

PRABAL TEST PAPER

Time : 1 : 00 Hr.

Question : 50

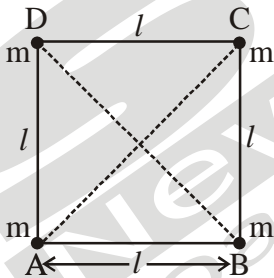
PHYSICS

01. A particle of mass m is projected upwards with velocity

$v = \frac{v_e}{2}$, where v_e is the escape velocity then at the maximum height the potential energy of the particle is (R is radius of earth and M is mass of earth)

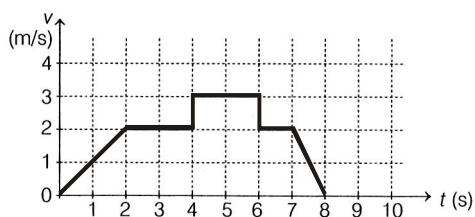
- (1) $-\frac{GMm}{2R}$ (2) $-\frac{GMm}{4R}$
(3) $-\frac{3GMm}{4R}$ (4) $-\frac{2GMm}{3R}$

02. Four equal masses, m each are placed at the corners of a square of length (l) as shown in the figure. The moment of inertia of the system about an axis passing through A and parallel to DB would be



- (1) $m/2$ (2) $2m^2$
(3) $3m^2$ (4) $\sqrt{3}m^2$

03. A particle starts from the origin at time $t = 0$ and moves along the positive X-axis. The graph of velocity with respect to time is shown in figure. What is the position of the particle at time $t = 5$ s ?

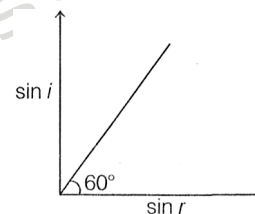


- (1) 6 m (2) 3 m (3) 10 m (4) 9 m

04. A ball is projected from a certain point on the surface of a planet at a certain angle with the horizontal surface. The horizontal and vertical displacement x and y vary with time t (in seconds) as $x = 5\sqrt{3}t$ and $y = 5t - 2t^2$ where x & y are in metre and t is in second. Find maximum height attained by the ball.

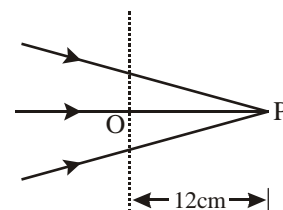
- (1) 25 m (2) 12.5 m
(3) 6.25 m (4) 3.125 m

05. A ray of light is incident on a medium with angle of incidence i and refracted into a second medium with angle of refraction r . The graph of $\sin i$ versus $\sin r$ is as shown in figure. Then, the velocity of light in the first medium is n times the velocity of light in the second medium. What should be the value of n ?



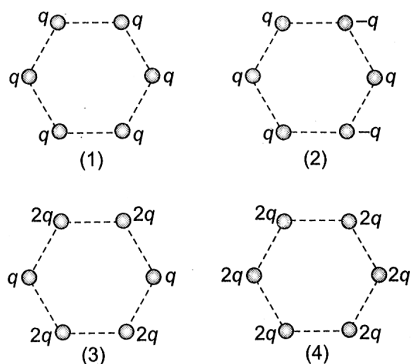
- (1) $\sqrt{3}$ (2) $1/\sqrt{3}$
(3) $\sqrt{3}/2$ (4) $2/\sqrt{3}$

06. Figure given below shows a beam of light converging at point P. When a concave lens of focal length 16 cm is introduced in the path of the beam at a place O shown by dotted line such that OP becomes the axis of the lens, the beam converges at a distance x from the lens. The value x will be equal to



- (1) 12 cm (2) 24 cm
(3) 36 cm (4) 48 cm

07. Figures below show regular hexagons, with charges at the vertices. In which of the following cases the electric field at the centre is not zero

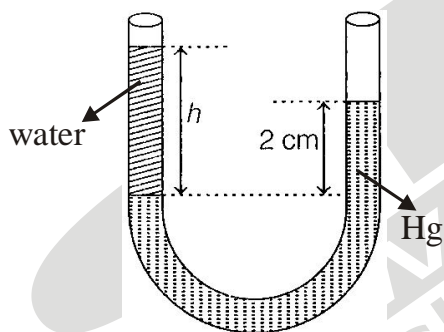


- (1) 1 (2) 2
(3) 3 (4) 4

08. Water rises in a capillary tube and it reads 1 cm. If the tube is tilted 60° from the vertical. What will be the new reading of tube ?

