


SAMPLE PAPER - 70

Time : 1 : 15 Hr.

Question : 60

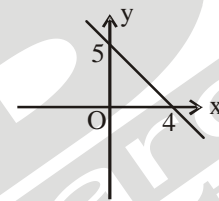
PHYSICS

01. $\int_{-1}^1 (1 + 2x + 3x^2 + 4x^3) dx =$
 (1) 4 (2) 0 (3) 2 (4) None of these
02. If $\int (\cos^2 \theta - \sin^2 \theta) d\theta = a \sin 2\theta + b$ then
 (1) $a = 1, b = 0$
 (2) $a = \frac{1}{2}, b = \text{any number}$
 (3) $a = -\frac{1}{2}, b = \text{any number}$
 (4) $a = \frac{1}{2}, b = 0$
03. (a) $\sin \theta + \cos \theta = \sqrt{2} \sin\left(\frac{\pi}{4} + \theta\right)$
 (b) $\sin \theta - \cos \theta = \sqrt{2} \sin\left(\frac{\pi}{4} - \theta\right)$
 (c) $\sqrt{3} \cos \theta - \sin \theta = 2 \cos\left(\frac{\pi}{6} + \theta\right)$
 (1) All are correct
 (2) only (a), (b) are correct
 (3) Only (b), (c) are correct
 (4) Only (a), (c) are correct
04. Phase difference between $\sin \omega t$ and $\cos\left(\omega t + \frac{\pi}{3}\right)$ is
 (1) $\frac{\pi}{3}$ (2) $\frac{\pi}{6}$
 (3) $\frac{5\pi}{6}$ (4) none of these
05. Phase difference between $\sin\left(2\pi t + \frac{\pi}{6}\right)$ and
 $\cos\left(2\pi t - \frac{\pi}{3}\right)$ is
 (1) π (2) zero (3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$

06. Slope of straight line $4x - 3y = 12$ is

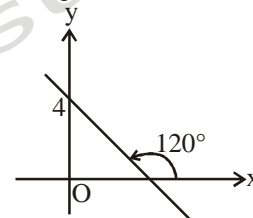
- (1) $\frac{4}{3}$ (2) $\frac{1}{4}$ (3) $\frac{1}{3}$ (4) $\frac{3}{4}$

07. Equation of straight line is



- (1) $4x + 5y = 20$ (2) $4x - 5y = 20$
 (3) $5x + 4y = 20$ (4) $5x - 4y = 20$

08. Equation of straight line is



- (1) $\sqrt{3}x + y = 4$ (2) $\sqrt{3}x - y = 4$
 (3) $x + \sqrt{3}y = 4$ (4) $x - \sqrt{3}y = 4$

09. The straight lines $x = 0, y = 0$ and $3x + 4y = 24$ form a triangle whose area is

- (1) 24 (2) 6 (3) 8 (4) 12

10. The equation $y = 2x^2 - 8x$ represents a parabola

- (1) which passes through origin and meets x-axis at points separated by 3
 (2) which passes through origin and meets x-axis at points separated by 4
 (3) which passes through origin and meets y-axis at point separated by 3
 (4) none of the above

11. $x = y^2 - 5y + 6$ is a parabola

- (1) which intersects x-axis at points distance 1 apart
 (2) which intersects x-axis at points distance 6 apart
 (3) which intersects y-axis at points distance 1 apart
 (4) which intersects y-axis at points distance 3 apart

12. If $N = N_0 e^{-\lambda t}$, the terms are having as usual meaning.

Find out time t when $N = \frac{N_0}{e}$

- (1) $.69\lambda$ (2) λ (3) $\frac{.69}{\lambda}$ (4) $\frac{1}{\lambda}$

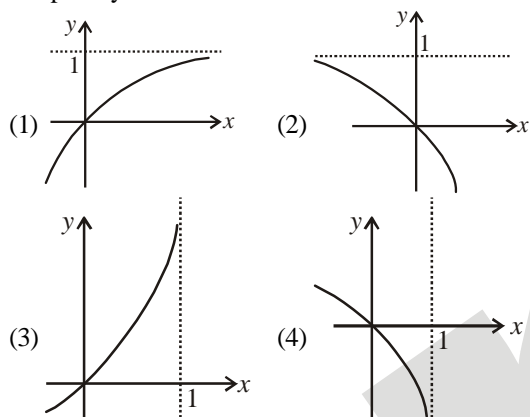
13. If x is numerically much less than 1, $\frac{(1-x)^{14}}{(1+x)^6}$ is

