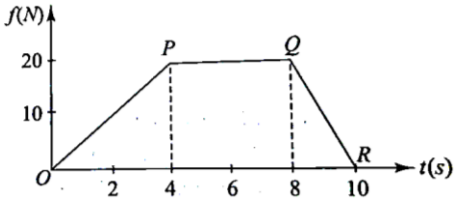
SECTION – 1 (PHYSICS)

1. A body of mass 10 kg is acted on by a net force *f* which varies with time t as shown in figure. Then the net momentum in SI units gained by the body at the end of 10 second is

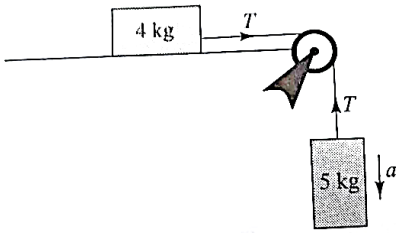


(1) 100 (2) 120 (3) 140 (4) zero

2. A bullet of mass m is fired at a certain angle θ with the vertical. The bullet is returned to the ground in time t. Then the total change of momentum is equal to
(1) mg (2) mgt (3) 2 mg (4) 2 mgt

3. The tension in the cable supporting an elevator equals the weight of the elevator. From this, it can be concluded that the elevator is going up or down with a
(1) uniform speed (2) uniform acceleration
(3) variation acceleration (4) all the above are correct

4. Two bodies of masses 5 kg and 4 kg are tied to a string as shown in figure. If the table and pulley both are smooth, then acceleration of 5 kg mass will be



(1) $9.81 ms^{-2}$ (2) $7.62 ms^{-2}$ (3) $5.45 ms^{-2}$ (4) $2.92 ms^{-2}$

5. The average force necessary to stop a hammer with 50 Ns momentum in 0.01 s is
(1) 50 N (2) 500 N (3) 5000 N (4) 5 N

6. A crate is pushed horizontally with 100N across a 5m floor. If the frictional force between the crate and the floor is 40N, then the kinetic energy gained by the crate is
(1) 200 J (2) 240 J (3) 250 J (4) 300 J

7. A spring of spring constant 5×10^3 Nm^{-1} is stretched initially by 5 cm from the unstretched position. Then the work required to stretch it further by another 5 cm is
(1) 25.00 Nm (2) 6.25 Nm (3) 12.50 Nm (4) 18.75 Nm

8. If a machine gun fires n bullets per second each with kinetic energy k, then the power of the machine gun is
(1) nk^2 (2) $\frac{k}{n}$ (3) n^2k (4) nk

9. A force $\vec{F}=(5\hat{i}+3\hat{j}+2k)$ N is applied over a particle which displaces it from its origin to the point $\vec{r}=(2\hat{i}-\hat{j})$ m The work done on the particle (in joule) is
(1) −7 (2) + 7 (3) + 10 (4) + 13

10. An automobile travelling with a speed of 60 km h^{-1}, can brake to stop within a distance of 20m. If the car is going twice as fast, i.e., at 120 km h^{-1}, the stopping distance will be
(1) 20m (2) 40m (3) 60m (4) 80m

11. A man runs towards the plane mirror at $2\,ms^{-1}$. The relative speed of his image w.r.t. him will be
(1) $2ms^{-1}$ (2) $4ms^{-1}$ (3) $8ms^{-1}$ (4) $10ms^{-1}$

12. A convergent beam of light is incident on a concave mirror so as to converge to distance 12 cm from the pole of mirror. An inverted image of the same size is formed coincident with the virtual object. What is the focal length of the mirror?
(1) 24cm (2) 12 cm (3) 6 cm (4) 3 cm

13. A concave mirror forms the real image of an object which is magnified 4 times. The object is moved 3 cm away, the magnification of the image is 3 times. What is the focal length of the mirror?
(1) 3 cm (2) 4 cm (3) 12 cm (4) 36 cm

14. The angle between the incident ray and the reflected ray from a plane mirror is 60^o. Through what angle is the reflected ray deviated with respect to the incident ray?
(1) 150^o (2) 120^o (3) 90^o (4) 60^o

15. A 2m tall person stands 3m from a plane mirror. What is the minimum mirror height required to see their full reflection?
(1) 2m (2) 1m (3) 1.5m (4) 3m

SECTION – 2 (CHEMISTRY)

16. The electronic configuration of an element is 2,8,3. Which statement is correct about it?
(1) Group 13, Period 3, metallic (2) Group 3, Period 2, non-metallic
(3) Group 15, Period 3, non-metallic (4) Group 13, Period 2, metalloid

17. In the modern periodic table, which of the following sets contains only metalloids?
(1) B, Si, Ge (2) Na, Mg, Al (3) F, Cl, Br (4) He, Ne, Ar

18. Which element has the highest ionisation energy in the second period?
(1) Li (2) Be (3) F (4) Ne

19. On moving from left to right along a period, which trend is observed?
(1) Atomic radius increases, ionisation energy decreases.
(2) Atomic radius decreases, ionisation energy increases
(3) Both atomic radius and ionisation energy decrease.
(4) Both atomic radius and ionisation energy increase.

20. Which among the following will form a basic oxide?
(1) S (16) (2) Cl (17) (3) Ca (20) (4) P (15)

21. Elements A(2,1), B(2,8,1), C(2,8,8,1) form a vertical column in the periodic table. What is the correct trend for their metallic character from top (A) to bottom (C)?
(1) Decreases (2) Remains same
(3) First increases then decreases (4) Increases

22. Which statement about valency in a group is correct?
(1) Valency increases down the group (2) Valency decreases down the group
(3) Valency remains the same down the group. (4) Valency is zero for all group elements.

