Answer is. PF * volts * amps.
Explanation. True power = PF * Apparent power. Apparent power = volts * amps.

Question Number. 33. The average value of 100 volts peak AC is.
Option A. 70.7 volts.
Option B. 141.4 volts.
Option C. 63.7 volts.
Correct Answer is. 63.7 volts.
Explanation. Average value of a sine wave is 0.637 * peak.

Question Number. 34. The RMS value of 200 volts peak to peak is.
Option A. 127.4 volts.
Option B. 70.7 volts.
Option C. 141.4 volts.
Correct Answer is. 141.4 volts.
Explanation. RMS = 0.707 * peak. Peak is 1/2 of peak-to-peak.

Question Number. 35. The power factor of an AC circuit is the.
Option A. cosine of the phase angle.
Option B. tangent of the phase angle.
Option C. sine of the phase angle.
Correct Answer is. cosine of the phase angle.
Explanation. NIL.

Question Number. 36. The Form Factor of an AC waveform can be found by.
Option A. RMS value divided by the average value.
Option B. average value divided by the RMS value.
Option C. average value times the RMS value.
Correct Answer is. RMS value divided by the average value.
Explanation. Form Factor = RMS / Average.

Question Number. 37. A differentiator has a time constant which is.
Option A. long.
Option B. equal to the input pulse.

Option C. short.
Correct Answer is. short.
Explanation. A differentiator provides a voltage proportional to the rate of change of the input. So for a square wave input, it needs to give a pulse on the step up, nothing on the straight bit of the square wave, then a negative pulse as the input drops back to zero. Only a very short time constant can do this.

Question Number. 38. If the frequency is increased in an AC circuit of pure resistance, the effect is.
Option A. nothing.
Option B. decreased resistance.
Option C. increased resistance.
Correct Answer is. nothing.
Explanation. NIL.

Question Number. 39. What sort of wave would be used in a CR oscilloscope to control sweep?
Option A. Square.
Option B. Sine wave.
Option C. Sawtooth.
Correct Answer is. Sawtooth.
Explanation. A sawtooth wave is used in an oscilloscope to control sweep.

Question Number. 40. If an AC sine wave has an RMS value of 5V its peak value is.
Option A. 6.37 V.
Option B. 7.07 V.
Option C. 14.14 V.
Correct Answer is. 7.07 V.
Explanation. Peak value = 1.414 * RMS = 1.414 * 5 = 7.07 V.

Question Number. 41. Apparent power in an AC circuit is found by.
Option A. V * I * cosØ.
Option B. V * I * sinØ.
Option C. V * I.
Correct Answer is. V * I.
Explanation. Apparent power = amps * volts.

Question Number. 42. A sine wave has a periodic time of 0.5 milliseconds, what is its frequency?
Option A. 200 Hz.

Option B. 2Khz.
Option C. 20Khz.
Correct Answer is. 2Khz.
Explanation. Frequency is 1/time period. Watch that prefix 'milli'. f = 1/T = 1/0.0005 = 10,000/5 = 2000 Hz = 2 kHz.

Question Number. 43. Phase angle is.
Option A. the cosine of the peak value of an ac voltage.
Option B. the difference in degrees of rotation between 2 alternating voltages or currents or a voltage and a current.
Option C. the difference in degrees between the positive and negative parts of an AC sine wave.
Correct Answer is. the difference in degrees of rotation between 2 alternating voltages or currents or a voltage and a current.
Explanation. Phase angle is the difference in degrees of rotation between 2 alternating voltages or currents or a voltage and a current.

Question Number. 44. The impedance of an AC circuit is measured in.
Option A. ohms.
Option B. kilovolt-amperes.
Option C. amperes.
Correct Answer is. ohms.
Explanation. Impedance is 'resistance to electron flow' in an AC circuit and is measured in Ohms.

Question Number. 45. What happens to the current in a series resistive resonant circuit?
Option A. It is maximum.
Option B. It is minimum.
Option C. It is zero.
Correct Answer is. It is maximum.
Explanation. At resonance the impedance is minimum (zero apart from the resistance in the circuit) and so current is highest.

Question Number. 46. A circuit has 115 V RMS, 2.5A at 60 degrees, what is the power dissipated?
Option A. 79 W.
Option B. 300 VA.
Option C. 143 W.
Correct Answer is. 143 W.
Explanation. Apparent Power = 115 * 2.5 = 287.5. PF = cos 60 = 0.5. True Power = Apparent Power * PF.

Question Number. 47. In a resonant parallel circuit, current is.
Option A. zero.
Option B. minimum.
Option C. maximum.
Correct Answer is. minimum.
Explanation. At resonance in a PARALLEL circuit, current is minimum (would be zero if it were not for the resistance in the circuit).

Question Number. 48. Power factor is.
Option A. sin theta.
Option B. tan theta.
Option C. cos theta.
Correct Answer is. cos theta.
Explanation. Power factor is cos of the phase angle (theta).

Question Number. 49. Peak factor in a standard AC circuit is.
Option A. 1.414 times max. value of applied voltage.
Option B. 1.11 times max. value of applied voltage.
Option C. 0.707 time max. value of applied voltage.
Correct Answer is. 1.414 times max. value of applied voltage.
Explanation. Peak Factor (or Crest Factor) = Peak/RMS = 1.414 for a sinusoidal wave.

Question Number. 50. The controlling wave in a CRT is.
Option A. square.
Option B. sawtooth.
Option C. sinusoidal.
Correct Answer is. sawtooth.
Explanation. A sawtooth wave is required to control the electron beam vertical and horizontal scan.

Question Number. 51. A wave form having equal amplitude and time base is a.
Option A. rectangular.
Option B. sawtooth.
Option C. square waveform.
Correct Answer is. square waveform.
Explanation. NIL.

Question Number. 52. The Sine wave signals of a circular time base are.
Option A. in phase.

Option B. phase separated by 90°.
Option C. phase separated by 180°.
Correct Answer is. phase separated by 90°.
Explanation. The two sine wave time bases (X and Y) for a CRT are displaced by 90° to produce a circle on the screen.

Question Number. 53. A differentiator has a time constant that will give.
Option A. a long pulse.
Option B. a short pulse.
Option C. a continuous output.
Correct Answer is. a short pulse.
Explanation. A differentiator turns a ramp signal into a steady state (of level corresponding to the slope of the ramp).

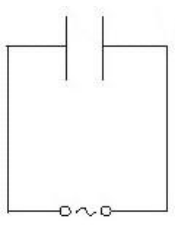
Question Number. 54. What is the power factor in a purely resistive circuit?
Option A. Equal to 1.
Option B. Less than 1 but greater than zero.
Option C. Greater than 1.
Correct Answer is. Equal to 1.
Explanation. NIL.

14. Resistive (R), Capacitive (C) and Inductive (L) Circuits.

Question Number. 1. In an A.C circuit, what happens if frequency is reduced?
Option A. Inductive elements may be damaged.
Option B. Capacitive elements may be damaged.
Option C. There will be no effect.
Correct Answer is. Inductive elements may be damaged.
Explanation. Lower frequency will decrease the reactance of the inductor which will increase its current, possibly damaging it.

Question Number. 2. What is the relationship between the voltage and the current in an A.C circuit containing resistance and inductance?
Option A. Current lags voltage by 90°.
Option B. Current lags voltage by up to 90°.
Option C. Current leads voltage by up to 90°.
Correct Answer is. Current lags voltage by up to 90°.
Explanation. Remember 'CIVIL'. But lag is not quite 90 degrees because of the resistance in the circuit.

Question Number. 3. In this circuit.

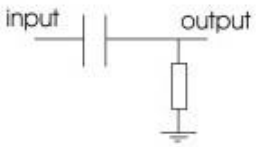


Option A. current = voltage.
Option B. current lags voltage.
Option C. current leads voltage.
Correct Answer is. current leads voltage.
Explanation. Remember 'CIVIL'.

Question Number. 4. Power factor relates to.
Option A. horsepower and Watts.
Option B. KW and KVAR.
Option C. true power and apparent power.
Correct Answer is. true power and apparent power.
Explanation. Power factor = True Power / Apparent Power.

Question Number. 5. If current lags voltage by 90°, the circuit is.
Option A. resistive.
Option B. capacitive.
Option C. inductive.
Correct Answer is. inductive.
Explanation. Remember 'CIVIL'.

Question Number. 6. What does the following circuit represent?



Option A. Low pass filter.
Option B. Differentiator.
Option C. Integrator.
Correct Answer is. Differentiator.
Explanation. An RC circuit with the output taken across the resistor is a differentiator.

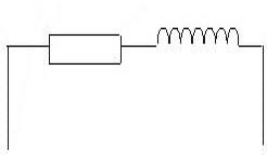
Question Number. 7. A low frequency supply.
Option A. will make the circuit operate faster due to the reduced impedance.
Option B. may damage inductive components.
Option C. will have no effect on inductive components.
Correct Answer is. may damage inductive components.
Explanation. Lowering the frequency of the current through an inductive component will reduce its reactance and increase the current, possibly burning out the component.

Question Number. 8. In a parallel R, L, C circuit, the value of the capacitor is quadrupled, then the value of the impedance would.
Option A. remain the same.
Option B. reduce.

Option C. increased.
Correct Answer is. reduce.
Explanation. Increasing the capacitor will decrease the capacitive reactance (and therefore the impedance) - just look at the formula for capacitive reactance. This will decrease the total reactance in the parallel circuit.

