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SAMPLE PAPER - 80

Time : 1 : 15 Hr.   **Question : 60**

PHYSICS

01. A stone is released from the top of a tower. It covers 34.3 m distance in the last second of its journey. What is the height of the tower ?
(1) 80 m   (2) 72 m
(3) 78.4 m   (4) 44.1 m.

02. A man runs at a speed of 6.0 m/s to overtake a standing bus. When he is 8.0 m behind the door (at $t = 0$), the bus moves forward and continues with a constant acceleration of 2.0 m/s². The man shall gain the door at time t equal to.
(1) 1 s   (2) 2 s
(3) 3 s   (4) 4 s

03. If the velocity of a particle is $v = (2t + 3t^2)$ ms⁻¹, where t is in second, then the distance travelled by it between 1 s and 2 s is:
(1) 15 m   (2) 27 m
(3) 10 m   (4) 2 m

04. From the given v-t graph, the distance covered by particle in first 25 s is

(1) 125 m   (2) 100 m   (3) 150 m   (4) 175 m

05. The maximum height attained by a projectile is increased by 5%. Keeping the angle of projection constant, what is the percentage increase in horizontal range ?
(1) 5%   (2) 10%   (3) 15%   (4) 20%

06. A ball is dropped from the top of a building 100 m high. At the same instant another ball is thrown upwards with a velocity of 40 m/s from the bottom of the building. The two balls will meet after
(1) 3 s   (2) 2 s   (3) 2.5 s   (4) 5 s

07. A particle is projected from a horizontal plane with a velocity of $8\sqrt{2}$ m s⁻¹ at an angle θ. At highest point its velocity is found to be 8 m s⁻¹. Its range will be
(g = 10 m s⁻²)
(1) 3.2 m   (3) 4.6 m   (2) 6.4 m   (4) 12.8 m

08. Two bodies x and y of weight 600 N and 1000 N are dropped simultaneously from the same height large above the earth's surface from same place. Their acceleration will be
(1) $a_x > a_y$ (2) $a_y > a_x$
(3) $a_x = a_y$ (4) Can't be predicted

09. The acceleration due to gravity g and mean density of the earth ρ are related by which of the following relations ? (where G is the gravitational constant and R is the radius of the earth)

(1) $\rho = \dfrac{3g}{4\pi GR}$ (2) $\rho = \dfrac{3g}{4\pi GR^3}$

(3) $\rho = \dfrac{4\pi gR^2}{3G}$ (4) $\rho = \dfrac{4\pi gR^3}{3G}$

10. Whith what velocity should a particle be projected so that its height becomes equal to radius of earth ?

(1) $\left(\dfrac{GM}{R}\right)^{1/2}$ (2) $\left(\dfrac{8GM}{R}\right)^{1/2}$

(3) $\left(\dfrac{2GM}{R}\right)^{1/2}$ (4) $\left(\dfrac{4GM}{R}\right)^{1/2}$

11. If the zero error correction of a screw gauge with least count 0.01 mm is +0.05 mm,
(1) the number of C.S.D. is 100, and the zero of the circular scale is 5 divisions above the index line.
(2) the number of C.S.D. is 100, and the zero of the circular scale is 5 divisions below the index line.
(3) the number of C.S.D. is 50, and the zero of the circular scale is 5 divisions below the index line.
(4) Both (2) and (3)

12. A screw gauge gives the following readings when used to measure the diameter of a wire
    Main scale reading : 0 mm
    Circular scale reading : 52 divisions
    Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is
    (1) 0.052 cm   (2) 0.52 cm
    (3) 0.026 cm   (4) 0.26 cm

13. When the studs of a screw gauge are in contact the position of the head of the screw is as shown below, Determine the zero error
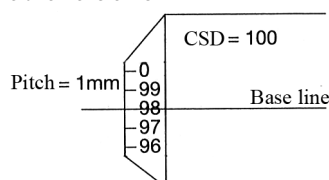
    (1) –0.01 mm   (2) –0.01 cm
    (3) +0.02 mm   (4) – 0.02 mm

14. The weight of a body on the surface of the earth is 90 N. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth?
    (1) 35 N   (2) 28 N   (3) 18 N   (4) 40 N

15. What will happen to the weight of the body at the south-pole, if the earth stops rotating about its polar axis?
    (1) No change
    (2) Increases
    (3) Decreases but not become zero
    (4) Reduces to zero

CHEMISTRY

16. At certain Hill-station pure water boils at 99.72 °C. If K_b for water is 0.513 °C kg mol^{-1}. The boiling point of 0.69 m solution of urea will be-
    (1) 100.074 °C   (2) 103 °C
    (3) 100.359 °C   (4) Un predictable

17. 2 moles of non-volatile solute is added to 1 kg water at – 8° C. K_f of water is 2 K kg mol^{-1}. Mass of ice that separates out is (Ignoring the effect of change in volume)
    (1) 250 g   (2) 500 g   (3) 750 g   (4) 100 g

18. One mole of sugar is dissolved in two moles of water. The V.P. of the solution relative to that of pure H_2O is
    (1) 2/3   (2) 1/3
    (3) 3/2   (4) 1/2.