23. Which is the correct balanced equation for the reaction of aluminium with chlorine?
(1) $Al + Cl_2 \rightarrow AlCl_3$ (2) $2Al + 3Cl_2 \rightarrow 2AlCl_3$
(3) $Al + 3Cl_2 \rightarrow AlCl_6$ (4) $2Al + Cl_2 \rightarrow 2AlCl$

24. Which change is an example of a double displacement reaction producing a gas?
(1) $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$ (2) $2KClO_3 \rightarrow 2KCl + 3O_2$
(3) $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$ (4) $CuO + H_2 \rightarrow Cu + H_2O$

25. A compound "X" turns limewater milky and is produced when dilute HCl reacts with a certain solid "Y". Which pair is correct?
(1) $X = SO_2, Y = Na_2SO_3$ (2) $X = CO_2, Y = Na_2CO_3$
(3) $X = H_2, Y = Zn$ (4) $X = O_2, Y = KClO_3$

26. Which reaction is endothermic decomposition?
(1) $CaCO_3 \rightarrow CaO + CO_2$ (on heating) (2) $2H_2 + O_2 \rightarrow 2H_2O$
(3) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (4) $AgNO3 + NaCl \rightarrow AgCl + NaNO_3$

27. Identify the oxidising agent in the reaction: $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
(1) Zn (2) HCl (3) $ZnCl_2$ (4) H_2

28. Which observation confirms that a chemical reaction has occurred when iron nails are dipped in copper sulphate solution?
(1) Solution turns colourless and a reddish-brown deposit forms on nails.
(2) Solution remains blue and nails stay shiny
(3) Gas bubbles evolve without colour change
(4) Temperature drops without any deposit.

29. Which is a correct balanced neutralisation reaction?
(1) $H_2SO_4 + NaOH \rightarrow Na_2SO_4 + H_2O$ (2) $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$
(3) $2H_2SO_4 + NaOH \rightarrow Na_2SO_4 + 2H_2O$ (4) $H_2SO_4 + NaOH \rightarrow NaHSO_4 + H_2$

30. For the skeletal equation: $KClO_3 \rightarrow KCl + O_2$, what are the correct coefficients to balance it?
(1) 1,1,1 (2) 2,2,3 (3) 2,1,3 (4) 1,2,1

SECTION – 3 (BIOLOGY)

31. The point of contact between the terminal branches of the axon of a neuron with the dendrites of another neuron is called _____
(1) Synapsis (2) Synapse (3) Chiasmata (4) Cleft

32. The living cell out of these is:
(1) Vessel (2) Sieve tube (3) Tracheid (4) Phloem fibre

33. The filtration units of kidneys are called
(1) Ureters (2) Urethra (3) Neurons (4) Nephrons

34. The blood leaving the tissues becomes richer in
(1) Carbon dioxide (2) Water (3) Hemoglobin (4) Oxygen

35. Heterodont condition of teeth implies _____.
(1) Having two sets of teeth during life time
(2) Having different types of teeth like incisors, canines etc.
(3) Teeth are embedded in socket of the jaw bones
(4) Teeth are arranged in 2123 order

36. How many ATP molecules can be obtained through anaerobic respiration of three molecules of Glucose?
(1) 114 (2) 76 (3) 10 (4) 6

37. The role of HCl in stomach is:
(1) Activation of gastric enzymes (2) Killing harmful pathogens in ingested food
(3) Softening food (4) All the above

38. The mode of asexual reproduction of Rhizopus (bread mould) is
(1) Fission (2) Budding
(3) Spore formation (4) Vegetative propagation

39. Tuber of potato is a modification of _____ for vegetative propagation.
(1) Root (2) Leaf (3) Stem (4) Bud

40. If hydrochloric acid is not produced in the stomach then which enzyme will not function?
(1) Pepsin (2) Ptyalin (3) Procarboxy peptidase (4) Lipase

41. Photophosphorylation is formation of _____ in the process of photosynthesis.
(1) Oxygen (2) Water (3) ATP (4) Carbon di-oxide

42. _____ closes the respiratory passage during ingestion of food.
(1) Uvula (2) Hard palate (3) Epiglottis (4) Tongue

43. The deficiency of _____ ions will delay blood clotting.
(1) Ca (2) Na (3) K (4) Al

44. Which one of the following triggers the ripening of fruits?
(1) Kinetin (2) IAA (3) Gibberellic acid (4) Ethylene

45. Bending of growing shoot towards sunlight is called
(1) Phototropism (2) Hydrotropism (3) Geotropism (4) Chemotropism

46. Emasculation is
(1) Removal of sepals of flower (2) Removal of petals of flower
(3) Removal of stamens of flower (4) Another name for self-pollination

47. Menopause in a human female refers to a stage when
(1) Menstruation stops (2) Puberty begins (3) Menstruation begins (4) Ovulation occurs

48. Which of the following is the correct sequence of events of sexual reproduction in plants?
(1) Pollination Fertilization, Seedling, Embryo
(2) Seedling, Embryo, Fertilization, Pollination
(3) Pollination, Fertilization, Embryo, Seedling
(4) Embryo, Seedling, Pollination, Fertilization

49. Which of the following is not part of the Alimentary canal?
(1) Mouth (2) Pharynx (3) larynx (4) Oesophagus

50. Where does The “Aerobic Respiration Primarily occur in a cell?
(1) Cytoplasm (2) Mitochondria (3) Nucleus (4) Chloroplast