Question Number. 9. In a capacitive circuit, if the frequency is increased.
Option A. reactance remains the same.
Option B. impedance increases.
Option C. the current increases.
Correct Answer is. the current increases.
Explanation. Get the formula for capacitive reactance. The current increases because the reactance decreases.

Question Number. 10. In the circuit shown, what happens to the total circuit impedance if L is tripled?



Option A. Reduces.
Option B. Increases.
Option C. Remains the same.
Correct Answer is. Increases.
Explanation. If the inductance of the inductor is tripled, then its reactance will triple which will increase the impedance of the circuit. (But not by three times - be careful).

Question Number. 11. In a tuned circuit at resonance, the circuit will be.
Option A. resistive.
Option B. capacitive.
Option C. inductive.
Correct Answer is. resistive.
Explanation. In a tuned circuit, the inductive reactance and the capacitive reactances cancel each other, leaving just pure resistance.

Question Number. 12. A circuit has a resistance of 50 ohms and an inductance of 0.2 Henry. If it is connected to a 200 volt 50 Hz supply the reactance will be.
Option A. 31.42 ohms.
Option B. 62.84 ohms.
Option C. 6.284 ohms.
Correct Answer is. 62.84 ohms.
Explanation. Inductive reactance = $2\pi fL$. 2 * 3.14 * 50 * 0.2 = 62.84 ohms. Since it asks for reactance (not impedance) you can neglect the resistance of 50 ohms.

Question Number. 13. In a vector diagram showing the magnitude and direction of the inductance, capacitance and resistance in an AC circuit.
Option A. the inductive and capacitance reactance would be additive with the resistance subtractive.
Option B. it is impossible to show values of this kind using vectors.
Option C. the inductive reactance would be in opposition to the capacitive reactance and resistance at 90 degrees.
Correct Answer is. it is impossible to show values of this kind using vectors. OR the inductive reactance would be in opposition to the capacitive reactance and resistance at 90 degrees.
Explanation. NIL.

Question Number. 14. At resonant frequency the phase difference between the voltage and current of an AC supply feeding an inductive and capacitive network is.
Option A. 90 degrees.
Option B. 0 degrees.
Option C. 180 degrees.
Correct Answer is. 0 degrees.
Explanation. NIL.

Question Number. 15. An increase in which of the following factors will cause an increase in the inductive reactance of a circuit?
Option A. Inductance and frequency.
Option B. Resistance and capacitive reactance.
Option C. Resistance and voltage.
Correct Answer is. Inductance and frequency.
Explanation. NIL.

Question Number. 16. When a circuit with a series inductance and capacitance is at resonant frequency.
Option A. the current in the circuit decreases.
Option B. the impedance of the circuit is such that the voltage is in phase with the current.
Option C. the impedance of the circuit is such that the voltage leads the current by exactly 90 degrees.
Correct Answer is. the impedance of the circuit is such that the voltage is in phase with the current.
Explanation. At resonance, the capacitive reactance and the inductive reactance cancel each other, leaving a circuit with a phase angle of zero degrees.

Question Number. 17. A pure capacitor, inductor and resistor are connected in series and the voltage drops across each are 10V and the total current flowing in the circuit is 1A. How much true power is the circuit consuming?
Option A. 30VA.
Option B. 30W.
Option C. 10W.
Correct Answer is. 10W.
Explanation. Get the formula for resonant frequency. Tricky calculation to do without a calculator though.

Question Number. 18. If a capacitor 1µF and an inductor 10mH are connected in parallel what is their approximate resonant frequency?
Option A. 1.6 kHz.
Option B. 62 Hz.
Option C. 3.2 MHz.
Correct Answer is. 1.6 kHz.
Explanation. Get the formula for resonant frequency. Tricky calculation to do without a calculator though.

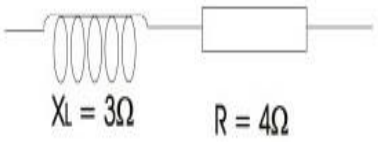
Question Number. 19. Current in an inductive circuit will.
Option A. lag voltage.
Option B. lead voltage.
Option C. be at unity.
Correct Answer is. lag voltage.
Explanation. Remember CIVIL.

Question Number. 20. The impedance of a series tuned circuit at resonance is.
Option A. zero.
Option B. minimum.
Option C. maximum.
Correct Answer is. minimum.
Explanation. NIL.

Question Number. 21. In an inductive resistive circuit, 1 amp flows from a supply of 100V dissipating 50 Watts of power. The phase angle is.
Option A. 60°.
Option B. 90°.
Option C. 45°.
Correct Answer is. 60°.

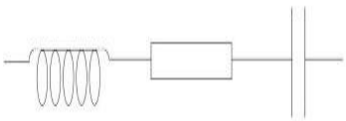
Explanation. Apparent power = amps * volts = 1 * 100 = 100VA. But True power = 50W. Power Factor = TP/AP = 50/100 = 0.5. Also, PF = COSINE of phase angle. 0.5 = COSINE of phase angle. Phase angle is therefore 60 degrees.

Question Number. 22. In the circuit shown, impedance will be.



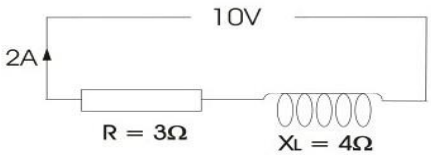
Option A. 5 ohms.
Option B. 9 ohms.
Option C. 7 ohms.
Correct Answer is. 5 ohms.
Explanation. Draw the vector diagram and find the resultant by Pythagoras - it is a 3-45 triangle.

Question Number. 23. In the circuit shown, if the frequency is increased from zero to resonant frequency, the circuit current would.



Option A. increase.
Option B. decrease.
Option C. stay the same.
Correct Answer is. increase.
Explanation. In a series resonant circuit, the impedance is a minimum (and equal only to the resistance of the resistor in the circuit).

Question Number. 24. The true power developed in this circuit is.



Option A. 20W.
Option B. 50W.
Option C. 12W.
Correct Answer is. 12W.
Explanation. True power is only in the resistor = I2 R = 2x2x3 = 12W.

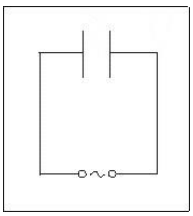
Question Number. 25. In a series LCR circuit at resonance, R = 100 ohms, L and C are each 10 ohms. The total impedance is.
Option A. zero ohms.
Option B. 100 ohms.
Option C. 30 ohms.
Correct Answer is. 100 ohms.
Explanation. Resultant reactance (XL-XC) is 10-10 = 0 ohms. So the total impedance of the circuit is the remaining 100 ohm resistor.

Question Number. 26. In a high Q parallel resonant circuit, what happens to impedance if capacitance is increased by a factor of 4?
Option A. It increases by factor of 4.
Option B. It reduces by 75%.
Option C. It remains the same.
Correct Answer is. It reduces by 75%.
Explanation. Impedance cannot be any higher in a parallel circuit at resonance. If capacitance is changed, circuit will no longer be at resonance and impedance will drop.

Question Number. 27. A parallel circuit at resonance has its impedance at a.
Option A. maximum.
Option B. zero.
Option C. minimum.
Correct Answer is. maximum.
Explanation. Parallel circuit - impedance is maximum at resonance.

Question Number. 28. The formula for impedance in a series circuit is the root of.
Option A. R2 + (XC-XL)2 .
Option B. R2 -(XL-XC)2 .
Option C. R2 + (XL-XC)2 .
Correct Answer is. R2 + (XL-XC)2 .
Explanation. XL is normally considered to be positive reactance and XC negative reactance. So formula is with XL-XC (not XC-XL).

Question Number. 29. In this circuit applied voltage is.



Option A. V = IXL.
Option B. V = I/R.
Option C. V = IXC.
Correct Answer is. V = IXC.
Explanation. V = I * XC (from Ohm's Law).

Question Number. 30. In a parallel LCR circuit, if the capacitance is increased by 4 times, what happens to the impedance of the capacitor?
Option A. increases by 4 times.
Option B. remains the same.
Option C. decreases by 75%.
Correct Answer is. decreases by 75%.
Explanation. Presumably this is referring to the impedance of the capacitor alone, which would reduce to 1/4 as $X = 1/2\pi fC$. The impedance of the parallel circuit

would reduce also, but how much depends upon the relative size of the other components.

Question Number. 31. If the frequency to a capacitor increases, the current through it.
Option A. decreases.
Option B. increases.
Option C. is zero.
Correct Answer is. is zero.
Explanation. If it really does mean 'through' it, the answer is zero, as no current goes 'through' a capacitor regardless of its frequency. However, if it means the current in the circuit, the capacitive reactance will go down, thus its current will go UP.

Question Number. 32. If in a electrical circuit there is a difference between the capacitive reactance and the inductive reactance, what would the power factor of the circuit be?
Option A. More than unity.
Option B. Less than unity.
Option C. Unity.
Correct Answer is. Less than unity.
Explanation. Power Factor is always less than one (unity).

Question Number. 33. In a Series LC circuit if the value of the capacitance is increased then the power factor will be.
Option A. greater than 1.
Option B. less than 1.
Option C. equal to 1.
Correct Answer is. less than 1.
Explanation. The power factor is always less than 1 unless the circuit is at resonance.

Question Number. 34. What is the current in the circuit with a resistance of 8 ohms, inductive reactance of 12 ohms, capacitive reactance of 18 ohms with 20 volts applied across it?
Option A. 10 amps.
Option B. 1 amp.
Option C. 2 amps.
Correct Answer is. 2 amps.
Explanation. Calculate the total impedance $Z = \sqrt{(36 + 64)} = 10$ and then use formula $V = Z * I$ to find current.