19. A 5% solution of cane sugar (molar mass = 342) is isotonic with 1% of a solution of an unknown solute. The molar mass of unknown solute in g/mol is
    (1) 136.2   (2) 171.2
    (3) 68.4   (4) 34.2

20. Total vapour pressure of mixture of 1 mol of volatile component A (p^0_A=100 mmHg) and 3 mol of volatile component B (p^0_B = 60 mm Hg) is 75 mm. For such case component is positive deviation from Raoult's law :
    (1) there is positive deviation from Raoult's law
    (2) boiling point has been lowered
    (3) force of attraction between A and B is smaller than that between A and A or between B and B
    (4) all the above statements are correct

21. Screening effect is not observed in
    (1) He^+ (2) Li^{2+}
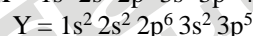   (3) Be^{3+} (4) in all the three

22. The five succesive ionization energies of an element are 800, 2427, 3658, 25024 and 32824 kJ mol^{-1} respectively. The number of valence electrons is
    (1) 3   (2) 5   (3) 4   (4) 2

23. The outer electronic configuration of Gd (Atomic No. 64) is
    (1) $4f^3 5d^5 6s^2$ (2) $4f^8 5d^0, 6s^2$
    (3) $4f^4 5d^4, 6s^2$ (4) $4f^7 5d^1, 6s^2$

24. The electronic configuration of two elements X and Y are given below:
    $$X = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$$
    $$Y = 1s^2 2s^2 2p^6 3s^2 3p^5$$
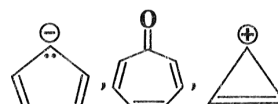   The formula of the ionic compound that can be formed between these elements is
    (1) XY   (2) XY_2
    (3) X_2Y (4) XY_3

25. The highest electron affinity is shown by
    (1) O^- (2) F^-
    (2) Cl_2 (4) F_2

26. Which class of organic compounds do the following compounds belong to?

    (1) Benzenoid aromatics
    (2) Non-benzenoid aromatics
   (3) Heterocyclics
    (4) Acyclic compounds

27. How many distinct terminal alkynes are possible for a compound having molecular formula C_5H_8?
    (1) 1   (2) 2   (3) 3   (4) 4

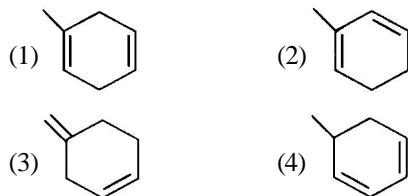28. Which of the following is a natural polymer?
    (1) cis-1, 4-polyisoprene
    (2) poly (Butadiene-styrene)
    (3) polybutadiene
    (4) poly (Butadiene-acrylonitrile)

29. Among the following compounds which have cis form of geometrical isomerism.

(P)   (Q)

(R)   (S)

(T)
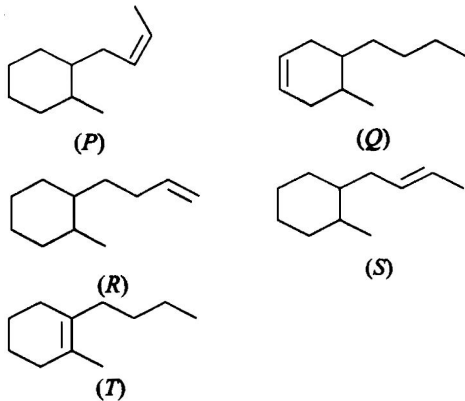
(1) P, Q, S, T   (2) P, Q, T
(3) P, Q, R, S   (4) P, Q, R, T

30. Structure among following only four mono chloro derivatives are obtained:

(1)   (2)

(3)   (4)

BOTANY

31. Read the following statements and find out the incorrect statements.

(a) Water is essential for all physiological activities of the plant and plays a very important role in all living organisms

(b) A mature corn plant absorbs almost five litres of water in a day

(c) A mustard plant absorbs water equal to its own weight in about 3 hours

(d) Water is often the limiting factor for plant growth and productivity in both agricultural and natural environments

(e) A watermelon has over 92 percent water, most herbaceous plants have only about 10 to 20 percent of its fresh weight as dry matter

(1) b, c, e   (2) a, b, d
(3) a, c, e   (4) b, c, d

32. Fill in the blanks

1. Despite the absence of a heart or a circulatory system in plants, the flow of water upward through the xylem in plants can achieve fairly high rates up to ...a.... metres per hour.

