1. The unit of electrical resistance may be expressed as

(A) $1\Omega = 1\ V.A^{-1}$
(B) $1\Omega = 1\ A.V$
(C) $1\Omega = 1\ A.V^{-1}$
(D) $1\Omega = 1\ W.A^{-1}$

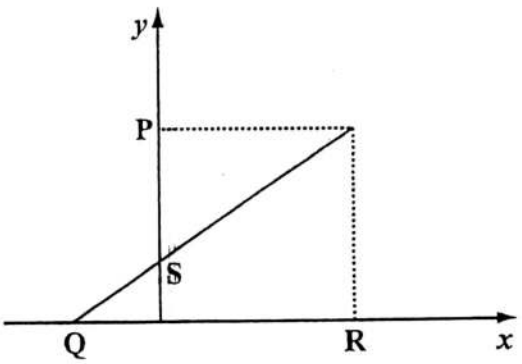
2. One gram is equal to

(A) 10 milligrams
(B) 100 milligrams
(C) 1 000 milligrams
(D) 10 000 milligrams

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

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

Item 4 refers to the relationship represented by the line through Q and S in the diagram below.




4. When $x = 0$, the value of $y$ is

(A) Q
(B) S
(C) P
(D) P/R

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

(A) Mass
(B) Volume
(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

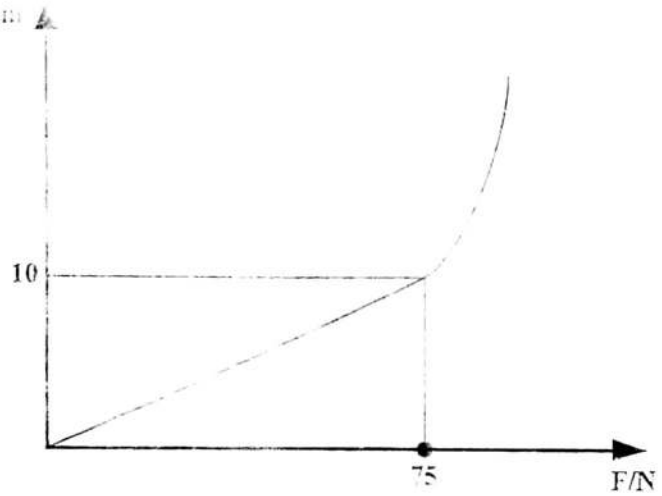
7. An object of mass, $m$, is attached to a spring balance and its weight, $w$, recorded. What will be the result if the object is taken to the moon and weighed there where the gravitational field strength is less?

(A) Mass = $m$; weight greater than $w$
(B) Mass = $m$; weight less than $w$
(C) Mass greater than $m$; weight = $w$
(D) Mass less than $m$; weight = $w$

8. Which of the following will be constant, if a constant net force is applied to a body?

(A) Velocity
(B) Kinetic energy
(C) Momentum
(D) Acceleration

Items 9 refer to the following diagram which shows a variable extension, x, of force, F, graph [illegible] spring.

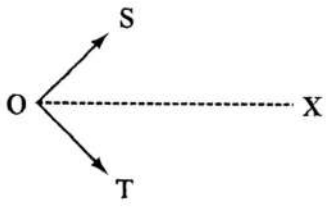


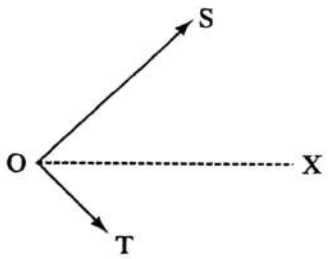

9. Which of the following statements would be true?

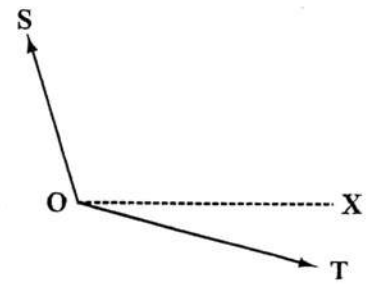
I. The elastic limit of the spring was exceeded.
II. The spring obeyed Hooke's law over its entire extension.
III. The force per unit extension in the elastic region was 7.5 N cm$^{-1}$.

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

10. The diagrams below, drawn to scale, represent two forces, S and T, acting at O. In which of the following is the resultant in the direction, OX?

