1. Which of the following is a fundamental quantity?

(A) Density
(B) Mass
(C) Relative Density
(D) Volume

2. Which of the following quantities has the same value as 6 μC?

(A) 6×10^{6} C
(B) 6×10^{3} C
(C) 6×10^{-3} C
(D) 6×10^{-6} C

3. When used in front of a unit the prefix 'mega' means

(A) 10^{+6}
(B) 10^{+3}
(C) 10^{-3}
(D) 10^{-6}

4. 3.1415926 expressed to two significant figures is

(A) 3.1
(B) 3.14
(C) 3.2
(D) 31

5. A slice of bread is squeezed into a little ball. Which quantity does NOT change?

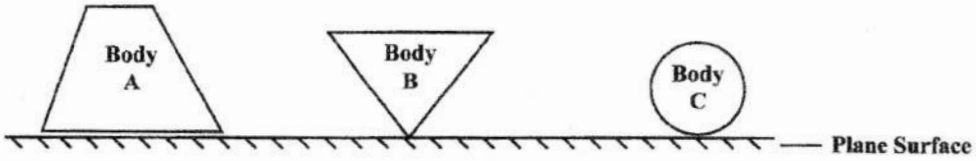
(A) Volume
(B) Mass
(C) Density
(D) Width

6. A boy measured the height of the laboratory table with a metre rule. Which of the following is MOST likely to be correct?

(A) 0.00895 m
(B) 0.0895 m
(C) 0.895 m
(D) 8.95 m

---

7. In relation to the diagrams below, which of the following statements is/are correct?



I. Body A is in neutral equilibrium.
II. Body B is in unstable equilibrium.
III. Body C is in stable equilibrium.

(A) II only
(B) I and II only
(C) II and III only
(D) I, II and III

8. What is the unit of the moment of a force?

(A) N
(B) N m
(C) $N\ m^{-1}$
(D) $N\ m^{-2}$

9. Which of the following is a vector physical quantity?

(A) Speed
(B) Energy
(C) Mass
(D) Displacement

10. A scalar quantity has

(A) magnitude only
(B) direction only
(C) magnitude and direction
(D) weight only

11. Which of the following expressions could be used to find the speed of an object?

(A) $\frac{\text{Change in velocity}}{\text{Time taken}}$

(B) $\frac{\text{Change in displacement}}{\text{Time taken}}$

(C) $\frac{\text{Distance travelled}}{\text{Time taken}}$

(D) Distance travelled x Time taken

12. Which of the following is a unit of work?

(A) $kg\ m\ s^{-2}$
(B) $N\ m^{-2}$
(C) N m
(D) $J\ s^{-1}$

---

13. A hydroelectric power station uses a renewable source of energy, X. This energy raises water to the top of a mountain so that it has gravitational potential energy. As the water runs down the mountain, it turns a turbine which converts Y energy into Z energy. Which set of answers for X, Y and Z is correct?

	X	Y	Z
(A)	Electrical	potential	kinetic
(B)	Solar	kinetic	electrical
(C)	Geothermal	potential	electrical
(D)	Chemical	kinetic	electrical

---

14. Power can be measured in

(A) J
(B) N m
(C) $kg\ m^{-3}$
(D) $J\ s^{-1}$

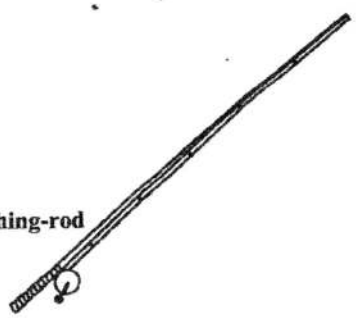
15. A book of weight 12 N is resting on a table. The force that the table exerts on the book is

(A) zero N
(B) greater than zero N but less than 12 N
(C) 12 N
(D) greater than 12 N

Item **16** refers to the diagrams below which show some simple machines.