Question Number. 35. A circuit containing a resistor, capacitor and inductor where resonant frequency is met, what will the impedance of the circuit be?
Option A. Maximum.
Option B. Resistance across the resistor.
Option C. Zero.
Correct Answer is. Resistance across the resistor.
Explanation. The XL and XC cancel at resonance, leaving only the R.

15. Transformers.

Question Number. 1. How many turns does the secondary winding of a 2:1 step-up transformer have?
Option A. Less than primary.
Option B. More than primary.
Option C. Less turns but with thicker wire.
Correct Answer is. More than primary.
Explanation. Clearly using British notation of Secondary: Primary.

Question Number. 2. To reduce eddy currents in a transformer you would.
Option A. increase the thickness of laminations in the magnetic core.
Option B. reduce the number of turns on the primary winding.
Option C. reduce the thickness of laminations in the magnetic core.
Correct Answer is. reduce the thickness of laminations in the magnetic core.
Explanation. Read up on transformer losses.

Question Number. 3. A transformer has an input of 400V and a ratio of 2:1. If the transformer is delta / star wound, what will the line voltage output be?
Option A. 115V.
Option B. 346V.
Option C. 200V.
Correct Answer is. 346V.
Explanation. Star wound output - line voltage is 1.73 * phase voltage.

Question Number. 4. A Transformer with 115V primary voltage and a ratio of 5:1 is supplying a landing light (load 24V 45 amps) is used, what is the current drawn?
Option A. 205 amps.
Option B. 4.5 amps.
Option C. 9 amps.
Correct Answer is. 9 amps.

Explanation. When the voltage is stepped DOWN, the current has been stepped UP. So with a 45A output current on a 5:1 transformer.

Question Number. 5. A Transformer has 4500 secondary turns and 750 primary turns. Its turns ratio is.
Option A. 1:6.
Option B. 1/6.
Option C. 6:1.
Correct Answer is. 6:1.
Explanation. Turns ratio is Secondary: Primary (using British notation).

Question Number. 6. The point of coercivity occurs when the.
Option A. magnetic flux is zero even though a magnetizing force is being applied.
Option B. magnetizing force reaches a peak positive or negative value.
Option C. magnetizing force applied causes the material to become magnetically saturated.
Correct Answer is. magnetic flux is zero even though a magnetizing force is being applied.
Explanation. NIL.

Question Number. 7. The primary winding of a 3-phase transformer.
Option A. is delta wound.
Option B. could be either delta or star wound.
Option C. is star wound.
Correct Answer is. could be either delta or star wound.
Explanation. NIL.

Question Number. 8. In a transformer, if the rate of change of current increases, the mutual inductance will.
Option A. decrease.
Option B. remain the same.
Option C. increase.
Correct Answer is. remain the same.
Explanation. Transformer ratio (which is dependant upon the mutual inductance) is not a function of frequency.

Question Number. 9. A 4:1 step down transformer draws 115 V and 1 A. The output power will be.
Option A. 460 V at 0.25 A.
Option B. 28.5 V at 16 A.
Option C. 28.5 V at 4 A.
Correct Answer is. 28.5 V at 4 A.

Explanation. NIL.

Question Number. 10. The secondary coil of a transformer has 1500 turns and 10 Ω resistance. The primary coil has 1kΩ resistance. How many turns does the primary coil have?
Option A. 15,000.
Option B. 1,500,000.
Option C. 150,000
Correct Answer is. 15,000.
Explanation. Turns ratio = square root of the impedance ratio.

Question Number. 11. In a star wound primary transformer, how could you wind the secondary winding?
Option A. star only.
Option B. either delta or star.
Option C. delta only.
Correct Answer is. either delta or star.
Explanation. The opposite type of winding is preferred because this reduces interference between the two. However, the connecting circuits may dictate which is used - either way, any combination is possible.

Question Number. 12. A step up transformer has.
Option A. two windings.
Option B. one winding.
Option C. three windings.
Correct Answer is. two windings.
Explanation. NIL.

Question Number. 13. In a transformer core loss is 200 W and copper loss is 220W at no load. What is the core loss at full load?
Option A. 200 W.
Option B. 0 W.
Option C. 220 W.
Correct Answer is. 200 W.
Explanation. Since the flux is (almost) the same when on load as it is off load, the core loss is the same. (However, copper loss will be greater ON load because of the higher current).

Question Number. 14. The secondary winding of a transformer has an impedance of 10 ohms and 1500 turns. For the primary winding to have an impedance of 1 kilohm, how many turns must it have?
Option A. 15,000.

Option B. 1,500,000.
Option C. 150,000
Correct Answer is. 15,000.
Explanation. Turns ratio = square root of impedance ratio.

Question Number. 15. Eddy currents in a transformer core are reduced by.
Option A. decreasing the thickness of the laminates.
Option B. making the core from a solid block.
Option C. increasing the thickness of the laminates.
Correct Answer is. decreasing the thickness of the laminates.
Explanation. To reduce eddy currents, the thinner the laminates, the better.

Question Number. 16. Transformer copper loss on full load is 220 Watts. On half load the loss will be.
Option A. 440 Watts.
Option B. 110 Watts.
Option C. 55 Watts.
Correct Answer is. 55 Watts.
Explanation. Since copper loss is given by I2R, if the load doubles, the copper loss will quadruple. So it must have been 55 Watts on half load to be 220Watts on full load. (Note: Core loss does not change with load).

Question Number. 17. How can it be determined if a transformer winding has some of its turns shorted together?
Option A. measure the input voltage with an ohmmeter.
Option B. the output voltage will be high.
Option C. the transformer will get hot in normal operation.
Correct Answer is. the transformer will get hot in normal operation.
Explanation. Copper loss (heat) is given by I2R. If some turns are shorted together, the resistance (R) goes down and the current (I) goes up. But since the current is squared, the heat loss will increase on a square law.

Question Number. 18. Eddy currents in a transformer can be reduced by.
Option A. using a single solid piece of metal.
Option B. laminations.
Option C. using a special nonmetallic material.
Correct Answer is. laminations.
Explanation. NIL.

Question Number. 19. What is the ratio of turns between the primary coil winding and the secondary coil winding of a transformer designed to triple its input voltage?

Option A. primary will have one-third as many turns as its secondary.
Option B. primary will have three times as many turns as its secondary.
Option C. primary will have twice as many turns as its secondary.
Correct Answer is. primary will have one-third as many turns as its secondary.
Explanation. NIL.

Question Number. 20. A transformer should always have its.
Option A. primary shorted or off load.
Option B. secondary shorted or on load.
Option C. secondary open circuit or on load.
Correct Answer is. secondary open circuit or on load.
Explanation. If you short out the secondary winding, the primary will burn out.

Question Number. 21. Which of the following would be used to calculate transformer turns ratio?
Option A. secondary turns ÷ primary turns.
Option B. primary turns × secondary turns.
Option C. primary turns ÷ secondary turns.
Correct Answer is. secondary turns ÷ primary turns.
Explanation. If the American version of turns ratio is used it is Primary: Secondary. English notation is Secondary : Primary.

Question Number. 22. The voltage in a transformer secondary coil that contains twice as many loops as the primary coil will be.
Option A. less and the amperage greater than in the primary coil.
Option B. greater and the amperage greater than in the primary coil.
Option C. greater and the amperage less than in the primary coil.
Correct Answer is. greater and the amperage greater than in the primary coil. OR greater and the amperage less than in the primary coil.
Explanation. It is a step up transformer. The voltage is therefore stepped up and the current stepped down by the same ratio. It must do this because the power (IV) is the same in the primary and secondary (neglecting efficiency).

Question Number. 23. The area of a hysteresis loop is proportional to the.
Option A. energy dissipated in putting the material through a complete cycle of magnetization and demagnetization.
Option B. relative permeability of the material being magnetized.
Option C. energy absorbed in completely demagnetizing the material.
Correct Answer is. energy dissipated in putting the material through a complete cycle of magnetization and demagnetization.
Explanation. NIL.

Question Number. 24. In transformer operation, hysteresis losses are.
Option A. current overcoming coil resistance.
Option B. induced current in the iron core.
Option C. energy wasted in reversing core magnetization.
Correct Answer is. energy wasted in reversing core magnetization.
Explanation. NIL.

Question Number. 25. What causes a transformer to be noisy?
Option A. High core losses.
Option B. An air gap in the core.
Option C. High coil resistance.
Correct Answer is. An air gap in the core.
Explanation. An air gap in the magnetic core causes noise.

Question Number. 26. A transformer with a 5:1 ratio has a 24V output. What is the input?
Option A. 120 V DC.
Option B. 4.8 V AC.
Option C. 120 V AC.
Correct Answer is. 120 V AC.
Explanation. 5:1 is step down. So input must be 5 * 24 = 120 V. Transformers only work on AC.

Question Number. 27. Copper losses in a transformer are caused by.
Option A. the resistance in the windings.
Option B. wasting of the copper wires due to friction.
Option C. circulating currents through the transformer.
Correct Answer is. the resistance in the windings.
Explanation. NIL.

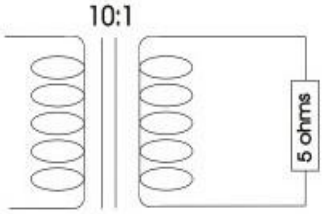
Question Number. 28. The copper loss on a single phase transformer is 25 Watts on full load. What will it be on half load?
Option A. 5 Watts.
Option B. 6.25 Watts.
Option C. 12.5 Watts.
Correct Answer is. 6.25 Watts.
Explanation. Copper loss = I2 R . So halve the current (load) and you reduce the copper loss to 1/4.