- approximately equal to
(1) $1+8x$ (2) $1-8x$ (3) $1+20x$ (4) $1-20x$

14. If $2^x = 5$ and $\log_{10} 2 = 0.3$ then $x =$

- (1) $\frac{7}{3}$ (2) $\frac{3}{7}$ (3) $\frac{5}{2}$ (4) none of these

15. Graph of $y = 1 - e^{-x}$ is



CHEMISTRY

16. 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

17. In a gaseous reaction of the type $aA + bB \longrightarrow cC + dD$, which is wrong?

- (1) a litre of A combines with b litre of B at same P & T to give C and D
(2) a mole of A combines with b mole of B to give C and D
(3) a g of A combines with b g of B to give C and D
(4) a molecules of A combines with b molecules of B to give C and D

18. 1 amu is equal to

- (1) $\frac{1}{12}$ of C-12 (2) $\frac{1}{14}$ of O-16
(3) 1 g of H_2 (4) 1.6×10^{-23} kg

19. The simplest formula of a compound containing 50% of element X (atomic mass 10) and 50% of element Y (atomic mass 20) is

- (1) XY (2) X_2Y (3) XY_3 (4) X_2Y_3

20. The atomic weights of two elements A and B are 40 and 80 respectively. If x g of A contains y atoms, how many atoms are present in 2x g of B?

- (1) $\frac{y}{2}$ (2) $\frac{y}{4}$ (3) y (4) 2y

21. The molecular weight of O_2 and SO_2 are 32 and 64 respectively. At 15 °C and 150 mm of Hg pressure, one litre of O_2 contains 'N' molecules. The number of molecules in two litres of SO_2 under the same conditions of temperature and pressure will be:

- (1) $\frac{N}{2}$ (2) N (3) 4N (4) 2N

22. The total number of electrons in one molecule of carbon dioxide is

- (1) 22 e (2) 22 mole e (3) 66 e (4) 66 mole e

23. What volume of CO_2 will be liberated at NTP, if 12 g of carbon is burnt in excess of oxygen?

- (1) 11.2 L (2) 22.4 L (3) 2.24 L (4) 1.12 L

24. How many atoms are contained in one mole of sucrose ($C_{12}H_{22}O_{11}$)

- (1) $45 \times 6.02 \times 10^{23}$ atoms/mole
(2) $5 \times 6.02 \times 10^{23}$ atoms/mole
(3) $5 \times 6.02 \times 10^{20}$ atoms/mole
(4) None of these

25. Number of mole in 1 m³ gas at NTP are:

- (1) 44.6 (2) 40.6 (3) 42.6 (4) 48.6

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 (2) 1 : 4 (3) 3 : 16 (4) 7 : 32

27. If the volume of x molecules of H_2 gas at STP is 5L. What will be the volume of x molecules of O_2 gas at STP?

- (1) $\frac{5}{80}$ L (2) $\frac{16}{5}$ L (3) $\frac{5}{16}$ L (4) 5 L

28. Ten mole of P_4 molecules contain:

- (1) 1 molecule (2) 24.088×10^{24} atoms

- (3) $\frac{1}{4} \times 6.022 \times 10^{23}$ atoms

- (4) 24.088×10^{23} atoms

29. When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$ each at STP, the moles of $HCl(g)$ formed is equal to:

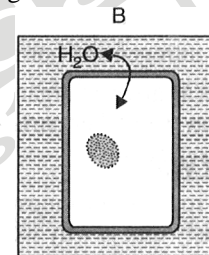
- (1) 5.0 mol of $HCl(g)$ (2) 1.5 mol of $HCl(g)$
(3) 1.0 mol of $HCl(g)$ (4) 2.0 mol of $HCl(g)$

30. Persons are medically considered to have lead poisoning if they have a concentration of greater than $10\ \mu\text{g}$ of lead per decilitre of blood. Concentration in parts per billion is
 (1) 1000 (2) 100 (3) 10 (4) 1

BOTANY

31. When molecules move across in a membrane independent of other molecule through carrier protein, then the process is known as
 (1) Symport (2) Antiport
 (3) Uniport (4) All of these
32. How can we get egg membrane?
 (1) Remove yolk and albumin through a small hole at one end of the egg
 (2) Place the shell in dilute HCl for few hours
 (3) Both (1) and (2)
 (4) None of these
33. Deplasmolysis occurs in a cell when it is placed in
 (1) Hypotonic solution
 (2) Hypertonic solution
 (3) Isotonic solution
 (4) Buffer solution
34. In flowering plants, we need to transport
 (1) Water and mineral nutrients
 (2) Organic nutrients
 (3) Plant growth regulators
 (4) All of these
35. Transport over longer distance is known as
 (1) Translocation
 (2) Transformation
 (3) Transduction
 (4) Diffusion
36. Diffusion can occur between
 (1) One part of cell to other part
 (2) Cell to cell
 (3) Intercellular space to outside of leaf
 (4) All of these
37. Which of the following process undergoes saturation?
 (1) Facilitated diffusion (2) Active transport
 (3) Simple diffusion (4) Both (1) and (2)
38. The two main components which determine water potential are
 (1) Solute potential (2) Pressure potential
 (3) Matrix potential (4) Both (1) and (2)
39. Dry seeds when placed in water swells due to
 (1) Imbibition (2) Absorption
 (3) Diffusion (4) Adsorption