I - Wheel-barrow



II - Fishing-rod

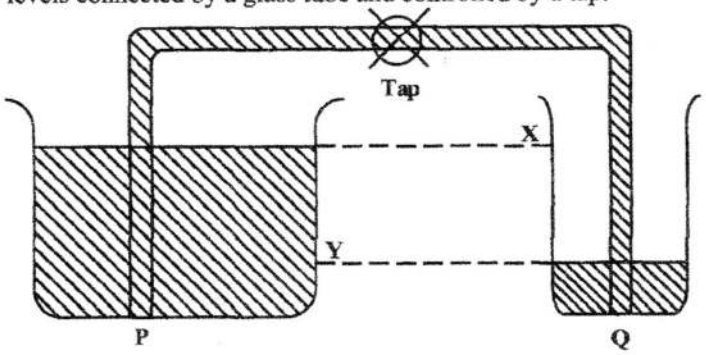


III - Garden fork

16. When in use, in which of the machines is the effort or applied force LESS than the load or resistance?

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

Item **17** refers to the diagram below which shows two different size containers with water at different levels connected by a glass tube and controlled by a tap.



17. When the tap is opened, water will flow from container P to container Q until

(A) the level of Q is at X
(B) container P is empty
(C) the level of P is at Y
(D) the water levels of P and Q are equal

18. Which of the following is/are renewable source of energy?

I. Solar radiation
II. Wind energy
III. Geothermal energy

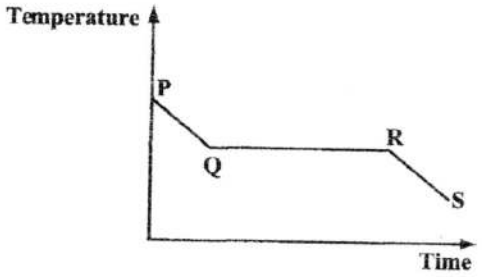
(A) I only
(B) I and II only
(C) I and III only
(D) I, II and III

19. A solid object, X, floats in mercury and sinks in water. A solid object, Y, floats in both mercury and water.

Which of the following is true about X and Y?

(A) X is less dense than Y.
(B) X is more dense than Y.
(C) X and Y are both denser than mercury.
(D) X and Y are both denser than water.

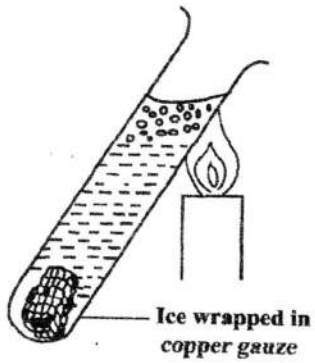
Item **20** refers to the following graph.



20. The graph shows the results of an experiment on change of phase. Solidification starts at Q. During which of the stages is the substance in the liquid phase?

(A) At P only
(B) Between Q and R
(C) Between R and S
(D) Between P and Q

Item **21** refers to the figure below which shows a piece of ice wrapped in copper gauze and submerged in a glass test tube of water.



21. The water when heated at the top boils long before the ice is melted. The MAIN reason for this is that

(A) the test tube is a poor conductor of heat
(B) copper is a good conductor of heat
(C) water is a poor conductor of heat
(D) ice is less dense than water

22. Which of the following (types of radiation) is responsible for an atom of $^{14}_{6}C$ changing into an atom of $^{14}_{7}N$?

(A) Alpha
(B) Beta
(C) Gamma
(D) Neutron

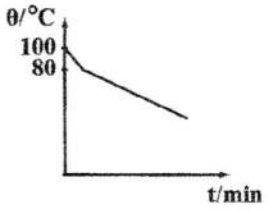
23. A flask contains air under pressure. Some of the air is let out slowly over a period of 10 seconds. When the flask is closed the

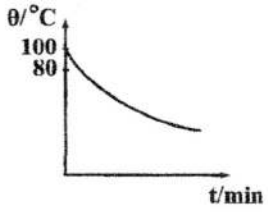
(A) pressure of the air in the flask will have increased
(B) volume of air in the flask will have decreased
(C) temperature in the flask will have increased
(D) number of molecules striking the wall per second will have decreased

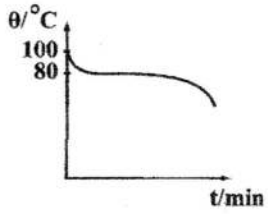
24. In which of the following is conduction the MAIN method of energy transfer?