Question Number. 29. A transformer is designed to operate at 60 Hz. It is connected across a 50 Hz supply. The primary windings would.
Option A. draw more current.

Option B. draw the same current.
Option C. draw less current.
Correct Answer is. draw more current.
Explanation. The inductive reactance decreases with a decreased frequency - so it will draw MORE current.

Question Number. 30. A current transformer, when disconnected from a circuit must be.
Option A. left open circuit.
Option B. short circuited.
Option C. have a resistor connected across the terminals.
Correct Answer is. short circuited.
Explanation. Current transformers must be short circuited when disconnected.

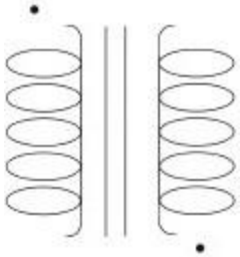
Question Number. 31. What is the reflected impedance in the primary of the transformer circuit shown?



Option A. 20 ohms.
Option B. 500 ohms.
Option C. 50 ohms.
Correct Answer is. 500 ohms.
Explanation. Turns ratio = √(turns ratio). 10/1 = √Zin/5. 100 = Zin/5 Zin = 500.

Question Number. 32. A transformer rated at a frequency of 200 Hz.
Option A. may be used at any other frequency.
Option B. may only be used at the rated frequency or above.
Option C. may only be used at the rated frequency or below.
Correct Answer is. may only be used at the rated frequency or above.
Explanation. Since the reactance of the primary coil decreases with decreasing frequency, using below the rated frequency may damage it due to increased current flow.

Question Number. 33. The dots on the transformer symbol shown are called, and indicate.



Option A. phasing dots, point that have the opposite polarity at the same moment in time.

Option B. phasing dots, point that have the same polarity at the same moment in time.
Option C. quadrature dots, points are 90o out of phase.
Correct Answer is. phasing dots, point that have the same polarity at the same moment in time.
Explanation. NIL.

Question Number. 34. A transformer is built with a material having a.
Option A. high coercive force.
Option B. wide hysteresis loop.
Option C. narrow hysteresis loop.
Correct Answer is. narrow hysteresis loop.
Explanation. The area of the hysteresis loop is the power lost in repeatedly reversing the magnetism.

Question Number. 35. In a circuit which possesses mutual inductance, current is increased to the primary.
Option A. the induced EMF in the secondary produces a current in the secondary circuit which opposes the increase in flux due to the increase of current in the primary.
Option B. the induced EMF in the secondary produces a current in the secondary circuit which assists the increase in flux due to the increase of current in the primary.
Option C. the induced EMF in the secondary produces a current in the secondary circuit whose flux has no effect on the flux in the primary.
Correct Answer is. the induced EMF in the secondary produces a current in the secondary circuit which opposes the increase in flux due to the increase of current in the primary.
Explanation. NIL.

Question Number. 36. A transformer has 500 turns on the primary and 100 turns on the secondary. When connected to a 100 V supply, the output is.
Option A. 500 V.
Option B. 25 V.
Option C. 20 V.
Correct Answer is. 20 V.
Explanation. 5:1 step down. 100/5 = 20V.

Question Number. 37. A transformer has 500 turns on the primary and 100 turns on the secondary. The secondary supplies 20V and is connected to a 10 ohm load. The primary current is.
Option A. 0.4 amps.
Option B. 2 amps.

Option C. 10 amps.
Correct Answer is. 0.4 amps.
Explanation. Secondary current = V/R = 20/10 = 2A. Primary current = 2A/5 = 0.4A.

Question Number. 38. A transformer has 1200 turns primary and 4800 turns secondary. What value of load resistance would be required to give a reflected impedance of 1000 ohms?
Option A. 4 kilohm.
Option B. 1 kilohm.
Option C. 16 kilohm.
Correct Answer is. 16 kilohm.
Explanation. Impedance matching formula, Turns Ratio = √(Impedance Ratio).

Question Number. 39. An autotransformer windings are.
Option A. wired in parallel.
Option B. on separate formers.
Option C. connected.
Correct Answer is. connected.
Explanation. NIL.

Question Number. 40. What voltage can the neutral line carry in a star transformer?
Option A. Zero voltage.
Option B. Phase voltage.
Option C. Combined line voltages.
Correct Answer is. Zero voltage.
Explanation. The neutral line is grounded.

Question Number. 41. A transformer to supply a 24V load with a 5:1 turns ratio will have what primary supply?
Option A. 120 V AC.
Option B. 48 V AC.
Option C. 120 V DC.
Correct Answer is. 120 V AC.
Explanation. 5:1 is step down, so the supply voltage must be 5 * 24 = 120 VAC (AC because transformers don't work with DC).

Question Number. 42. A transformer has 2000V, 500 turns on the primary and 50 turns on the secondary. What would be the line voltage if the transformer were Delta/Star connected?
Option A. 200V.
Option B. 450V.

Option C. 346V.
Correct Answer is. 346V.
Explanation. It is a 10:1 step down transformer. Phase voltage in secondary = 200V. With star wound secondary, line voltage = 1.73 * 200 = 346V.

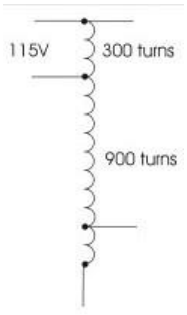
Question Number. 43. The line voltage in a Wye wound transformer is.
Option A. root 3 / phase voltage.
Option B. root 3 * phase voltage.
Option C. the same as phase voltage.
Correct Answer is. root 3 * phase voltage.
Explanation. Line voltage = root 3 * phase voltage in a Wye (star) wound transformer.

Question Number. 44. Eddy current losses in a transformer are.
Option A. magnetic flows induced into the core.
Option B. current used in magnetising the core.
Option C. hysteresis losses.
Correct Answer is. magnetic flows induced into the core.
Explanation.

Question Number. 45. A 3-phase star-delta wound transformer gives.
Option A. 30° phase shift.
Option B. 90° phase shift.
Option C. no phase shift.
Correct Answer is. 30° phase shift.
Explanation. A star-delta wound transformer gives a 30 degree phase shift.

Question Number. 46. In a 4:1 step up transformer, what would give a reflected impedance of 1Kilohm?
Option A. 1 k ohm.
Option B. 16k ohm.
Option C. 4k ohm.
Correct Answer is. 16k ohm.
Explanation. Turns ratio = √(impedance ratio).

Question Number. 47. The input is 115V and is applied across the 300 turn portion of the autotransformer shown. What is the output?



Option A. 115V.
Option B. 28V.
Option C. 460V.
Correct Answer is. 460V.

Explanation. Autotransformer 300:1200 ratio 1:4. Output = 4 * 115V.

Question Number. 48. A near perfect 4:1 step up transformer has it's primary connected to 120VAC, if the secondary is connected to a load with 1600 ohms resistance, what is the current in the primary?
Option A. 1 amp.
Option B. 0.3 amps.
Option C. 1.2 amps.
Correct Answer is. 1.2 amps.
Explanation. Secondary voltage = 480V, Secondary current = 480/1600 = 0.3A, Primary current = 4 * 0.3 = 1.2A.

Question Number. 49. Flux losses in a transformer can be prevented by.
Option A. winding the primary on top of the secondary.
Option B. the use of primary shielding.
Option C. laminating the core.
Correct Answer is. winding the primary on top of the secondary.
Explanation. Flux losses are due to primary flux lines not going through the secondary.

Question Number. 50. To supply a 24volt output with a transformer with a 5:1 turns ratio, the input required is.
Option A. 4.8V.
Option B. 24V.
Option C. 120V.
Correct Answer is. 120V.
Explanation. Assuming this is a step-down transformer (i.e 5:1 means Primary: Secondary).

Question Number. 51. What would you use for the core in a generator current transformer?
Option A. Air core.
Option B. Laminated core.
Option C. Steel Core.
Correct Answer is. Air core.
Explanation. A current transformer uses the generator output cable as its primary, so it must have a hollow (air) core.

Question Number. 52. An aircraft transformer is needed to step up a voltage. What sort would be used?
Option A. Air core.
Option B. Solid core.

Option C. Laminated core.
Correct Answer is. Laminated core.
Explanation. Laminated core transformers are most efficient.

Question Number. 53. In a 4:1 step-up transformer, 120V is applied to the primary, and the load on the secondary is 1600 Ohms. What is the current in the primary?
Option A. 0.075A.
Option B. 1.2A.
Option C. 3A.
Correct Answer is. 1.2A.
Explanation. Voltage in secondary = 4 * 120 = 480V. Current in Secondary = 480/1600 (Ohm's Law) = 3/10A. Current in Primary = 4 * 3/10A = 12/10A = 1.2A (Remember that current is stepped down Primary to Secondary in a step-up transformer).

Question Number. 54. A 10:1 step up power transformer has 120 V, and 3A flowing through the primary, and 0.285 A flowing through the secondary what is the efficiency?
Option A. 90%.
Option B. 95%.
Option C. 85%.
Correct Answer is. 95%.
Explanation. Power in primary = 120 * 3 = 360W. Power in secondary = 1200 * 0.285 = 342W. 342/360 = 0.95.

Question Number. 55. Aircraft autotransformers are of what type?
Option A. Open core.
Option B. Twin core.
Option C. Laminated core.
Correct Answer is. Laminated core.
Explanation. Pg 60 Aircraft Electrical Systems Pallett.