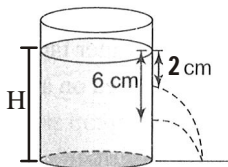
- (1) 4.0 cm (2) 2.0 cm
(3) 1.0 cm (4) water will not rise at all

09. The liquids in U-tube of a uniform cross-section are water and mercury, If the difference of the height of the mercury columns is 2 cm, then the height h of water column is



- (1) 6.8 cm (2) 13.6 cm
(3) 27.2 cm (4) 54.4 cm

10. Figure shows two holes in a wide tank containing a common liquid. The water streams coming out of these holes strike the ground at the same point. The height of liquid column (H) in the tank is



- (1) $H=10$ cm (2) $H=8$ cm
(3) $H=9$ cm (4) $H=980$ cm

11. Two solutions of KNO_3 and CH_3COOH are prepared separately. Molarity of both is 0.1 M and osmotic pressure are P_1 and P_2 respectively. The correct relationship between the osmotic pressures is:

- (1) $P_2 > P_1$ (2) $P_1 = P_2$
(3) $P_1 > P_2$ (4) $\frac{P_1}{P_1 + P_2} = \frac{P_2}{P_1 + P_2}$

12. What will be the molar mass of NaCl determined experimentally following elevation in the boiling point or depression in freezing point method?

- (1) < 58.5 (2) > 58.5
(3) $= 58.5$ (4) None of these

13. Which has the highest freezing point at one atmosphere?

- (1) 0.1 M NaCl solution
(2) 0.1 M sugar solution
(3) 0.1 M BaCl_2 solution
(4) 0.1 M FeCl_3 solution

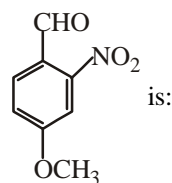
14. Which of the following aqueous solutions will exhibit highest boiling point?

- (1) 0.015 M glucose (2) 0.01 M KNO_3
(3) 0.15 M glucose (4) 0.01M Na_2SO_4

15. From the colligative properties of solution which one is the best method for the determination of molecular weight of proteins and polymers:

- (1) osmotic pressure
(2) lowering in vapour pressure
(3) lower in freezing point
(4) elevation in boiling point

16. The correct IUPAC name of the compound



- (1) 2-formyl-5-methoxynitrobenzene
(2) 4-formyl-3-nitroanisole
(3) 4-methoxy-2-nitrobenzaldehyde
(4) 4-methoxy-6-nitrobenzaldehyde

17. Keto-enol tautomerism is not observed in:

- (1) $\text{C}_6\text{H}_5\text{COC}_6\text{H}_5$ (2) $\text{C}_6\text{H}_5\text{COCH}=\text{CH}_2$
(3) $\text{C}_6\text{H}_5\text{COCH}_2\text{COCH}_3$ (4) $\text{CH}_3\text{COCH}_2\text{COCH}_3$