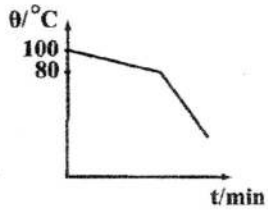
(A) Food heated in a microwave oven.
(B) Energy transferred from the sun to earth.
(C) Food being cooked on a barbecue grill.
(D) Food being cooked in a pot on an electric stove.

25. Some molten naphthalene at 100 °C is allowed to cool down to room temperature. If naphthalene has a melting point of 80 °C, which of the following graphs BEST represents the cooling curve?

(A)


(B)


(C)


(D)


26. The specific latent heat of vapourization of water is the energy required to change 1 kg of water at

(A) 0 °C to ice at 0 °C
(B) 99.9 °C to steam at 100.1 °C
(C) 100 °C to steam at 100 °C
(D) 0 °C to steam at 100 °C

27. A metal of mass, m, requires energy, E, to raise its temperature from T_1 to T_2. The specific heat capacity of the metal will be given by

(A) $\frac{E}{mT_2}$

(B) $\frac{Em}{(T_1 - T_2)}$

(C) $\frac{E}{m(T_1 - T_2)}$

(D) $\frac{E}{m(T_2 - T_1)}$

28. Which of the following statements BEST explains Brownian motion of smoke particles in air?

(A) The air molecules are moving and colliding with the smoke particles.
(B) Smoke particles are colliding with each other.
(C) Convection currents of air cause the vibration of smoke particles.
(D) The intense beam of light causes the smoke particles to vibrate.

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29. Which of the following would be the basic difference between a transverse mechanical wave and a longitudinal mechanical wave?

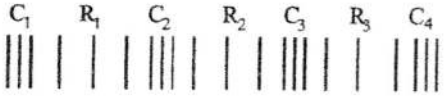
I. Medium through which they travel
II. Direction of vibration of particles in medium
III. Wavelength

(A) I only
(B) II only
(C) I and II only
(D) II and III only

30. In which of the following groups are the electromagnetic waves written in order of increasing frequency, starting with the lowest?

(A) X-rays, ultraviolet, infrared, radio
(B) X-rays, infrared, ultraviolet, radio
(C) Radio, x-rays, infrared, ultraviolet
(D) Radio, infrared, ultraviolet, x-rays

Item **31** refers to the diagram below which shows a longitudinal wave where C and R represent *compressions* and *rarefractions* respectively.



31. If λ = wavelength, the distance between C_1 and R_2 is

(A) $\frac{1}{2}\lambda$
(B) 1λ
(C) $1\frac{1}{2}\lambda$
(D) 2λ

32. Which of the following statements about sound is NOT correct?

(A) Sound is transmitted as transverse waves.
(B) Sound may be produced by vibrating systems.
(C) Sound does not travel through a vacuum.
(D) Sound travels slower than light.

33. A ray of light in air strikes a glass block at an angle of incidence of 0°. The light will be

(A) undeviated
(B) totally reflected
(C) refracted at 90° to normal
(D) refracted at an unknown angle

34. In a longitudinal wave, the particles

(A) remain stationary
(B) move forward with the speed of the wave
(C) move backwards and forwards *parallel to the direction of travel* of the wave
(D) move from side to side, perpendicular to the direction of travel of the wave

35. In a projector the slide is 5 cm from the lens, while the screen is 500 cm from the lens on the other side. What is the magnification?