2. Less than ...b.... percent of the water reaching the leaves is used in photosynthesis and plant growth.

3. Water loss from a leaf can be studied by using ...c...

4. Most researchers agree that water is mainly ...d... through the plant.

(1) a–10, b–5, c–potato osmometer, d–pushed
(2) a–5, b–10, c–cobalt chloride paper, d–pulled
(3) a–15, b–1, c–cobalt chloride paper, d–pulled
(4) a–10, b–1, c–cobalt chloride paper, d–pulled

33. Osmosis is the special type of diffusion of water across a .... which depends on .... and .... respectively.

(1) Semi-permeable membrane, pressure gradient and concentration gradient.
(2) Selectively permeable membrane, pressure gradient and concentration gradient
(3) Selectively permeable membrane, apoplast and symplast
(4) Semi-permeable membrane, apoplast and symplast

34. Most water flow in root occurs via apoplast as
(1) Cortical cells are living cells
(2) Cortical cells are loosely arranged
(3) Cortical cells are thin walled
(4) All of the above

35. 0.1 M solution of solute (non-electrolyte) will have a water potential of
(1) –2.3 bars
(2) Zero
(3) 2.3 bars
(4) 22.4 bars

36. Bulk flow can be achieved through a hydrostatic pressure gradient. Negative hydrostatic pressure gradient and positive hydrostatic pressure gradient are seen in
(1) Suction through a straw and a garden hose respectively
(2) A garden hose and suction through a straw respectively
(3) Cobalt chloride paper and polythene respectively
(4) Blotting paper and cobalt chloride paper respectively

37. Identify A to D in the given figure.
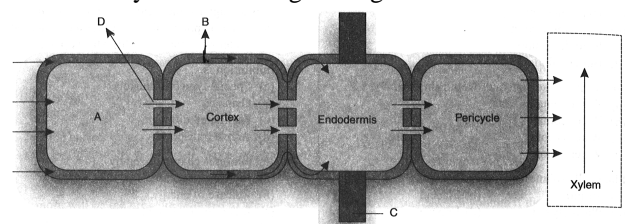
(1) A–Plasma membrane, B–Plasmodesmata, C–Epidermis, D–Casparian strip.
(2) A–Casparian strip, B–Epidermis, C–Plasmodesmata, D–Plasma membrane
(3) A–Plasmodesmata, B–Epidermis, C–Casparian strip, D–Plasma membrane
(4) A–Epidermis, B–Plasma membrane, C–Casparian strip, D–Plasmodesmata

38. The movement of water is correctly represented by
(1) Cortex → Root hair (Epidermis) → Xylem → Endodermis → Pericycle
(2) Root hair (Epidermis) → Endodermis → Xylem → Pericycle → Cortex
(3) Root hair (Epidermis) → Cortex → Endodermis → Pericycle → Xylem
(4) Xylem → Cortex → Endodermis → Pericycle → Root hair (Epidermis)

39. Match the colums I and II, and choose the correct combination from the options given.

	Column I		Column II
a.	Cristae	1.	Flat membranous sacs in stroma
b.	Cisternae	2.	Infolding in matrix
c.	Thylakoids	3.	Disc shaped sacs in golgi apparatus
d.	Pili	4.	Small bristle like fibres
e.	Fimbriae	5.	Elongated tubular structures

(1) a–2; b–3; c–1; d–5; e–4
(2) a–3; b–1; c–2; d–4; e–5
(3) a–2; b–3; c–1; d–4; e–5
(4) a–1; b–3; c–2; d–5; e–4

40. Recognise the figure and find out the correct matching.
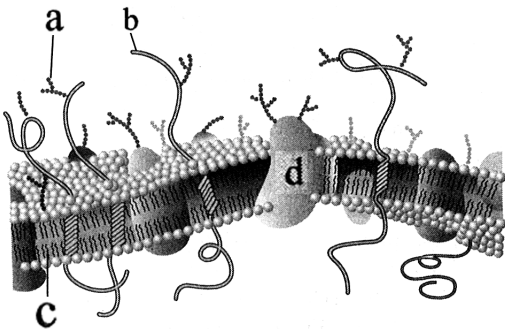
(1) a–protein, c–sugar, d–cholesterol, b–integral protein
(2) b–protein, a–sugar, c–cholesterol, d–integral protein
(3) c–protein, d–sugar, b–cholesterol, a–integral protein
(4) d–protein, b–sugar, a–cholesterol, c–integral protein