18. The total number of isomers in $\text{C}_6\text{H}_3\text{Cl}_3$ is:

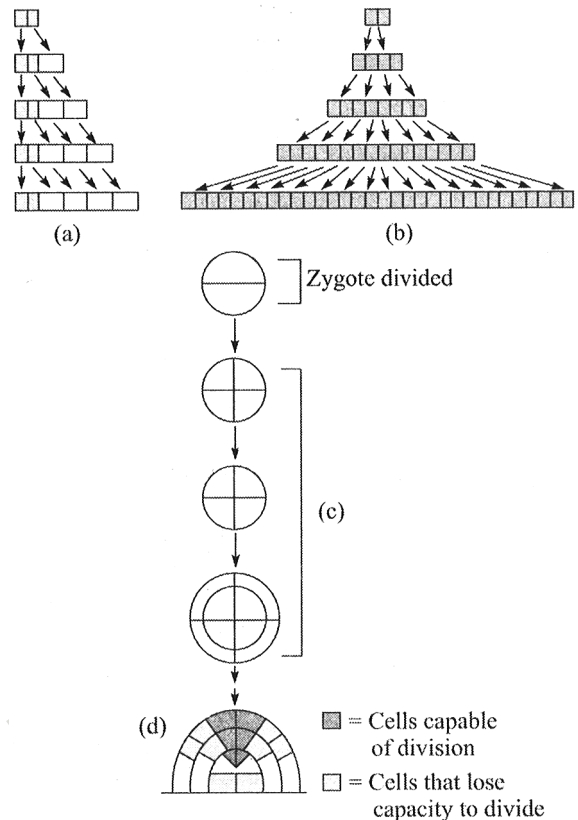
- (1) two (2) three
(3) four (4) five

19. Dehydration of alcohol involves:
 (1) free radical (2) carbocation
 (3) carbanion (4) carbene
20. Most stable carbocation is:
 (1) $\text{CH}_3 - \overset{+}{\text{C}}\text{H}_2$ (2) $\overset{+}{\text{C}}\text{H}_2\text{CHCl}_2$
 (3) $\overset{+}{\text{C}}\text{H}_2\text{CH}_2\text{Cl}$ (4) $\text{CH}_3 - \text{CH}_2\text{NO}_2$

BOTANY

21. N-6-Furfurylamino purine is a derivative of
 (1) Indole compounds
 (2) Adenine
 (3) Terpenes
 (4) Carotenoids
22. Root apical meristem and shoot apical meristem are responsible for the growth of plants and principally contribute to the elongation of the plants along their axis. This growth is called
 (1) Primary growth
 (2) Secondary growth
 (3) Indeterminate growth
 (4) Both (2) and (3)
23. Characteristic found in the cells of the meristematic zone is/are
 (1) The cells of this region are rich in protoplasm, possess small inconspicuous nuclei
 (2) Their cell walls are primary in nature, thin and cellulosic with abundant plasmodesmatal connections.
 (3) Both (1) and (2).
 (4) None of the above
24. Fill in the blanks:
 (1) Spraying sugarcane crop with ...a... increases in the length of the stem, thus increasing the yield by as much as ...b... tonnes per acre.
 (2) ...c... does not occur naturally in plants.
 (3) Search for natural substances with cytokinin like activities led to the isolation ofd... from corn kernels and coconut milk.
 (1) a-auxins, b-10, c-NAA, d-zeatin
 (2) a-gibberellins, b-20, c-zeatin, d-kinetin
 (3) a-gibberellins, b-10, c-zeatin, d-kinetin
 (4) a-gibberellins, b-20, c-kinetin, d-zeatin

25. Recognise the figure and find out the correct labelling:



- (1) a and c-arithmetic, b-and d-geometric
 (2) a and c-geometric, b and d-arithmetic
 (3) a and d-geometric, b and c-arithmetic
 (4) a and d-arithmetic, b and c-geometric
26. Complex IV refers to cytochrome c oxidase complex containing cytochromes
 (1) b and c_1 and one copper center
 (2) a and a_3 and four copper center
 (3) c and c and three copper center
 (4) a and a_3 and two copper center
27. All plastids have essentially the same structure because
 (1) they have to perform the same function
 (2) they are localised in the aerial parts of plants
 (3) one type of plastid can differentiate into another type of plastid depending upon the cell requirements
 (4) all plastids have to store starch, lipids and proteins.
28. Read the given statements.
 (i) Flat membranous sacs in stroma of chloroplasts
 (ii) Infoldings in mitochondria
 (iii) Disc shaped sacs in Golgi apparatus
 Select the correct option as per the given codes.
 (1) Cristae-(iii); Cisternae-(i); Thylakoids-(ii)
 (2) Cristae-(i); Cisternae-(ii); Thylakoids-(iii)
 (3) Cristae-(ii); Cisternae-(iii); Thylakoids-(i)
 (4) Cristae-(iii); Cisternae-(ii); Thylakoids-(i)

29. Which of the following is correct regarding the structure of a section of cilia/flagella?
- (1) Peripheral microtubules (doublets)–9+0; Central microtubules (singlets)–2; Radial spokes–8; Central sheath–1
 - (2) Peripheral microtubules (doublets)–9+2; Central microtubules (singlets)–9+0; Radial spokes–9; Central sheath–2
 - (3) Peripheral microtubules (doublets)–9; Central microtubules (singlets)–2; Radial spokes–9; Central sheath–1
 - (4) Peripheral microtubules (doublets)–3; Central microtubules (singlets)–6; Radial spokes–9; Central sheath–1

30. Assertion: The arrangement of axonemal microtubules in cilia or flagella is called 9 + 2 array.
Reason: The axoneme usually has nine pairs or doublets of radially arranged peripheral microtubules, and a pair of centrally located microtubules.
- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
 - (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
 - (3) If assertion is true but reason is false.
 - (4) If assertion is false but reason is true.