(A) 50
(B) 100
(C) 250
(D) 500

36. An eye can see the image of an object which is placed in front of a plane mirror because

(A) light from the object passes through the mirror
(B) the image is real
(C) light from the person's eye travels in a straight line
(D) light from the object is reflected off the mirror to the eye

37. For which of the following object distances will a convex lens of focal length 18 cm produce a real image?

I. 15 cm
II. 36 cm
III. 54 cm

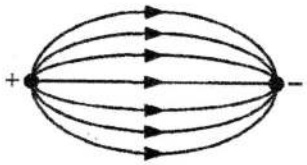
(A) I only
(B) I and II only
(C) II and III only
(D) I, II and III

38. Which of the following units is the SMALLEST quantity?

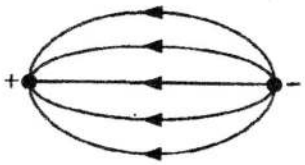
(A) 1 microampere
(B) 1 milliampere
(C) 10^{-5} ampere
(D) 10^{5} ampere

39. Which of the following diagrams represents the electric field existing between two oppositely charged point charges?

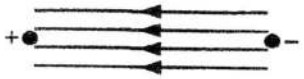
(A)



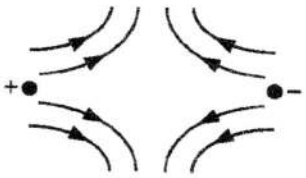
(B)



(C)



(D)



40. Which of the following relationships between electrical quantities is correct?

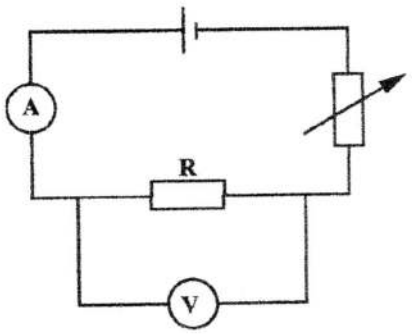
(A) $V = P I$

(B) $R = V I$

(C) $Q = \frac{E}{V}$

(D) $E = VI$

Item **41** refers to the circuit below where the ammeter reads 0.4 A and the voltmeter reads 0.6 V.



41. What is the resistance of R?

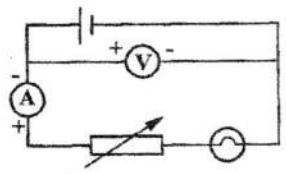
(A) 15 Ω
(B) 1.5 Ω
(C) 0.67 Ω
(D) 0.24 Ω

42. Which of the following gives the correct colour code for electrical wiring?

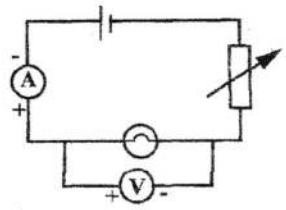
	LIVE	**NEUTRAL**	**EARTH**
(A)	Brown	Blue	Green/yellow
(B)	Red	Blue	Green
(C)	Blue	Green/yellow	Brown
(D)	Green	Brown	Blue

43. In which of the circuits below would the meters give readings which would enable you to determine the resistance of the filament lamp?

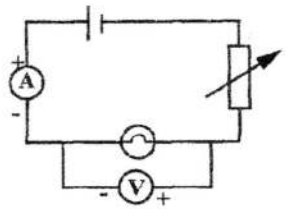
(A)



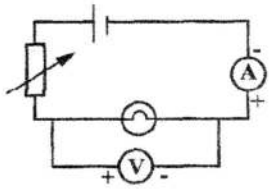
(B)



(C)



(D)



44. The electric current supplied to homes and to factories is alternating (a.c) rather than direct (d.c.) because

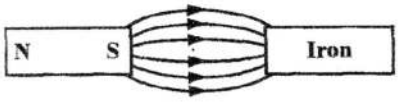
(A) the use of a.c. reduces electrical hazards
(B) the use of a.c. reduces transmission losses
(C) a.c. enables a wider variety of appliances to be used
(D) a.c. power lines are less likely to be struck by lightning than d.c. power lines