(A)



(B)



(C)



(D)



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 × Time taken

12. Which of the following is the unit of momentum?

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

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 defined as

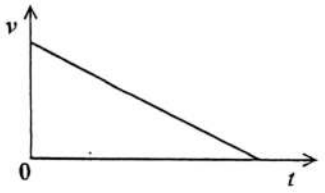
(A) force × distance moved

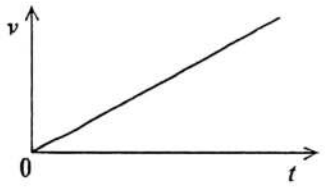
(B) $\frac{\text{force}}{\text{time}}$

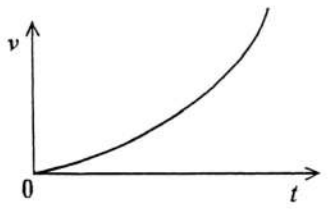
(C) $\frac{\text{work done}}{\text{time}}$

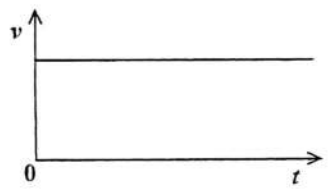
(D) work done × time

15. A coconut falls from a tree. Which of the velocity/time graphs below BEST represents its motion, if air resistance is neglected?

(A)



(B)


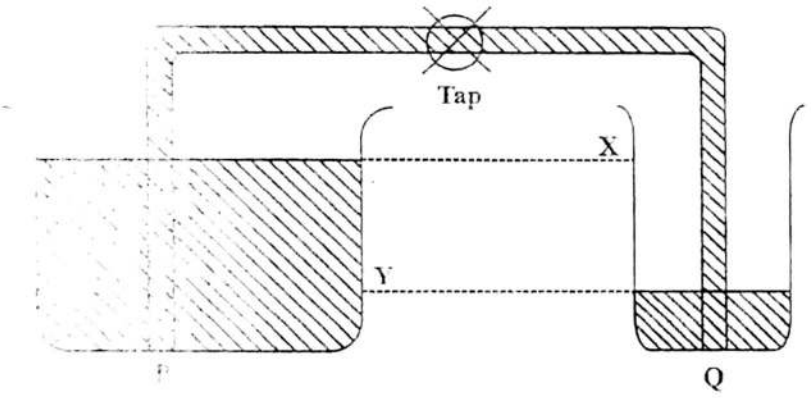

(C)



(D)



16. A bubble of gas rises to the surface of a soft drink. This is because the

(A) upthrust on the bubble is greater than the weight of the bubble
(B) upthrust on the bubble is greater than the weight of water it displaces
(C) weight of the water displaced by the bubble is less than the weight of the bubble
(D) density of the gas is greater than the density of the drink

Item 17 refers to the diagram below which shows two different sized 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 P to 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 depths of P and Q are equal

---

18 Solid object X floats in mercury and sinks in water and 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 and Y are both denser than water.
(C) X and Y are both denser than mercury.
(D) X is more dense than Y.

19 A piece of string is tied onto a small stone and the stone is then suspended, totally immersed, in water. The tension in the string will be

(A) zero
(B) equal to the weight of the stone
(C) less than the weight of the stone
(D) more than the weight of the stone

20. There are NO attractive forces between the molecules in a

(A) liquid and gas
(B) solid and a liquid
(C) liquid
(D) gas

21. The specific heat capacity of a material is the energy required to

(A) melt 1 kg of the material with no change of temperature
(B) change the temperature of the material by 1 K
(C) change 1 kg of the liquid material to 1 kg of gas without a change in temperature
(D) change the temperature of 1 kg of the material by 1 K

22. In the pressure law which of the following statements would be true?

I. Ratio of pressure to Kelvin temperature is constant.
II. Volume is constant.
III. Pressure is constant.

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

23. Which of the following statements concerning the radiation of heat would be true?

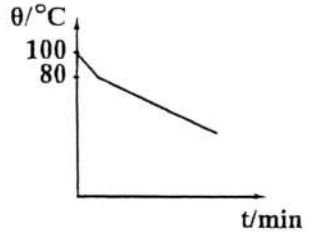
I. Radiation can only take place in a material medium.
II. A good absorber is also a good emitter of radiation.
III. Dark dull surfaces are better emitters than shiny ones.