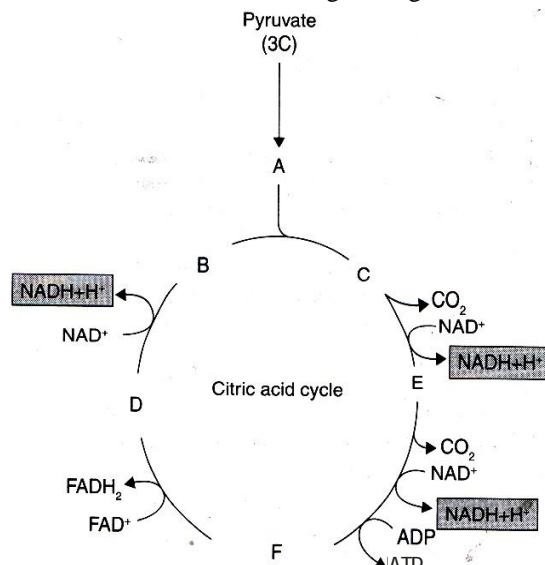
31. 2,4-dichlorophenoxyacetic acid is used to eliminate _____ weeds from a _____ crop field.
- (1) monocotyledonous; dicot
 - (2) dicotyledonous; monocot
 - (3) biennial; annual
 - (4) biennial; perennial

32. Match column I with column II, and choose the correct combination from the options given below.

	Column I		Column II
a.	Auxin	1.	GA ₃
b.	Gibberellin	2.	Indole acetic acid
c.	Cytokinin	3.	Abscisic Acid
d.	Dormin	4.	Acetic acid
		5.	Zeatin

- (1) a-2, b-3, c-1, d-5
- (2) a-2, b-4, c-1, d-5
- (3) a-2, b-1, c-5, d-3
- (4) a-2, b-5, c-1, d-3

33. What indicated A – F in the given figure?



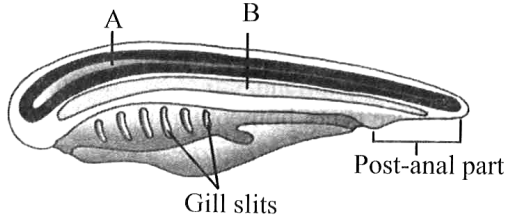
- (1) A–Oxaloacetic acid (4C), B–Malic acid (4C), C–Succinic acid (4C), D–Acetyl coenzyme A (2C), E–Citric acid (6C), F– α -ketoglutaric acid
- (2) A– α -ketoglutaric acid, B–Citric acid (6C), C:Oxaloacetic acid (4C), D–Succinic acid (4C), E–Acetyl coenzyme A (2C), F–Malic acid (4C)
- (3) A–Acetyl coenzyme A (2C), B–Oxaloacetic acid (4C), C–Citric acid (6C), D–Malic acid (4C), E– α -ketoglutaric acid, F–Succinic acid (4C)
- (4) A–Succinic acid (4C), B–Acetyl coenzyme A (2C), C–Malic acid, D– α -ketoglutaric acid, E–Citric acid (6C), F–Oxaloacetic acid (4C)

34. Read the following statements about organelle.
- (i) Network of tiny tubular structures, scattered in the eukaryotic cell cytoplasm.
 - (ii) It divides the intracellular space into two distinct compartments.
 - (iii) Ribosomes are attached to their outer surface. Select the most suitable statement for the structure, above discussed.
 - (1) Organelle is double membranous and involved in β -oxidation of fats.
 - (2) They are frequently observed in cells actively involved in protein synthesis.
 - (3) Organelle has colloidal matrix and involved in photophosphorylation.
 - (4) They are frequently present in photoautotrophic prokaryotes.

35. Read the following statements:
- (i) Presence of DNA
 - (ii) Presence of cristae
 - (iii) Presence of the 70S ribosome
 - (iv) Enzyme for carbohydrate synthesis
 - (v) Site for oxidative phosphorylation
- How many of the above statements are in common for mitochondria and chloroplast?
- (1) Two
 - (2) Five
 - (3) Four
 - (4) Three

ZOOLOGY

36. A and B are respectively represents?



- (1) Nerve cord and notochord
- (2) Nerve cord and myotomers
- (3) Notochord and vertebral column
- (4) Notochord and nerve cord

37. The figures given show the types of coelom. Identify them and select the correct group of organisms which possess them.



