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SAMPLE PAPER - 57

Time : 1 : 15 Hr.

PHYSICS

01. A body moves with speed V_1 for distance L and then with speed V_2 for distance 2L. The average speed for the motion is

(1)
$$\frac{V_1 + V_2}{2}$$
 (2) $\frac{3V_1V_2}{V_1 + 2V_2}$
(3) $\frac{3V_1V_2}{2V_1 + V_2}$ (4) $\frac{3V_1V_2}{V_1 + V_2}$

- 02. At time t, the position of a body moving along the x-axis is $x=t^3-6t^2+9t$ m. The deceleration of the body at 1 s is (1) $6ms^{-2}$ (2) $4ms^{-2}$ (3) $8ms^{-2}$ (4) none
- 03. The water drops fall at regular intervals from a tap 5 m above the ground. The third drop is leaving the tap at an instant when the first drop touches the ground. How far above the ground is the second drop at that instant? (Take $g = 10 \text{ m/s}^2$) (1) 1.25 m (2) 2.50 m (3) 3.75 m (4) 5.00 m
- 04. A car starts from rest and moves with uniform acceleration a on a straight road from time t = 0 to t = T. After that, a constant deceleration of magnitude a brings it to rest. In this process the average speed of the car is (1) aT/4 (2) 3aT/2 (3) aT/2 (4) at
- 05. A particle moves along a straight line path. Its speed decreases continuously and after some time it comes to rest. The motion is with constant acceleration whose direction with respect to the direction of velocity is
 - (1) positive throughout motion
 - (2) negative throughout motion
 - (3) first positive then negative
 - (4) first negative then positive
- 06. A bus is moving with a velocity of 10 ms^{-1} on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1 km from the scooterist, the scooterist should chase the bus with a constant velocity of

 $(1)\ 50\ ms^{-1}\quad (2)\ 40\ ms^{-1}\quad (3)\ 30\ ms^{-1}\quad (4)\ 20\ ms^{-1}$

Question: 60

- 07. The distance traveled by a particle is proportional to the square of time, then the particle travels with (1) uniform acceleration
 - (2) uniform velocity
 - (3) increasing acceleration
 - (4) decreasing velocity
- 08. The average velocity of a body moving with uniform acceleration travelling a distance of $3.06 \text{ m} \text{ is } 0.34 \text{ ms}^{-1}$. If the change in velocity of the body is 0.18 ms^{-1} during this time, its uniform acceleration is (1) 0.01 ms^{-2} (2) 0.02 ms^{-2}

 $\begin{array}{cccc} (1) \ 0.01 \ \mathrm{ms}^{-2} & (2) \ 0.02 \ \mathrm{ms}^{-2} \\ (3) \ 0.03 \ \mathrm{ms}^{-2} & (4) \ 0.04 \ \mathrm{ms}^{-2} \end{array}$

- 09. Speeds of two identical cars are v and 4v, respectively, at a specific instant. If the same retardation is applied to both the cars, the ratio of the respective distances in which the two cars are stopped, from that instant, is (1)1:1 (2)1:4
 - (3)1:8 (4)1:16
- 10. If the first one-third of a journey is travelled at 20 km h⁻¹, next one-third at 40 km h⁻¹ and the last one-third at 60 km h⁻¹, then the average speed for the whole journey will be (1) 32.7 km h⁻¹ (2) 35 km h⁻¹ (3) 40 km h⁻¹ (4) 45 km h⁻¹
- 11. Which of the following graphs represents the motion of a particle moving with constant velocity ?



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12. One stone is dropped from a tower from rest and simultaneously another stone is projected vertically upwards from the tower with some initial velocity. The graph of the distance(s) as (before either stone hits the ground)



13. A particle starts from rest at t = 0 and moves in a straight line with acceleration as shown in figure. The velocity of the particle at t = 3 s is



14. The motion of a particle moving along the y-axis is represented as $y = 3(t-2) + 5(t-2)^2$. Identify the correct statement

(1) the initial (t = 0) velocity of the particle is 3 ms^{-1}

(2) the acceleration of the particle is 5 ms⁻¹

(3) the particle is at the origin at t = 2 s(4) all of the above

- 15. The displacement y (in metres) of a body varies with time t (in seconds) as $y = -t^2 + 16t + 2$
 - How long does the body take to come to rest? (1) 8 s (3) 12 s (2) 10 s (4) 16 s



- 16. The largest number of molecules is in

 (1) 36 g of water
 (2) 28 g of carbon monoxide
 (3) 46 g of ethyl alcohol
 (4) 54 g of nitrogen pentoxide
- 17. How many atoms are contained in one mole of sucrose $(C_{12}H_{22}O_{11})$ (1) 45 × 6.02 × 10²³ atoms/mole (2) 1 × 6.02 × 10²³ atoms/mole