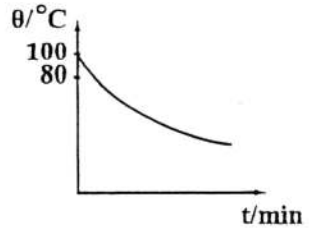
(A) III only
(B) I and II only
(C) I and III only
(D) II and III only

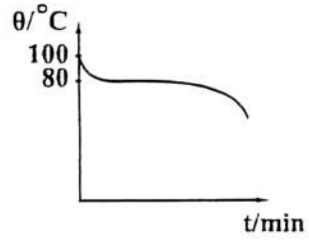
24. An electric kettle full of water is plugged into the mains. The process by which heat travels through the water is

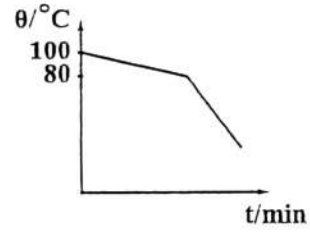
(A) electrification
(B) convection
(C) evaporation
(D) radiation

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

(A)



(B)



(C)



(D)



26. The specific latent heat of vapourization water is the energy required to change 1 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) $\frac{Em}{T_2}$

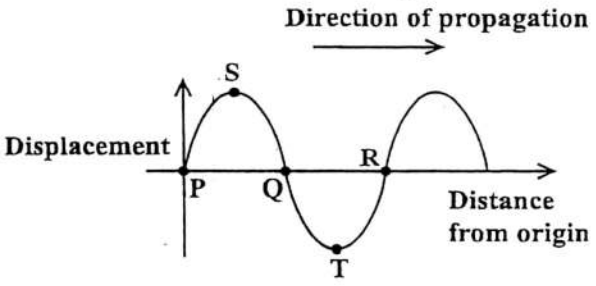
(C) $\frac{E}{m(T_2 - T_1)}$

(D) $\frac{E}{mT_2 - T_1}$

28. The spreading of a wave into the region behind an obstruction is called

(A) diffraction
(B) refraction
(C) superposition
(D) interference

Item **29** refers to the following diagram.




29. Which of the following statements about the wave shown in the diagram above is/are true?

I. Points P, Q and R are in phase.
II. Points S and T are out of phase.
III. The wavelength of the wave is the distance PR.

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

30. If sounds of differing frequencies are played in succession, in which of the following would a change be detected? (Assume amplitude constant.)

(A) Loudness
(B) Speed
(C) Pitch
(D) Wavelength

31. An explosion causes the emission of the following types of radiation.

I. Light
II. Sound
III. Infra-red

Which of these will be received first by a person some distance away from the source?

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

32. A vibrator on a ripple tank sends waves over the water. The vibrator is now adjusted so that the number of waves created each second is doubled. The waves would now

(A) travel at half the original speed
(B) travel at twice the original speed
(C) have twice the original wave length
(D) have half the original wave length

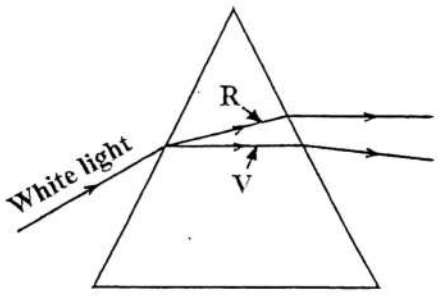
33. A ray of light in air strikes a glass block at an angle of incidence of 0°. The light will be

(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

Item 35 refers to the following diagra




35. The diagram above shows a beam o light being dispersed (R-Red, V-Viol prism to form a visible spectrum. W the following makes this possible?

I. The colour violet has the wavelength, hence refrac than colour red.
II. The colour red has the wavelength, hence refra than colour violet.
III. The colour violet has the wavelength, hence refrac than colour red.
IV. The colour red has the wavelength, hence refrac than colour violet.

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

36. Which of the following would be true of the image of an object placed at the bottom of a pool of water and viewed vertically from above?

I. It is virtual.
II. It is diminished.
III. It is nearer to the eye than the object.

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

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. 18 cm
III. 54 cm

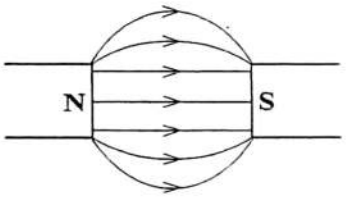
(A) I only
(B) I and II only
(C) I and III only
(D) I, II and III

38. When a polythene rod is rubbed with a cloth, it becomes

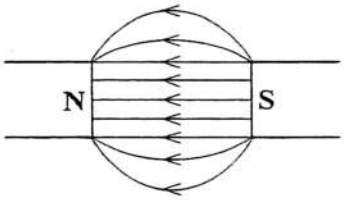
(A) positively charged by gaining protons
(B) negatively charged by gaining electrons
(C) positively charged by gaining electrons
(D) negatively charged by losing protons