45. Magnetic induction occurs when

(A) a N pole attracts a S pole
(B) a magnet is suspended and points in the N S direction
(C) iron nails near a magnet become magnetised
(D) an electroscope is charged

46. Which of the following diagrams shows the magnetic field between a bar magnet and a piece of iron?

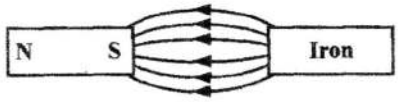
(A)



(B)



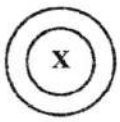
(C)



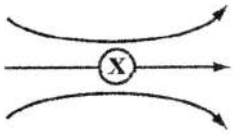
(D)

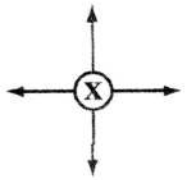


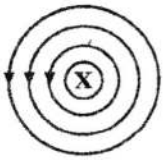
Item 47 refers to the diagram below which represents a straight wire carrying a current into the plane of the paper.

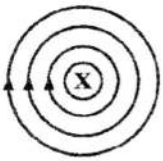


47. Which of the following diagrams BEST represents the magnetic field around the wire?

(A)


(B)


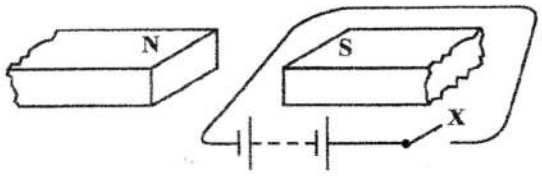
(C)


(D)


48. A plastic rod, P, is rubbed with cloth, Q. P becomes positively charged. This is because

(A) protons flowed from Q to P
(B) protons flowed from P to Q
(C) electrons flowed from Q to P
(D) electrons flowed from P to Q

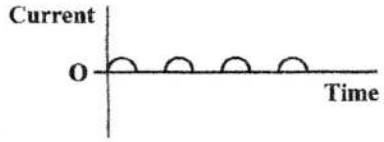
Item 49 refers to the diagram below which shows flexible wire loosely supported in a strong magnetic field.

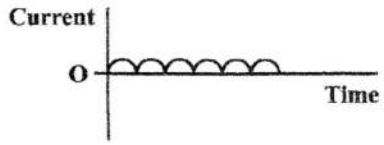


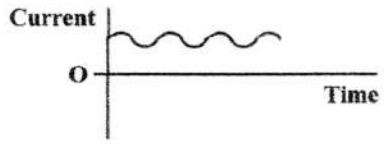
49. When the switch, X, is closed the wire moves

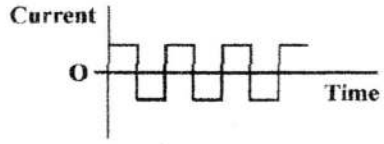
(A) downwards
(B) upwards
(C) towards the north pole
(D) towards the south pole

50. Which of the following graphs illustrates an ALTERNATING current?

(A)


(B)


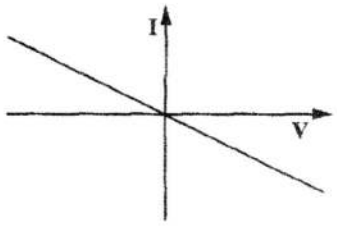
(C)


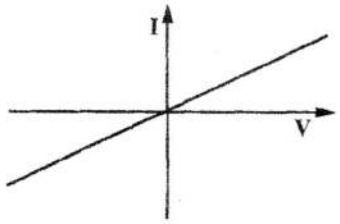
(D)