Question Number. 56. An autotransformer is.
Option A. primary and secondary coils.
Option B. primary coil only.
Option C. primary and secondary coils on single bar.
Correct Answer is. primary and secondary coils on single bar.
Explanation. NIL. http://www.hyperdictionary.com/dictionary/autotransformer

Question Number. 57. The windings on a autotransformer are.
Option A. wound on separate legs of core.
Option B. wound with no magnetic core.

Option C. wound with the primary over the secondary.
Correct Answer is. wound with no magnetic core. OR wound with the primary over the secondary.
Explanation. NIL.

Question Number. 58. How do you reduce Hysteresis loss of a transformer?

Option A. Wind the coils one over the other and by careful design of the transformer.
Option B. By laminating the core.
Option C. By using a core material which can be easily demagnetised.
Correct Answer is. By laminating the core. OR By usinga core material which can be easily demagnetised.
Explanation. NIL.

16. Filters.

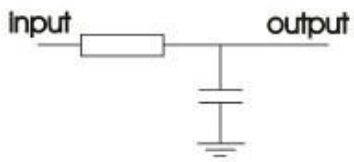
Question Number. 1. Which is a high-pass filter?
Option A. L type with series L and shunt C.
Option B. L type with series C and shunt L.
Option C. Π type with series C and L.
Correct Answer is. Π type with series C and L.
Explanation. NIL.

Question Number. 2. A high pass filter will.
Option A. allow frequencies above a certain value to pass.
Option B. allow frequencies within a range to pass.
Option C. allow frequencies below a certain value to pass.
Correct Answer is. allow frequencies above a certain value to pass.
Explanation. Read up on filters - especially high pass, low pass, band pass and band stop.

Question Number. 3. A band stop filter.
Option A. attenuates frequencies either side of a narrow range.
Option B. stops a narrow range of frequencies.
Option C. stops frequencies either side of a narrow range.
Correct Answer is. stops a narrow range of frequencies.
Explanation. NIL.

Question Number. 4. This is a diagram of a.

Option A. high pass filter.



Option B. band pass filter.
Option C. low pass filter.
Correct Answer is. low pass filter.
Explanation. This is a very simple low pass filter, since the capacitor will absorb all high frequencies.

Question Number. 5. A capacitor in series and inductor in parallel make what kind of filter?
Option A. Low pass.
Option B. Band pass.
Option C. High pass.
Correct Answer is. High pass.
Explanation. NIL.

Question Number. 6. A high pass filter has.
Option A. high impedance to high frequency, low impedance to low frequency.
Option B. high impedance to both high and low frequency.
Option C. high impedance to low frequency, low impedance to high frequency.
Correct Answer is. high impedance to low frequency, low impedance to high frequency.
Explanation. NIL.

Question Number. 7. A circuit with good selectivity will have.
Option A. a large bandwidth.
Option B. a narrow bandwidth.
Option C. a low L/C ratio.
Correct Answer is. a narrow bandwidth.
Explanation. NIL.

Question Number. 8. A filter with a small bandwidth has.
Option A. a high value of Q.
Option B. a Q of zero.
Option C. a low value of Q.
Correct Answer is. a high value of Q.
Explanation. Q is the 'quality' of a filter.

Question Number. 9. Band stop filter.
Option A. attenuates frequencies in a specified narrow band.
Option B. stops frequencies in a narrow band.
Option C. pass all frequencies in that band.
Correct Answer is. attenuates frequencies in a specified narrow band.

Explanation. Attenuates means 'to reduce'. No filter will totally stop the unwanted filter band.

Question Number. 10. Band pass filter in a circuit.
Option A. only allows a narrow band of frequency to pass.
Option B. allows frequencies below a cut-off frequency to pass.
Option C. allows frequencies above a cut-off frequency to pass.
Correct Answer is. only allows a narrow band of frequency to pass.
Explanation. NIL.

Question Number. 11. A high pass filter consists of a.
Option A. capacitor in series and inductor in series.
Option B. capacitor in series and inductor in parallel.
Option C. an inductor in series and a capacitor in parallel.
Correct Answer is. capacitor in series and inductor in parallel.
Explanation. NIL.

17. AC Generators.

Question Number. 1. In an alternating current Star wired system, the phase voltage is 115 volts and the line voltage will be approximately.
Option A. 200 volts.
Option B. 115 volts.
Option C. 163 volts.
Correct Answer is. 200 volts.
Explanation. NIL.

Question Number. 2. An alternating current generator is operating at 50 kVA in a circuit with a power factor of 0.8. The real power is.
Option A. 40kW.
Option B. 72kW.
Option C. 50kW.
Correct Answer is. 40kW.
Explanation. NIL.

Question Number. 3. The two factors which govern the output frequency of an AC generator are the.
Option A. the number of poles (in pairs) and the rotor RPM.
Option B. strength of the stator field flux and number of poles.
Option C. speed of rotation of the rotor and the stator field flux strength.
Correct Answer is. the number of poles (in pairs) and the rotor RPM.
Explanation. NIL.

Question Number. 4. In a delta-connected generator.
Option A. line voltage = root 3 times phase voltage, line current = phase current.
Option B. line volts = phase volts, line current = phase current divided by root 3.
Option C. line volts = phase volts, line current = root 3 times phase current.
Correct Answer is. line volts = phase volts, line current = root 3 times phase current. **Explanation.** NIL.

Question Number. 5. When measuring the phase and line voltages of a generator, it was found that line and phase voltages were equal. The generator is?
Option A. either delta or star wound.
Option B. delta wound.
Option C. star wound.
Correct Answer is. delta wound.
Explanation. NIL.

Question Number. 6. The permanent magnet in an A.C generator induces.
Option A. A.C. in the main generator.
Option B. A.C. in the exciter generator.
Option C. D.C. in the exciter generator.
Correct Answer is. A.C. in the exciter generator.
Explanation. NIL.

Question Number. 7. If the phase voltage in a star connected generator is 200V what will be the line voltage?
Option A. 115V.
Option B. 346V.
Option C. 200V.
Correct Answer is. 346V.
Explanation. Star connected generator - line voltage is 1.73 * phase voltage.

Question Number. 8. A generator is labeled as having 115V/200V, 20A and PF 0.8. What is the apparent power in each line that the generator can produce?
Option A. 2.3kVA.
Option B. 2.3kW.
Option C. 4kVA.
Correct Answer is. 4kVA.
Explanation. Apparent power is measured in VA. Line voltage is 200V (always the higher of the two voltages - and the presence of 2 voltages confirms it as star wound). So 200 * 20 = 4 KVA (PF not required).

Question Number. 9. AC generators are rated in.

Option A. kVA.
Option B. kVARs.
Option C. kW.
Correct Answer is. kVA.
Explanation. NIL.

Question Number. 10. The frequency of the output of a 4 pole generator is 400 Hz. The generator is turning at.
Option A. 6000 RPM.
Option B. 12000 RPM.
Option C. 3000 RPM.
Correct Answer is. 12000 RPM.
Explanation. Get the formula for frequency.

Question Number. 11. The voltage induced in the stator of an AC generator is produced by.
Option A. an alternating field.
Option B. a rotating magnetic field.
Option C. a fixed magnetic field.
Correct Answer is. a rotating magnetic field.
Explanation. NIL.

Question Number. 12. A 30 KVA rated generator has a power factor of 0.8. What is its maximum consistent power?
Option A. 30 KW.
Option B. 37.5 KW.
Option C. 24 KW.
Correct Answer is. 24 KW.
Explanation. Power factor = true power / apparent power.

Question Number. 13. The three voltages of a three phase generator are connected.
Option A. in series with each other.
Option B. independently of each other.
Option C. in parallel with each other.
Correct Answer is. independently of each other.
Explanation. NIL.

Question Number. 14. In a 2 phase generator, how far apart are the windings electrically?
Option A. 45°.
Option B. 180°.
Option C. 90°.

Correct Answer is. 90°.
Explanation. NIL.

Question Number. 15. Where are the output windings on an AC generator?
Option A. Rotor with slip rings.
Option B. Rotor with commutator.
Option C. Stator.
Correct Answer is. Stator.
Explanation. NIL.

Question Number. 16. The line voltage from a generator with a delta type connection will be.
Option A. lower than the phase voltage.
Option B. higher than the phase voltage.
Option C. the same as the phase voltage.
Correct Answer is. the same as the phase voltage.
Explanation. Line and phase voltages are the same with a delta connections (it is the current that is different).

Question Number. 17. An advantage of a star connected generator over a delta connected generator is.
Option B. the line and phase voltages are equal.
Option C. two potentials are available.
Option D. a balance load is guaranteed.
Correct Answer is. two potentials are available.
Explanation. NIL.

Question Number. 18. Permanent magnets in an AC generator are.
Option A. to provide initial excitation.
Option B. to control the frequency.
Option C. to rectify the current.
Correct Answer is. to provide initial excitation.
Explanation. NIL.

Question Number. 19. The exciter winding in a brushless AC generator is supplied with electrical power from.
Option A. permanent magnets.
Option B. a rotating generator integrally mounted on the same shaft as the AC windings.
Option C. the busbar.
Correct Answer is. a rotating generator integrally mounted on the same shaft as the AC windings. OR permanent magnets.

Explanation. Aircraft Electricity and Electronics Eismin Page 220.