39. Which of the following diagrams represents the magnetic field existing between two opposite magnetic poles?

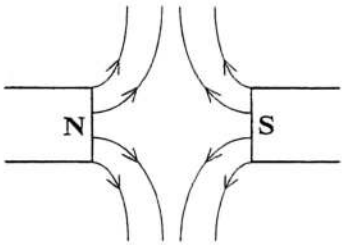
(A)



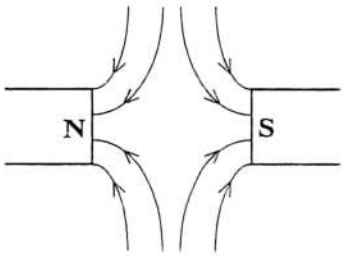

(B)




(C)




(D)




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

(A) $V = PI$

(B) $R = VI$

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

(D) $E = VI$

41. Which of the following options 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 |

42. Which of the following could NOT be a unit of current?

(A) $W V^{-1}$
(B) $V W^{-1}$
(C) $C s^{-1}$
(D) C s

43. Which of the following equations CANNOT be used to determine the power dissipated in a resistor?

(A) $P = I^2R$

(B) $P = \frac{V_2}{R}$

(C) $P = VI$

(D) $P = \frac{R}{V^2}$

44. The refractive index of a transparent medium with a critical angle, $c$, for light travelling from the medium to air is

(A) $\frac{1}{c}$

(B) $\frac{90^o}{\sin c}$

(C) $\frac{\sin 90^o}{\sin c}$

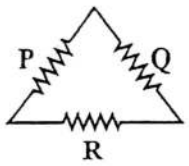
(D) $\sin c$

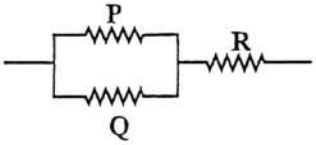
45. In domestic installation systems, which following should be placed in the live

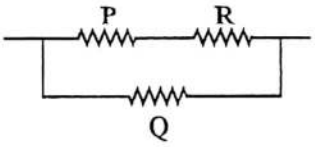
I. Switches
II. Circuit breakers
III. Fuses

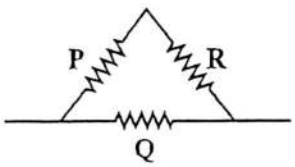
(A) I only
(B) III only
(C) II and III only
(D) I, II and III

46. In which of the following diagrar resistors P and Q in series with eacl and parallel with R?

(A)



(B)


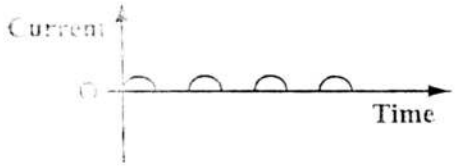

(C)


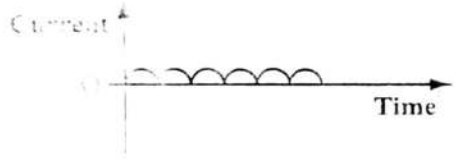

(D)


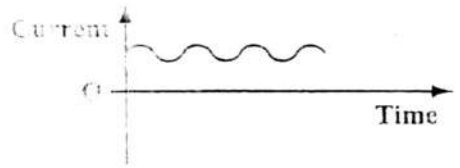

47. Which of the following equation correct?

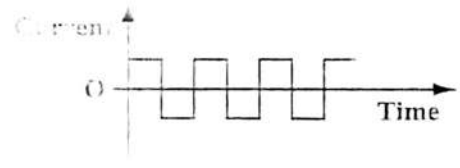
(A) 1 C = 1 A × 1 s
(B) 1 V = 1 A × 1 Ω
(C) 1 J = 1 C × 1 V
(D) 1 W = 1 V × 1 C

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

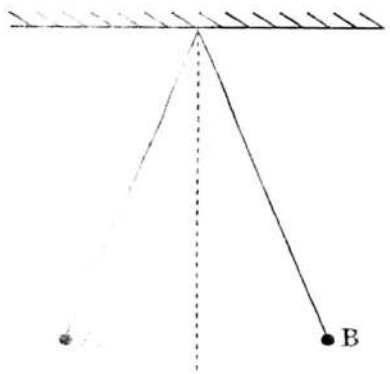
(A)



(B)



(C)



(D)


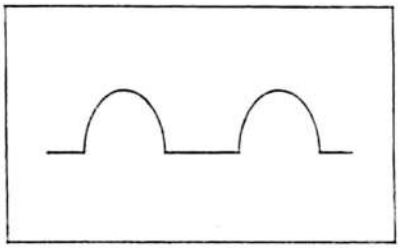

Item 49 refers to the diagram below.