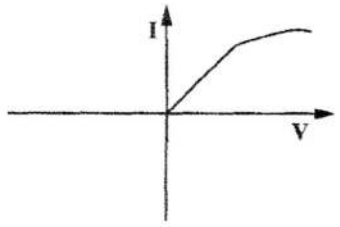
51. A conductor, rotating in a uniform magnetic field, induces maximum instantaneous current when the conductor cuts the magnetic field lines at

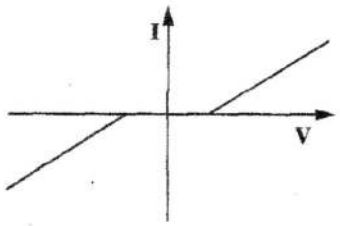
(A) 30°
(B) 45°
(C) 90°
(D) 180°

52. Which of the following graphs is a representation of the current/p.d. relationship for a metallic conductor at a constant temperature?

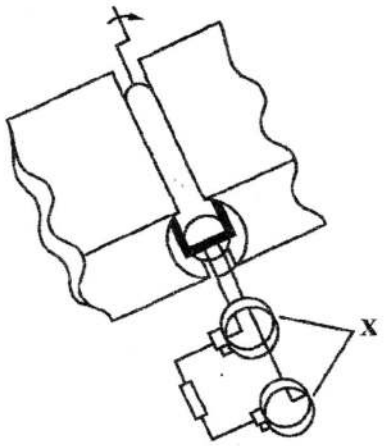
(A)


(B)


(C)


(D)


Item 53 refers to the following diagram of a simple a.c. generator.



53. The parts labelled X in the diagram are known as the

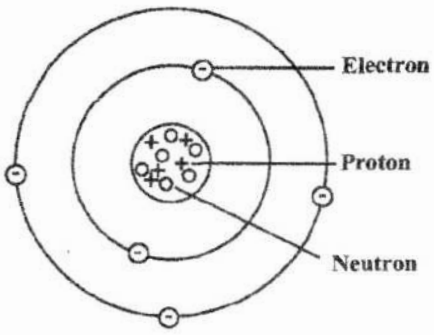
(A) coils
(B) armatures
(C) slip rings
(D) commutators

54. Rectification can BEST be done by using a

(A) transformer
(B) capacitor
(C) transistor
(D) diode

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Item 55 refers to the diagram below which shows the shell model of an atom.



55. Which of the following statements is/are correct?

I. The mass (nucleon) number is 11.
II. The atomic (proton) number is 5.
III. The atom shown in the diagram is positively charged.

(A) I only
(B) II only
(C) I and II only
(D) I, II and III

56. According to the Rutherford Bohr model of a neutral, stable atom, if n = number of neutrons, p = number of protons and e = number of electrons in the atom, then for all elements

(A) $n = e$
(B) $p = e$
(C) $n + e = p$
(D) $n + p = e$

57. An isotope of zinc has a nuclide which can be represented as ${}^{64}_{30}\mathrm{Zn}$. The number of electrons in a neutral atom is

(A) 30
(B) 34
(C) 64
(D) 94

58. Which of the following would be possible symbols for an isotope of a nuclide represented by ${}^{A}_{Z}\mathrm{X}$?

I. ${}^{A-2}_{Z}\mathrm{X}$

II. ${}^{A}_{Z-2}\mathrm{X}$

III. ${}^{A+2}_{Z}\mathrm{X}$

(A) I only
(B) II only
(C) III only
(D) I and III only

59. Which of the following are definitions of the term 'half-life' of radioactive nuclide?

I. The time taken for the activity of any give sample to fall to half its original value.
II. The time taken for half the nuclei present in any given sample to decay.
III. Half the average number of disintegrations per second.

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

60. In the equation $\Delta E = \Delta mc^2$,

(A) c = speed of light, Δm = mass of atom
(B) c = speed of light, Δm = mass lost
(C) c = specific heat capacity of substance, Δm = mass lost
(D) c = specific heat capacity of substance, Δm = mass of substance

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.