40. A cell increases in volume if the external medium is
 (1) Hypotonic (2) Hypertonic
 (3) Isotonic (4) None of these
41. A cell is plasmolyzed after being kept in a hypertonic solution. What will be present between the cell wall and plasmalemma?
 (1) Isotonic solution (2) Hypertonic solution
 (3) Air (4) Hypotonic solution
42. Diffusion rate is affected by
 (1) Concentration gradient
 (2) Membrane permeability through which it occurs
 (3) Pressure and temperature
 (4) All of these
43. Where porin proteins are present?
 (1) Outer membrane of plastid
 (2) Inner membrane of mitochondria
 (3) Inner membrane of some bacteria
 (4) All of these
44. Which of the following has maximum water potential?
 (1) 1 M of NaCl (2) 0.5 M of glucose
 (3) Pure water (4) 0.001 M of HCl
45. Identify the figure and select the correct statement.



- (1) The movement of water occurred across the membrane moving from an area of high water potential to an area of lower water potential
 (2) Water flows into the cell and out of the cell and are in equilibrium
 (3) Water diffuses into the cell causing the cytoplasm to build up a pressure against the wall
 (4) None of the above

ZOOLOGY

46. What is serum?
 (1) (Blood) - (Plasma)
 (2) (Blood) - (Plasma + RBC)
 (3) (Plasma) - (Clotting factor)
 (4) (Plasma) - (WBC)
47. The main osmotic protein of blood is
 (1) Albumin (2) Globulin
 (3) Fibrinogen (4) Thromboplastin

48. The shape of RBC in mammal is
 (1) Oval (2) Biconvex
 (3) Biconcave (4) Flattened
49. Deficiency of which of the following blood cell leads of bleeding?
 (1) Thrombocytes (2) Neutrophils
 (3) Monocytes (4) RBCs
50. The cell involved in inflammatory reaction is
 (1) RBCs (2) Platelets
 (3) Basophils (4) All of these
51. Megakaryocytes are found in
 (1) Lungs (2) Liver
 (3) Bone marrow (4) Spleen
52. Which of the following cells are responsible for immune response of the body?
 (1) T lymphocyte (2) B lymphocyte
 (3) Both (1) and (2) (4) Astrocytes
53. Find the correct decending order to percentage proportion of leucocytes in human blood.
 (1) Neutrophils → Basophils → Lymphocytes → Acidophils (Eosinophils) → Monocytes
 (2) Neutrophils → Monocytes → Lymphocytes → Acidophils → Basophils
 (3) Neutrophils → Lymphocytes → Monocytes → Acidophils → Basophils
 (4) Neutrophils → Acidophils → Basophils → Lymphocytes → Monocytes
54. Closed circulatory system is found in
 (1) Arthropod and chordates.
 (2) Molluscs and chordates.
 (3) Amphibians and molluscs.
 (4) Annelids and chordates.
55. The following diagram represents circulation in
-
- Deoxygenated
- Oxygenated
- Deoxygenated
- (1) Fishes (2) Amphibians
 (3) Birds (4) Reptiles
56. Bicuspid valve/mitral valve is found between
 (1) Left atrium and left ventricle.
 (2) Right Atrium and right ventricle.
 (3) Right atrium and left ventricle.
 (4) Left atrium and right ventricle.
57. Chordae tendineae are found in
 (1) Joints (2) Atria of heart
 (3) Ventricles of heart (4) Ventricles of brain
58. SA node is located in
 (1) Upper left corner of right atrium.
 (2) Lower left corner of left atrium
 (3) Lower right corner of left atrium.
 (4) Upper right corner of right atrium.
59. Bundle of His is a group of
 (1) Ganglia (2) Nerve fibres
 (3) Muscular fibres (4) Connective tissue
60. During ventricular systole, oxygenated blood is pumped into the
 (1) Aorta and deoxygenated blood is pumped into the pulmonary artery.
 (2) Pulmonary artery and deoxygenated blood is pumped into the artery.
 (3) Aorta and deoxygenated blood is pumped into pulmonary vein.
 (4) Pulmonary vein and deoxygenated blood is pumped into pulmonary artery.