1. A seat marked with Reg. No. will be allotted to each student. The student should ensure that he/she occupies the correct seat only. If any student is found to have occupied the seat of another student, both the students shall be removed from the examination and shall have to accept any other penalty imposed upon them.

2. Duration of Test is 3 Hours and Questions Paper Contains 180 Questions. The Max. Marks are 720.

3. Student can not use log tables and calculators or any other material in the examination hall.

4. Student must abide by the instructions issued during the examination, by the invigilators or the centre incharge.

5. Before attempting the question paper ensure that it contains all the pages and that no question is missing.

6. Each correct answer carries 4 marks, while 1 mark will be deducted for every wrong answer. Guessing of answer is harmful.

7. A candidate has to write his / her answers in the OMR sheet by darkening the appropriate bubble with the help of Blue / Black Ball Point Pen only as the correct answer(s) of the question attempted.

8. Use of Pencil is strictly prohibited.

Note: In case of any Correction in the test paper, please mail to dlpcorrections@allen.ac.in within 2 days along with Paper code and Your Form No.

Your Target is to secure Good Rank in Pre-Medical 2016
<table>
<thead>
<tr>
<th>Subject</th>
<th>Topics</th>
</tr>
</thead>
</table>
| **PHYSICS**      | Basic Mathematics used in Physics, Vectors, Units, Dimensions and Measurement  
|                  | Kinematics (Motion along a straight line and Motion in a plane)          
|                  | Laws of Motion and Friction                                            
|                  | Work, Energy & Power and Circular Motion, Rotational Motion             
|                  | Conservation Laws and Collisions, Centre of Mass                        |
| **CHEMISTRY**    | Some Basic Concept of Chemistry                                         
|                  | Structure of Atom                                                       
|                  | States of Matter: Gases and Liquids                                     
|                  | Thermodynamics                                                          
|                  | Equilibrium (Chemical Equilibrium & Ionic Equilibrium)                 
|                  | Solid State                                                             
|                  | Solutions                                                               |
| **BIOLOGY**      | Diversity in the Living World: (i) The living world                     
|                  | (ii) Biological Classification                                          
|                  | (iii) Plant Kingdom                                                     
|                  | (iv) Animal Kingdom                                                     
|                  | **Structural Organisation in Plants & Animals:**                        
|                  | (i) Morphology of Flowering plants                                     
|                  | (ii) Anatomy of Flowering Plants                                       
|                  | (iii) Structural Organisation in Animals, Cockroach                     
|                  | **Structure and Functions:**                                           
|                  | (i) Cell: The Unit of Life                                              
|                  | (ii) Biomolecules (Protoplasm)                                          
|                  | (iii) Cell cycle and Cell Division                                      |
1. Find out perimeter of triangle
   (1) 14 cm  (2) 12 cm  (3) 10 cm  (4) None

2. A body throws a ball upwards with velocity $v_0 = 20 \text{ m/s}$. The wind imparts a horizontal acceleration of $4 \text{ m/s}^2$ to the ball. The angle $\theta$ from vertical at which the ball must be thrown so that the ball returns to the boy's hand is ($g = 10 \text{ m/s}^2$)
   (1) $\tan^{-1}(1.2)$  (2) $\tan^{-1}(0.2)$  (3) $\tan^{-1}(2)$  (4) $\tan^{-1}(0.4)$

3. A constant force $F$ is applied in horizontal direction as shown in figure. Contact force between $M$ and $m$ is $N$ and between $m$ and $M'$ is $N'$ then :
   (1) $N = N'$  (2) $N > N'$  (3) $N' > N$  (4) cannot be determined

4. A ring of mass $m$ moves from point 1 to point 2 along a smooth rigid horizontal wire with a constant speed $v$. The average force acting the ring over the time of its motion from 1 to 2 is–
   (1) $\frac{2mv^2}{R} \sin \theta$  (2) $\frac{mv^2}{R}$  (3) $\frac{2mv^2 \sin \theta}{2R \theta}$  (4) None of these
5. Two semicircular rings of linear mass densities \( \lambda \) and \( 3\lambda \) and of radius \( R \) each are joining to form a complete ring. The distance of the centre of the mass of complete ring from its geometrical centre is

\[
\begin{align*}
(1) & \quad \frac{2R}{3\pi} \\(2) & \quad \frac{R}{\pi} \\(3) & \quad \frac{2R}{\pi} \\(4) & \quad \frac{R}{3\pi}
\end{align*}
\]