Question Number. 20. An AC generator's frequency will.
Option A. always be constant regardless of the generators drive speed.
Option B. be proportional to the RPM at which it is driven.
Option C. vary with changes in field strength.
Correct Answer is. be proportional to the RPM at which it is driven.
Explanation. NIL.

Question Number. 21. A frequency wild AC generator is used for.
Option A. any AC load.
Option B. deicing loads.
Option C. instruments and navigation.
Correct Answer is. deicing loads.
Explanation. Frequency wild can only be used on resistive circuits (heating and lighting).

Question Number. 22. How many cycles of AC voltage are produced in a six-pole alternator of the revolving-field type, with each revolution of the rotor?
Option A. Six.
Option B. Four.
Option C. Three.
Correct Answer is. Three.
Explanation. Each pair of poles produces 1 cycle.

Question Number. 23. The variable frequency output from an AC generator is used for.
Option A. driving AC operated instruments.
Option B. supplying non-inductive loads.
Option C. the AC supply instead of using inverters.
Correct Answer is. supplying non-inductive loads.
Explanation. Variable frequency (frequency wild) can only be used for resistive loads (i.e. non inductive and non capacitive).

Question Number. 24. In a single phase AC generator, frequency is determined by.
Option A. the number of pairs of poles.
Option B. controlling the current flow through the voltage field windings.
Option C. the generator speed.
Correct Answer is. controlling the current flow through the voltage field windings. OR the generator speed.
Explanation. NIL.

Question Number. 25. The amount of electrical power for a given generator weight is.
Option A. greater for AC generator.
Option B. determined by the size of the aircraft.
Option C. greater for DC generator.
Correct Answer is. greater for AC generator.
Explanation. This is one of the advantages of AC power.

Question Number. 26. On a typical AC generator the output is taken.
Option A. direct from the rotor via slip rings.
Option B. direct from the stator windings.
Option C. direct from the exciter.
Correct Answer is. direct from the stator windings.
Explanation. NIL.

Question Number. 27. An AC generator is producing the required voltage but a higher frequency than that required. To remedy this, the following action must be taken?
Option A. Decrease the speed of the prime mover.
Option B. Decrease the speed of the prime mover, and then decrease the strength of the field.
Option C. Decrease the speed of the prime mover, and then increase the strength of the field.
Correct Answer is. Decrease the speed of the prime mover, and then increase the strength of the field.
Explanation. Decreasing the speed of the prime mover decreases the frequency, but it also decreases the output voltage. So you must then return the output voltage to the required level by increasing the generator field strength.

Question Number. 28. In a 3 phase generator with balanced load, the potential between the neutral point and earth is.
Option A. equal to line volts.
Option B. zero volts.
Option C. equal to phase volts.
Correct Answer is. zero volts.
Explanation. NIL.

Question Number. 29. The power output of an AC parallel generator system is measured in.
Option A. KW / KVARS.
Option B. amperes.
Option C. KVA.

Correct Answer is. KVA.
Explanation. NIL.

Question Number. 30. The shape of the output waveform of an AC generator is known as a.
Option A. sine wave.
Option B. frequency wave.
Option C. cosine wave.
Correct Answer is. sine wave.
Explanation. NIL.

Question Number. 31. The sum of the instantaneous EMF's in a three phase system is.
Option A. three times the phase voltage.
Option B. zero.
Option C. equal to the line voltage.
Correct Answer is. zero.
Explanation. Look at a diagram of 3 phases. Add up all three at any vertical line and it always comes to zero.

Question Number. 32. One revolution of a three phase generator will produce.
Option A. 1 cycle.
Option B. 3 cycles.
Option C. 2 cycles.
Correct Answer is. 1 cycle.
Explanation. Although there are three phases, they are considered separate - so one cycle is generated per revolution.

Question Number. 33. The 'A' phase of a three phase power system is color coded.
Option A. red.
Option B. blue.
Option C. yellow.
Correct Answer is. red.
Explanation. NIL.

Question Number. 34. The tolerance of the AC generator frequency is.
Option A. 10 Hz.
Option B. 40 Hz.
Option C. 20 Hz.
Correct Answer is. 20 Hz.
Explanation. +/-10Hz (for paralleling of generators).

Question Number. 35. The voltage of an AC generator.
Option A. rises to max in one direction and remains.
Option B. rises to max in one direction, falls to zero and rises in the same direction.
Option C. rises to max in one direction then falls to zero then rises to max in the opposite direction.
Correct Answer is. rises to max in one direction, falls to zero and rises in the same direction. OR rises to max in one direction then falls to zero then rises to max in the opposite direction.
Explanation. NIL.

Question Number. 36. A generator supplies 25 A, 4 V and 50 W. What is the apparent power and the power factor?
Option A. 400 VA and 0.5.
Option B. 100 VA and 2.
Option C. 100 VA and 0.5.
Correct Answer is. 100 VA and 0.5.
Explanation. PF = true power / apparent power. Apparent power = IV = 100 VA. PF = 50/100 = 0.5.

Question Number. 37. A conventional aircraft generator will be.
Option A. delta wound.
Option B. series wound.
Option C. star wound.
Correct Answer is. star wound.
Explanation. Star wound will give 2 choices of voltage. Aircraft never use series wound generators.

Question Number. 38. Power factor of a generator is.
Option A. tan ø.
Option B. cos ø.
Option C. sin ø.
Correct Answer is. cos ø.
Explanation. NIL.

Question Number. 39. In a 3 phase generator, what angle are the phases to each other?
Option A. 180°.
Option B. 120°.
Option C. 0°.
Correct Answer is. 120°.
Explanation. NIL.

Question Number. 40. In a 2 phase generator, what angle are the phases to each other?
Option A. 90°.
Option B. 0°.
Option C. 180°.
Correct Answer is. 90°.
Explanation. NIL.

Question Number. 41. Delta wound line current is.
Option A. equal to phase current.
Option A. root 3 * phase current.
Option A.less than the phase current.
Correct Answer is.root 3 * phase current.
Explanation. NIL.

Question Number. 42.An alternator delivers 500V RMS at 1 ampere. The power factor is 0.8. The true power is.
Option A. 500W.
Option B. 100VA.
Option C. 400W.
Correct Answer is. 400W.
Explanation. Apparent Power = amps * volts = 1 * 500 = 500VA. Power Factor = TP/AP. 0.8 = TP/500. TP = 500 * 0.8 = 400W.

Question Number. 43. On a brushless AC generator, the main rotating field is fed with.
Option A. DC via diodes on the rotor.
Option B. AC.
Option C. AC from the rotating field exciter.
Correct Answer is. DC via diodes on the rotor.
Explanation. NIL.

Question Number. 44. Single phase components in a three phase system may be connected between.
Option A. phase A and B only.
Option B. any phase and neutral OR between any two phases.
Option C. phase and neutral only.
Correct Answer is. any phase and neutral OR between any two phases.
Explanation. NIL.

Question Number. 45. A generator rated at 30 KVA and power factor 0.8 has a maximum continuous power output of.

Option A. 30 kW.
Option B. 24 kW.
Option C. 48 kW.
Correct Answer is. 24 kW.
Explanation. True Power = PF * Apparent Power = 0.8 * 30 = 24kW.

Question Number. 46. If there was a mainly inductive load on an AC generator, the voltage with respect to the current would.
Option A. lag.
Option B. be in phase.
Option C. lead.
Correct Answer is. lead.
Explanation. Remember CIVIL.

Question Number. 47.On a brushless AC generator, the permanent magnet generator output is.
Option A. DC.
Option B. pulsed.
Option C. AC.
Correct Answer is. AC.
Explanation. The output is AC before it is rectified by the diodes inside the shaft.

Question Number. 48. The output from a rotating armature AC generator would be taken from.
Option A. either the rotor or the stator.
Option B. the rotor.
Option C. the stator.
Correct Answer is. the rotor.
Explanation. View Comment/Reference (if available).

Question Number. 49. A frequency wild AC generator system has.
Option A. variable voltage only.
Option B. variable voltage and frequency.
Option C. variable frequency only.
Correct Answer is. variable frequency only.
Explanation. The voltage is held constant by a voltage regulator, which varies the resistance of the field current.

Question Number. 50. An AC generator has four poles. To produce a frequency of 400Hz it must achieve a speed of.
Option A. 6000 RPM.
Option B. 3000 RPM.

Option C. 12000 RPM.
Correct Answer is. 12000 RPM.
Explanation. If it had the minimum of 2 poles (1 pair) it would require 400 revs/sec = 400 * 60 = 24,000 revs/min. With 4 poles (2 pairs), that speed can be halved.

Question Number. 51. The stator of a permanent magnet rotor AC generator.
Option A. is usually star wound.
Option B. is wound in series with the field.
Option C. is usually delta wound.
Correct Answer is. is usually star wound.
Explanation. Star wound is more common due to the provision of two voltages.

Question Number. 52.The power output of a similar sized 3 phase compared to a single phase generator is.
Option A. more.
Option B. same.
Option C. less.
Correct Answer is. more.
Explanation. 3 phase generators are lighter and more compact for their output power.

Question Number. 53. In a voltage equalising circuit the generators are regulated so.
Option A. the higher output is decreased to that of the lower.
Option B. the lower is increased and the higher is decreased until they are equal.
Option C. the lower output is increased to that of the higher.
Correct Answer is. the lower is increased and the higher is decreased until they are equal.
Explanation. NIL.

Question Number. 54. In a 3-phase delta wound circuit, line current is.
Option A. same as the phase current.
Option B. the vectorial sum of all 3 phase currents.
Option C. in phase with the phase current.
Correct Answer is. the vectorial sum of all 3 phase currents.
Explanation. Line current is root 3 * phase current (rules out a). There is a 30 degree phase shift (rules out b). The root 3 is derived from the vector sum of all three phases.