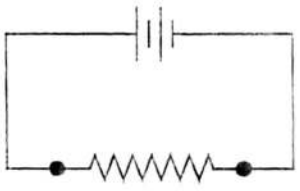

49. Two light aluminium spheres, A and B, are suspended by insulating threads. If they come to rest as shown in the diagram, the force keeping them apart is

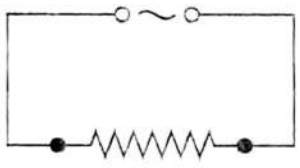
(A) gravitational
(B) electrostatic
(C) magnetic
(D) centripetal

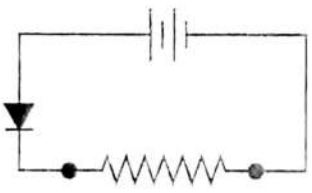
Item 50 refers to the following diagram.

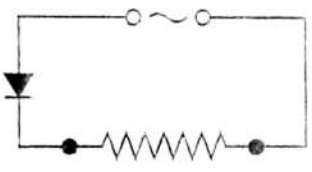


50. Which of the circuits below could produce the voltage-time graph shown in the diagram above when the ends of the resistor are connected?

(A)


(B)


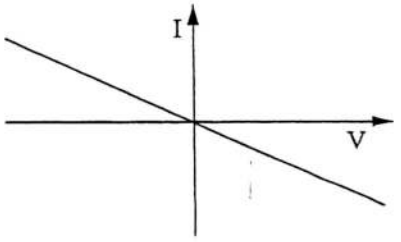
(C)


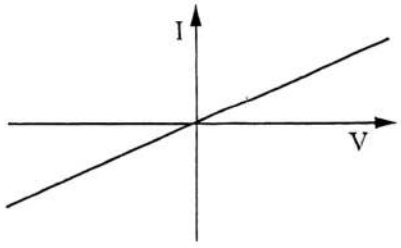
(D)


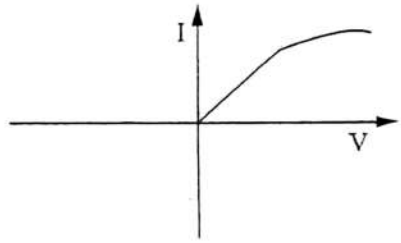
51. A conductor, rotating in a uniform magnetic field, induces maximum instantaneous current when the conductor cuts the magnetic field lines at

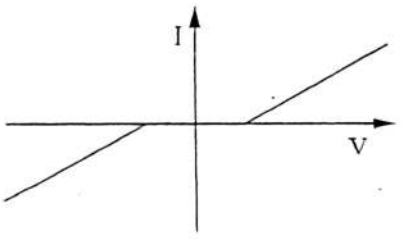
(A) 30°
(B) 45°
(C) 90°
(D) 180°

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

(A)



(B)



(C)



(D)



53. A wire carrying a current in a mag field may experience a force. Which following devices does NOT depend c force?

(A) Loudspeaker
(B) Electric motor
(C) Moving coil galvanometer
(D) Electromagnet

54. Which of the following statements alternating current is true?

(A) It can be rectified by u semiconductor diode.
(B) It can be changed into direct by a transformer.
(C) It can be used to recharge a l
(D) It can be used to transmit el energy because of it frequency.

55. The Rutherford model of the atom s that an atom consists of a

(A) solid mass of protons and e
(B) nucleus of protons on orbiting electrons
(C) nucleus of equal num neutrons and electro orbiting protons
(D) nucleus of protons and with orbiting electrons

56. The number of neutrons present in th of the nuclide $^{222}_{86}Rn$ is

(A) 86
(B) 136
(C) 222
(D) 308

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

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

58. Which of the following scientists discovered radium?

(A) Marie Curie
(B) Isaac Newton
(C) Albert Einstein
(D) J. J. Thompson

59. Which of the following statements about a proton is NOT correct?

(A) It is a hydrogen atom minus an electron.
(B) It has the same mass as that of an electron.
(C) It has a mass about 2 000 times that of an electron.
(D) It has a charge equal in size but opposite in sign to that of an electron.

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

I. The time taken for the activity of any given sample to fall to half its original value.
II. The time taken for half the nuclei present in any given sample to decay.
III. It is 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

**END OF TEST**

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