41. Match the columns I and II, and choose the correct combination from the options given.

	Column I (Organelle)		Column II (Size)
a.	Cisternae of GB	K.	2-4 μm
b.	Length of mitochondrion	L.	0.2-1.0 μm
c.	Diameter of mitochondrion	M.	5-10 μm
d.	Length of chloroplast	N.	0.5-1.0 μm
e.	Width of chloroplast	Q.	1.0-4.1 μm

(1) a–L, b–M, c–N, d–Q, e–K
(2) a–N, b–Q, c–K, d–M, e–L
(3) a–L, b–Q, c–N, d–M, e–K
(4) a–N, b–Q, c–L, d–M, e–K

42. How many fo the given cell structure are found only in prokaryotic cells ?
[Vacuoles, Mesosomes, Ribosomes, Flagella, Cell wall, Mitochondria]
(1) 1   (2) 2   (3) 5   (4) 4

43. According to fluid mosaic model (proposed by Singer & Nicolson), plasma membrane is composed of:
(1) Cellulose, hemicellulose
(2) Phospholipid and integrated protein
(3) Phospholipid, extrinsic protein, intrinsic protein
(4) Phospholipid and hemicellulose

44. Incorrect statement is:
(1) The shape of the cell may vary with the function they perform.
(2) The plasma membrane is the main area of cellular activities in both, plant and animal cells.
(3) Ribosomes are non-membrane bound organelles found in all cells.
(4) Animal cell contain a non-membrane bound organelle called centriole which helps in cell division.

45. Select the incorrect match:
(1) Lampbrush   -Diplotene bivalents chromosomes
(2) Allosomes   - Sex chromosomes
(3) Submetacentric   -L-shaped chromosomes
(4) Polytene   -Oocytes of amphibians chromosomes

ZOOLOGY

46. The formation of erythrocytes in foetus takes place in
(1) liver and spleen
(2) red bone marrow
(3) Placenta
(4) All of the above

47. Which one has the thickest wall?
(1) Right auricle   (2) Right ventricle
(3) Left auricle   (4) Left ventricle

48. Which among the following is the principal cation in the human blood?
(1) Potassium   (2) Sodium
(3) Calcium   (4) Maganese

49. Thrombokinase is associated with
(1) elimination of urea and other excretory products from the body
(2) production of erythrocytes from the bone marrow
(3) pulmonary and systemic circulation
(4) enzymatic reactions in coagulation of blood

50. In all the waves of ECG, all following are positive waves except
(1) P (2) Q (3) R (4) T

51. The thickening of walls of arteries is called
(1) arteriosclerosis (2) arthritis
(3) Atherosclerosis (4) Both (2) and (3)

52. Blood leaving the liver going towards the heart is rich in
(1) bile (2) urea (3) ammonia (4) oxygen

53. Which one of the following statement is incorrect about cockroach?
(1) They are pest because they destroy food and contaminate it with their smelly excreta.
(2) All species have economic importance
(3) Development in P. americana is paurometabolous type.
(4) Next to last nymphal stage has wing pad.

54. Match the columns.

	Column–I		Column–II
(1)	Pair of spermatheca	(A)	2 – 6th segment (Abdominal)
(2)	Ovary	(B)	6th segment (Abdominal)
(3)	Mushroom shaped accessory reproductive gland	(C)	6 – 7th segment (Abdominal)
(4)	Anal cerci	(D)	10th segment

(1) 1–B, 2–A, 3–C, 4–D
(2) 1–C, 2–B, 3–D, 4–A
(3) 1–D, 2–C, 3–A, 4–B
(4) 1–A, 2–D, 3–B, 4–C

55. Where sperm is stored in cockroach?
(1) Seminal vesicle (2) Phallomere
(3) Ejaculatory duct (4) None of these

56. Malpighian tubules are lined with
(1) Glandular and non-ciliated epithelium
(2) Non-glandular and non-ciliated epithelium
(3) Glandular and ciliated epithelium
(4) Non-glandular and ciliated epithelium

57. Proventriculus is also known as
(1) Pharynx (2) Oesophagus
(3) Crop (4) Gizzard

58. In each segment, the exoskeleton has hardened plates in cockroach and it is known as
(1) Sclerites (2) Nocturnal
(3) Carapace (4) All of these

59. Which of the following structures does not open into the genital chamber of female cockroaches?
(1) A pair of collateral glands
(2) A single median oviduct
(3) Spermatheca
(4) A pair of anal cerci

60. The terga and sterna of cockroach body are joined by:
(1) Cementing glue
(2) Muscular tissue
(3) Arthrodial membrane
(4) Cartilage