- (1) A–Annelids; B–Aschelminthes; C–Platyhelminthes
- (2) A–Molluscs; B–Arthropods; C–Platyhelminthes
- (3) A–Echinoderms; B–Aschelminthes; C–Annelids
- (4) A–Echinoderms; B–Arthropods; C–Platyhelminthes

38. Match the Column-I with Column-II and choose the correct option.

	Column-I		Column-II
A.	Porifera	1.	Canal system
B.	Aschelminthes	2.	Water vascular system
C.	Annelida	3.	Muscular Pharynx
D.	Arthropoda	4.	Jointed appendages
E.	Echinodermata	5.	Metameres

- (1) A–2; B–3; C–5; D–4; E–1
- (2) A–2; B–5; C–3; D–4; E–1
- (3) A–1; B–3; C–5; D–4; E–2
- (4) A–1; B–5; C–3; D–4; E–2

39. Select the total number of organisms from the following that shows both intra, and extracellular digestion. Physalia, Pleurobrachia, Taenia, Culex, Apis, Nereis, Echinus, Salpa, Meandrina, Pennatula, Doliolum, Catla, Hyla, Adamsia, Gorgonia, Ctenoplana.

- (1) 6
- (2) 8
- (3) 7
- (4) 10

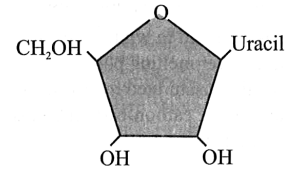
40. The most abundant mineral of animal body is

- (1) Ca
- (2) Na
- (3) K
- (4) Fe

41. A unit composed of sugar and nitrogen base linked by glycosidic bond is:

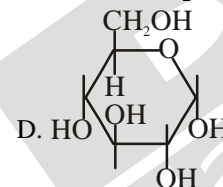
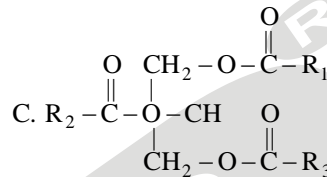
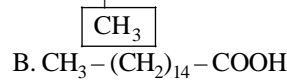
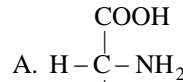
- (1) Nucleoside
- (2) glycoside
- (3) Purine
- (4) Nucleotide

42. Identify the structural formula given in the figure.



- (1) Uridylic acid
- (2) Ribose
- (3) Uridine
- (4) Uracil

43. Select correct information about the given diagrams:



- (1) B is triglyceride and is a type of lipid
- (2) D is fructose and is a disaccharide sugar
- (3) A is an amino acid and participates in protein formation
- (4) C is a cholesterol and maintains membrane fluidity

44. Corals belong to phylum:

- (1) Annelida
- (2) Porifera
- (3) Mollusca
- (4) Cnidaria

45. Which of the following pairs of animals comprises “jawless fishes”?

- (1) Mackerals & Rohu
- (2) Lampreys & Hag fishes
- (3) Guppies & Hag fishes
- (4) Lampreys & Eels

46. Choose the false statement regarding Petromyzon.

- (1) The circulatory system is closed
- (2) The body is devoid of scales
- (3) Mouth is circular and lacks jaws
- (4) It migrates to the marine water (ocean) for spawning

47. Which of the following organism possess cartilaginous cranium, vertebral column, closed type of circulatory system, which helps hem migrate to fresh water for spawning?

- (1) Ascidia
- (2) Scoliodon
- (3) Petromyzon
- (4) All of these

48. Find the correct statement:
- (1) Biomacromolecules are found in the acid soluble fraction.
 - (2) The compounds found in the acid soluble pool have a common feature, i.e., molecular weight ranging from 18 to 800 daltons.
 - (3) Acid insoluble pool represents cytoplasmic composition only.
 - (4) Acid soluble pool is due to macromolecules from cytoplasm and cell organelles.

49. Incorrect statement is:
- (1) Transferases can transfer of group (other than H) from one substrate to another.
 - (2) Enzymes are micromolecules of amino acids which are synthesized on ribosomes under the control of genes.
 - (3) Lecithin is a phosphorylated diglyceride.
 - (4) The bond between the phosphate and hydroxyl group of sugar is an ester bond as there is one such ester bond on either side, it is called phosphodiester bond

50. Correct statement is:
- (1) Arachidonic acid is a saturated fatty acid
 - (2) Many secondary metabolites have ecological importance
 - (3) Without metabolism there cannot be equilibrium
 - (4) Living organism cannot trap the energy, liberated in metabolic reactions

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