Question Number. 55. In an aircraft brushless alternator the armature is.
Option A. in series with the field.
Option B. delta wound.

Option C. star wound.
Correct Answer is. star wound.
Explanation. The armature is normally Star Wound to give a choice of 2 voltages.

Question Number. 56. If the phase voltage of a star wound generator is 115V, what would be the line to line voltage?
Option A. 220V.
Option B. 180V.
Option C. 200V.
Correct Answer is. 200V.
Explanation. Line to line voltage means 'Line' voltage. For star wound, Line voltage = 1.73 * phase voltage.

Question Number.57.What are the factors affecting the frequency of an AC generator?
Option A. Number of pole pairs and rpm.
Option B. Number of turns in the armature coil and number of pole pairs.
Option C. Number of turns in the armature coil and rpm.
Correct Answer is. Number of pole pairs and rpm.
Explanation. See formula for frequency of generator output.

Question Number. 58. A generator with more than two phases is known as.
Option A. polyphase.
Option B. multiphase.
Option C. delta phase.
Correct Answer is. polyphase.
Explanation. Aircraft Electricity and Electronics. Eismin 5th Edition Page 92.

Question Number. 59. A generator supplies 150VAC phase and load is 10 Ohms per phase. What is the phase current ?
Option A. 25.5 A.
Option B. 1.5 A.
Option C. 15 A.
Correct Answer is. 15 A.
Explanation. I = V/R = 150/10 = 15A.

Question Number. 60. The phases on a three phase AC generator are spaced at.
Option A. 120 degrees.
Option B. 90 degrees.
Option C. 180 degrees.
Correct Answer is. 120 degrees.
Explanation. The phases are equally spaced.

Question Number. 61. Increasing the load on a permanent magnet generator will.
Option A. reduce the terminal voltage by a large amount.
Option B. reduce the terminal voltage by a small amount.
Option C. increase the terminal voltage by a small amount.
Correct Answer is. reduce the terminal voltage by a small amount.
Explanation. Aircraft Electricity and Electronics Eismin Pg 193 and Electrical Systems for A&Ps Pg 106.

Question Number. 62. Two 3 phase generators operating in parallel with different phase and line voltages will be connected in.
Option A. Parallel configuration.
Option B. star configuration.
Option C. delta configuration.
Correct Answer is. star configuration.
Explanation. NIL.

Question Number. 63. The Stability windings in a 3 phase AC generator are to sense.
Option A. field oscillations.
Option B. overvolt.
Option C. phase shift.
Correct Answer is. overvolt.
Explanation. Stability Winding CAIPs EEL/1-2 3.4.5 (d).

Question Number. 64. Delta wound alternator currents are.
Option A. the same as line current.
Option B. the same as phase current.
Option C. the phase current multiplied be the square root of 3.
Correct Answer is. the phase current multiplied be the square root of 3.
Explanation. Delta wound Line current = root 3 * phase current.

Question Number. 65. In smaller single or twin engine aircraft the primary DC power is supplied in the form of rectified output from.
Option A. constant frequency ac generator.
Option B. inverter.
Option C. frequency wild ac generator.
Correct Answer is. frequency wild ac generator.
Explanation. NIL.

Question Number. 66. Single phase components in a 3 phase system may be connected between.

Option A. any phase and earth or between any two phases.
Option B. any phase and earth.
Option C. phase A and B only.
Correct Answer is. any phase and earth or between any two phases.
Explanation. Eismin - Aircraft Electricity & Electronics - page 220.

Question Number. 67. Under frequency in an AC supply would cause.
Option A.overheating of inductive devices.
Option B.overspeeding of AC motors.
Option C. overvoltage of capacitive devices.
Correct Answer is. overheating of inductive devices.
Explanation. NIL.

Question Number. 68. The line voltage of a 3 phase star connected AC generator is.
Option A. equal to the phase voltage.
Option B. greater than the phase voltage.
Option C. less than the phase voltage.
Correct Answer is. greater than the phase voltage.
Explanation. Eismin - Aircraft Electricity & Electronics - page 220.

Question Number. 69. In an AC generator of the brushless type the rotating field winding is fed with.
Option A. AC via rotating exciter windings.
Option B. DC via the slip rings from an external supply.
Option C. DC via diodes from the main exciter winding on the rotor.
Correct Answer is. DC via diodes from the main exciter winding on the rotor.
Explanation. Eismin - Aircraft Electricity & Electronics - page 220.

Question Number. 70. An AC generator is rated at 30 kVA at 0.8 Power Factor: this means that the maximum continuous output should not exceed.
Option A. 24 KW.
Option B. 30 KW.
Option C. 37.5 KW.
Correct Answer is. 24 KW.
Explanation. Eismin - Aircraft Electricity & Electronics - page 90.

Question Number. 71. To adjust the voltage of an AC generator, whilst maintaining constant frequency, it is necessary to.
Option A. alter the reactance of the starter winding circuit.
Option B. alter the field current.
Option C. alter the driving speed.
Correct Answer is. alter the field current.

Explanation. Eismin - Aircraft Electricity & Electronics - page 199.

Question Number. 72. In a Delta connected generator the line current is equal to.
Option A. 1.7 * phase voltage.
Option B. 1.7 * phase current.
Option C. phase current.
Correct Answer is. 1.7 * phase current.
Explanation. NIL.

18. AC Motors.

Question Number. 1. An AC motor which rotates at the same speed as supply frequency is called.
Option A. a universal machine.
Option B. a synchronous motor.
Option C. an induction motor.
Correct Answer is. a synchronous motor.
Explanation. NIL.

Question Number. 2. A three phase AC motor is running at speed on constant load. If one phase goes open circuit, the motor will run at.
Option A. same speed.
Option B. ⅓ speed.
Option C. ⅔ speed.
Correct Answer is. same speed.
Explanation. NIL.

Question Number. 3. Shaded poles in an alternating current motor are intended to.
Option A. reduce eddy current losses.
Option B. prevent overshooting.
Option C. facilitate starting.
Correct Answer is. facilitate starting.
Explanation. NIL.

Question Number. 4. In a 3 phase motor, if 1 phase is lost, the motor.
Option A. runs at 2 thirds speed.
Option B. runs at 1 third speed.
Option C. remains at the same speed.
Correct Answer is. remains at the same speed.
Explanation. The speed of a 3-phase motor is dependent only on the frequency of the power supply.

Question Number. 5. A three-phase motor has the windings.
Option A. 180°apart.
Option B.120° apart.
Option C.90° apart.
Correct Answer is. 120° apart.
Explanation. NIL.

Question Number. 6. To change the direction of a 3-phase induction motor you would.
Option A. swap all of the input connections.
Option B. remove one of the input connections.
Option C. swap two of the stator connections.
Correct Answer is. swap two of the stator connections.
Explanation. NIL.

Question Number. 7. A capacitor in a single phase AC motor is to.
Option A. provide a phase shift.
Option B. prevent spikes.
Option C. block DC.
Correct Answer is. provide a phase shift.
Explanation. NIL.

Question Number. 8. The slip speed of an induction motor is.
Option A. stator speed-rotor speed.
Option B. stator speed / rotor speed.
Option C. stator speed + rotor speed.
Correct Answer is. stator speed-rotor speed.
Explanation. NIL.

Question Number. 9. An inductance/resistance motor is.
Option A. restricted to low loads only.
Option B. less efficient than a capacitance motor.
Option C. better than a capacitance motor.
Correct Answer is. less efficient than a capacitance motor.
Explanation. Aircraft Electrical Systems EHJ Pallett Third Edition. Page 143.

Question Number. 10. If a connection to a 3-phase AC motor is disconnected, the motor will.
Option A. slow down and stop.
Option B. continue to run.
Option C. stop.
Correct Answer is. continue to run.

Explanation. 3 phase motor, disconnecting a phase will not slow down or stop the motor, since the speed is dependant upon the frequency and the load (slip). It will however have less torque.

Question Number. 11. The phases in supply to a 2 phase motor are electrically.
Option A. 120 degrees apart from each other.
Option B. 180 degrees apart from each other.
Option C. 90 degrees apart from each other.
Correct Answer is. 180 degrees apart from each other. OR 90 degrees apart from each other.
Explanation. NIL.

Question Number. 12. Calculate the speed of a 400 Hz, 4 pole machine.
Option A. 12,000 rpm.
Option B. 6000 rpm.
Option C. 8000 rpm.
Correct Answer is. 12,000 rpm.
Explanation. See formula for speed of an AC motor.

Question Number. 13. A capacitor in a single phase motor is to.
Option A. prevent sparking at the switch.
Option B. provide smoothing.
Option C. provide a phase shift.
Correct Answer is. provide a phase shift.
Explanation. NIL.

Question Number. 14. Slip on a synchronous motor on start is.
Option A. 0 %.
Option B. 100 %.
Option C. 50 %.
Correct Answer is. 100 %.
Explanation. The rotating field commences instantly upon start, but the rotor takes time to 'lock-on'.

Question Number. 15. A shaded pole motor has shaded poles to.
Option A. create a rotating field.
Option B. reduce interference.
Option C. increase efficiency.
Correct Answer is. create a rotating field.
Explanation. NIL.

Question Number. 16. In a 2 phase induction motor the control winding is fed with.