(3) $5 \times 6.02 \times 10^{23}$ atoms/mole (4) None of these

18. Four one litre flasks are separately filled with the gases H_2 , He, O_2 and O_3 at the same temperature and pressure. The ratio of total number of atoms of these gases present in different flask would be: (1)1:1:1:1(2) 1:2:2:3 (3) 2:1:2:3 (4) 3:2:2:1 19. The mass of a molecule of water is (1) 3×10^{-26} kg (2) 3×10^{-25} kg (3) 1.5×10^{-26} kg (4) 2.5×10^{-26} kg 20. Under the same conditions, two gases have the same number of molecules. They must (1) be noble gases (2) have equal volume (3) have a volume of 22.4 dm^3 each (4) have an equal number of atoms 21. 1 mol of CH₄ contains (1) 6.02×10^{23} atoms of H (2) 4 g atom of Hydrogen (3) 1.81×10^{23} molecules of CH₄ (4) 3.0 g of carbon Number of mole in 1 m³ gas at NTP are: 22. (1)44.6 (2)40.6(3) 42.6 (4)48.623. Volume of a gas at STP is 1.12×10^{-7} cc. Calculate the number of molecules in it (2) 3.0×10^{12} $(1) 3.01 \times 10^{20}$ (4) 3.0×10^{24} $(3) 3.01 \times 10^{23}$ 24. Gram molecular volume of oxygen at STP is $(1) 3200 \,\mathrm{cm}^3$ $(2) 5600 \text{ cm}^3$ (3) 22400 cm³ $(4) 11200 \,\mathrm{cm}^3$ 25. The maximum number of molecules are present in (1) 15 L of H_2 gas at STP (2) 5 L of N₂ gas at STP $(3) 0.5 \text{ g of H}_2 \text{ gas}$ (4) 10 g of O_2 gas 26. A gas mixture contains O_2 and N_2 in the ratio of 1: 4 by weight. The ratio of their number of molecules is (1)1:8(3)3:16 (2)1:4(4)7:3227. The vapour density of a gas A is twice that of a gas B. If the molecular weight of B is M, the molecular weight of A will be: $(4) \frac{M}{2}$ (1) M(2) 2 M(3) 3 M 28. In a compound C, H, N atoms are present in 9:1:3.5 by weight. Molecular weight of compound is 108. Its molecular formula is: $(1) C_2 H_6 N_2$ $(2) C_3 H_4 N$ $(3) C_6 H_8 N_2$ $(4) C_9 H_{12} N_3$

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- 29. The empirical formula of an acid is CH_2O_2 , the probable (1) A: Antiport B, B: Uniport A, C: Antiport A, D: Symport molecular formula of acid may be B. E: Carrier point (1)CH₂O $(2) CH_2O_2$ (2) A: Carrier point, B: Antiport A, C: Uniport A, D: Symport $(3) C_2 H_4 O_2$ $(4) C_3 H_6 O_4$ B, E: Antiport B (3) A: Carrier point, B: Antiport C: Symport D: Uniport Equal mass of Fe_2O_3 and FeO has mass of oxygen in the (4) A: Symport B, B: Antiport A, C: Antiport B, D: Carrier 30. point, E: Uniport A ratio: (1)1.35(2)0.74(3)0.37(4)2.739. Water will move from (1) Higher pressure potential to lower BOTANY (2) Higher solute potential to lower (3) Higher water potential to lower 31. What is the approximate rate of ascent of sap? (4) Lower water potential to higher (1)5 m/hr(2) 15 m/hr (3) 40 m/hr 40. (4) 2 m/hrA cell is plasmolyzed after being kept in a hypertonic solution. What will be present between the cell wall and 32. In flowering plants, we need to transport plasmalemma? (1) Water and mineral nutrients (1) Isotonic solution (2) Hypertonic solution (2) Organic nutrients (3)Air (4) Hypotonic solution (3) Plant growth regulators (4) All of these 41. Facilitated diffusion is affected by (1) Solubility of substance in lipid 33. (2) Size of substance Transport over longer distance is known as (1) Translocation (2) Transformation (3) Concentration gradient (3) Transduction (4) Diffusion (4) All of these 42. 34. Which of the following undergoes multi-directional The relationship between Ψ_{w} , Ψ_{s} and Ψ_{p} is (2) $\Psi_{\rm p} = \Psi_{\rm w} + \dot{\Psi}_{\rm s}$ transport? (1) $\Psi_{\rm s} = \Psi_{\rm w} + \Psi_{\rm p}$ (1) Water (3) $\Psi_{\rm w} = \Psi_{\rm p} + \Psi_{\rm s}^{\rm r}$ (2) Mineral nutrients (4) All of these (3) Organic nutrients (4) Both (2) and (3) 43. The best example of imbibition is 35. Diffusion can occur between (1) Absorption of water by seed (1) One part of cell to other part (2) Absorption of water by dry wood (2) Cell to cell (3) Both (1) and (2)(3) Intercellular space to outside of leaf (4) None of these (4) All of these 44. Identify A to D in the given figure. 36. Facilitated diffusion requires to transport substance across membrane. (1) Special membrane protein (2)ATP(4) All of these (3) Protein inhibitor 37. Which of the following process undergoes saturation? (1) Facilitated diffusion (2) Active transport (3) Simple diffusion (1) A-Plasma membrane, B-Plasmodesmata, C-(4) Both (1) and (2)Epidermis, D-Casparian strip. 38. Identify A to E in the given figure. (2) A-Casparian strip, B-Epidermis, C-Plasmodesmata, D-Plasma membrane (3) A-Plasmodesmata, B-Epidermis, C-Casparian strip, D-Plasma membrane
 - (4) A-Epidermis, B-Plasma membrane, C-Casparian strip, D–Plasmodesmata
 - 45. During symplastic pathway, water is moved through (1) Cytoplasm (2) Plasmodesmata
 - (3) Cell membrane (4) All of these

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Membrane

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