Option A. variable phase AC supply.
Option B. constant phase AC supply.
Option C. DC supply.
Correct Answer is. constant phase AC supply. OR variable phase AC supply.
Explanation. A two phase induction motor used on a servo system uses one fixed reference phase and one control phase. The control phase is the same frequency as the reference phase (and is constant) but varies in amplitude. When the amplitude goes negative it is effectively 180 degrees out of phase with the reference phase and the motor turns backwards. More on this subject in module 4.

Question Number. 17. A 3 phase induction motor can be reversed by.
Option A. isolating one phase.
Option B. changing over any two phases.
Option C. reversing the rotor connections.
Correct Answer is. reversing the rotor connections. OR changing over any two phases.
Explanation. NIL.

Question Number. 18. The speed of an AC motor can be affected by the.
Option A. field current.
Option B. armature current.
Option C. pairs of poles.
Correct Answer is. pairs of poles.
Explanation. The number of pairs of poles depends upon the frequency of the supply, which is the only thing which can vary the speed.

Question Number. 19. An AC motor which rotates at the same speed as the supply frequency is called.
Option A. a synchronous motor.
Option B. a universal motor.
Option C. an induction motor.
Correct Answer is. a synchronous motor.
Explanation. NIL.

Question Number. 20. In a synchronous motor, when the motor is running the slip is.
Option A. 0%.
Option B. 5%.
Option C.100%.
Correct Answer is. 0%.
Explanation. Synchronous motors have no slip, at any time.

Question Number. 21. In a two-phase induction motor there are.
Option A. 3 poles.
Option B. 4 poles.
Option C. 2 poles.
Correct Answer is. 4 poles.
Explanation. A pair of poles per phase.

Question Number. 22. The speed of a single phase induction motor is dependant on.
Option A. the strength of the armature current.
Option B. the number of pairs of poles.
Option C. the strength of the field.
Correct Answer is. the number of pairs of poles.
Explanation. Any AC motor's speed is determined by the supply frequency and/or the number of poles. A stronger field or armature current results in only more torque but not speed. http://www.engineeringtoolbox.com/33_649.html

Question Number. 23. Motor slip is.
Option A. the percentage of difference in speeds between the stator and rotor fields.
Option B. a symptom of a weak field.
Option C. a shifting of the MNA of the motor.
Correct Answer is. the percentage of difference in speeds between the stator and rotor fields.
Explanation. Motor slip is the percentage of difference in speeds between the stator and rotor fields.

Question Number. 24. The principal characteristic of a synchronous motor is.
Option A. it must have a synchronised 3 phase supply to operate.
Option B. it rotates at a speed that is synchronised with the applied dc current.
Option C. it rotates at a speed that is synchronised with the applied ac current.
Correct Answer is. it rotates at a speed that is synchronised with the applied ac current.
Explanation. A synchronous motor rotates at a speed that is synchronised with the applied ac current.

Question Number. 25. A simple basic induction motor has.
Option A.good starting torque, poor running torque.
Option B. poor starting torque, good running torque.
Option C. poor starting torque, poor running torque.
Correct Answer is. poor starting torque, good running torque.
Explanation. Starting torque is usually about 60% of maximum. See forum topic 'Induction Motors' for more info.

Question Number. 26. Which of the following applications would require a 'continuously rated' motor?
Option A. Fuel pump motor.
Option B. Flap drive actuator.
Option C. Cargo door actuator.
Correct Answer is. Fuel pump motor.
Explanation. Most pump motors are 'continuous rated' to provide a constant output.

Question Number. 27. A centrifugal speed switch is used.
Option A. to cut out the resistor/inductor circuit on an AC motor.
Option B. to cut out the capacitor circuit on an AC motor.
Option C. to cut out the slow start resistor on an AC motor.
Correct Answer is. to cut out the resistor/inductor circuit on an AC motor.
Explanation. Pallett Aircraft Electrical Systems 3rd Edition Page 143.

Question Number. 28. Disconnecting one of the phases from a 3-phase motor will cause the motor to.
Option A. run at the same speed.
Option B. run at 2/3 speed.
Option C. stop.
Correct Answer is. run at the same speed.
Explanation. It will run at the same speed.

Question Number. 29. The controlling phase on a two phase motor is of a.
Option A. variable amplitude.
Option B. fixed amplitude.
Option C. direct current.
Correct Answer is. variable amplitude.
Explanation. Pg 141 Aircraft instruments and Integrated Systems Pallett.

Question Number. 30. The difference in speed between a synchronous motor's rotor and stator is known as.
Option A. phase lag.
Option B. rotor lag.
Option C.slip speed.
Correct Answer is. slip speed.
Explanation. NIL. http://cipco.apogee.net/mnd/mfpsync.asp

Question Number. 31. What is the purpose of the capacitor used in a single phase AC motor?
Option A. Smoothing.

Option B. Changing direction of motor.
Option C. Provides a high starting torque.
Correct Answer is. Provides a high starting torque.
Explanation. NIL.

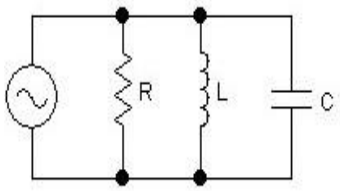
19.

Question Number. 1. Three 5-microfarad capacitors are connected in parallel. What is there total capacitance?
Option A. 15 microfarad.
Option B. 5 microfarad.
Option C. 1.66 microfarad.
Correct Answer is. 15 microfarad.
Explanation. Capacitance in parallel add up directly.

Question Number. 2. When capacitors are joined in parallel, the total capacitance is.
Option A. less than the smallest of the individual capacitors.
Option B. equal to the sum of the individual capacitors.
Option C. dependant upon the voltage applied.
Correct Answer is. equal to the sum of the individual capacitors.
Explanation. Capacitors in series/parallel theory, is the opposite to resistors in series/parallel theory.

Question Number. 3. If the distance between the two plates of a capacitor is reduced, what will be the effect?
Option A. Capacitance increases.
Option B. Capacitance decreases.
Option C. Capacitance is unaffected.
Correct Answer is. Capacitance increases.
Explanation. Get a formula for the capacitance of a capacitor. See that 'd' is inversely proportional to the capacitance.

Question Number. 4. The circuit shown is at resonance. If the value of the inductance is trebled, the impedance will.



Option A. stay the same.
Option B. treble.
Option C. reduce by one-third.
Correct Answer is. reduce by one-third.
Explanation. At resonance, the impedance of the L-C pair is maximum. If you upset the L-C balance you destroy the resonance. The impedance of the L-C pair will then

reduce, reducing the impedance of the circuit as a whole (although 'by one-third' is debatable).

Question Number. 5. The strength of the EMF generated by a DC generator is given the formula : E = EMF, B = flux density, l = length of conductors in the armature, V = velocity of conductors.
Option A. E = (B*l)/V.
Option B. E = B*l*V.
Option C. E = (l*V)/B.
Correct Answer is. E = B*l*V.
Explanation. NIL.

Question Number. 6. The rotating part of a motor/generator is called.
Option A. commutator.
Option B. armature.
Option C. yoke.
Correct Answer is. armature.
Explanation. NIL.

Question Number. 7. No EMF is induced in the loop of a generator when.
Option A. it is moving at right angles to the field.
Option B. it is moving parallel to the field.
Option C. the field is at a minimum.
Correct Answer is. it is moving parallel to the field.
Explanation. NIL.

Question Number. 8. The instantaneous value of the EMF induced in a rotating wire loop is.
Option A. directly proportional to the sine of the angle between the loop and the field.
Option B. indirectly proportional to the sine of the angle between the loop and the field.
Option C. directly proportional to the cosine of the angle between the loop and the field.
Correct Answer is. directly proportional to the cosine of the angle between the loop and the field.
Explanation. When the loop is laying parallel with the field (0o) there is maximum EMF. Cos0o = 1.

Question Number. 9. One purpose of the commutator is to.
Option A. switch the direction of the current flow every half cycle.
Option B. switch the direction of current flow every cycle.

Option C. switch the direction of current flow every two cycles.
Correct Answer is. switch the direction of the current flow every half cycle.
Explanation. NIL.

Question Number. 10. The power output of a DC generator is governed primarily by.
Option A. its speed of rotation.
Option B. its ability to dissipate heat.
Option C. its method of construction.
Correct Answer is. its ability to dissipate heat.
Explanation. NIL.

Question Number. 11. A DC machine has internal resistance due to.
Option A. armature windings, brushes and brushes to commutator contact.
Option B. armature windings, brushes and commutator inertia.
Option C. armature windings and brushes.
Correct Answer is. armature windings, brushes and brushes to commutator contact.
Explanation. NIL.

Question Number. 12. Compensation windings are fitted to a generator in.
Option A. series with the field windings.
Option B. parallel with armature windings.
Option C. series with armature windings.
Correct Answer is. series with armature windings.
Explanation. NIL.

Question Number. 13. Armature reaction has the effect of.
Option A. reducing the output by displacing the geometrical neutral axis.
Option B. reducing the output by distorting the magnetic field.
Option C. reducing the output by increasing internal resistance.
Correct Answer is. reducing the output by distorting the magnetic field.
Explanation. NIL.

Question Number. 14. Reactive sparking maybe overcome by.
Option A. decreasing the time constant of the armature by increasing its resistance.
Option B. increasing the time constant of the armature by decreasing its resistance.
Option C. increasing the time constant of the armature by increasing its resistance.
Correct Answer is. decreasing the time constant of the armature by increasing its resistance.
Explanation. The ratio of armature inductance to its resistance is the electrical time constant of a brush type motor.