6. The equation \( P + \frac{a}{V^2} (V - b) = \text{constant} \). The units of \( a \) are:

\[
\begin{align*}
(1) & \quad \text{dyne} \times \text{cm}^5 \\(2) & \quad \text{dyne} \times \text{cm}^4 \\(3) & \quad \text{dyne} / \text{cm}^3 \\(4) & \quad \text{dyne} / \text{cm}^2
\end{align*}
\]

7. A particle moves along a straight line such that its displacement at any time \( t \) is given by \( S = t^3 - 6t^2 + 3t + 4 \) metres. The velocity when the acceleration is zero is:

\[
\begin{align*}
(1) & \quad 3 \text{ ms}^{-1} \\(2) & \quad -12 \text{ ms}^{-1} \\(3) & \quad 42 \text{ ms}^{-1} \\(4) & \quad -9 \text{ ms}^{-1}
\end{align*}
\]

8. Force on a body varies with position as shown in figure. It is in unstable equilibrium at point.

\[
\begin{align*}
(1) & \quad D \\(2) & \quad A \\
(3) & \quad E \\(4) & \quad C
\end{align*}
\]

9. A body of mass \( m \) is tied to one end of a spring and whirled round in a horizontal plane with a constant angular velocity. The elongation in the spring is one centimetre. If the angular velocity is doubled, the elongation in the spring is 5 cm. The original length of the spring is:

\[
\begin{align*}
(1) & \quad 16 \text{ cm} \\(2) & \quad 15 \text{ cm} \\(3) & \quad 14 \text{ cm} \\(4) & \quad 13 \text{ cm}
\end{align*}
\]
10. A shell in free space initially at rest explodes into two pieces, A and B, which then move in opposite directions. Piece A has less mass than piece B. Ignore all external forces. Identify correct statement.

1. Both have the same momentum after the explosion.
2. Piece B has greater magnitude of momentum after the explosion.
3. Piece A has greater kinetic energy after the explosion.
4. Both have the same kinetic energy after the explosion.

11. The equation of a wave is given by:

\[ y = A \sin \omega \left( \frac{x}{v} - K \right), \]

where \( \omega \) is angular velocity and \( v \) is the linear velocity. The dimension of \( K \) is

1. \([LT]\)
2. \([T]\)
3. \([T^{-1}]\)
4. \([T^2]\)

12. Find the acceleration of particle at \( x = 5 \text{ m} \) with the help of graph, where \( v \)-velocity and \( x \)-displacement.

1. \( \frac{1}{\sqrt{3}} \text{ m/s}^2 \)
2. \( \frac{1}{\sqrt{2}} \text{ m/s}^2 \)
3. \( \frac{2}{\sqrt{3}} \text{ m/s}^2 \)
4. \( \frac{1}{2\sqrt{3}} \text{ m/s}^2 \)

13. A small object is released from rest from the top most point of a smooth hemispherical surface having radius \( R \). Depth below the topmost point at which the object leaves the surface will be

1. \( \frac{2R}{3} \)
2. \( \frac{R}{2} \)
3. \( \frac{R}{3} \)
4. \( \frac{R}{4} \)
14. A small block of mass \( m \) slides along a smooth frictional track as shown in the figure. If it starts from rest at \( P \), velocity of block at point \( Q \) is:

\[
\begin{align*}
(1) & \quad \sqrt{2gR} \\
(2) & \quad \sqrt{3gR} \\
(3) & \quad 2\sqrt{gR} \\
(4) & \quad \text{Zero}
\end{align*}
\]

15. The angular momentum of a projectile projected at an angle \( \theta \) with the horizontal with speed \( u \) about the point of projection when it is at the highest point of its trajectory is:

\[
\begin{align*}
(1) & \quad \text{musin} \theta \\
(2) & \quad \frac{3}{2} \mu u \cos \sin 2\theta \\
(3) & \quad \frac{3}{2} \mu u \sin \sin 2\theta \\
(4) & \quad \text{Zero}
\end{align*}
\]

16. If \( \vec{A} \) and \( \vec{B} \) are two non-zero vectors such that

\[
|\vec{A} + \vec{B}| = \frac{|\vec{A} - \vec{B}|}{2} \quad \text{and} \quad |\vec{A}| = 2|\vec{B}| \]

Then the angle between \( \vec{A} \) and \( \vec{B} \) is:

\[
\begin{align*}
(1) & \quad 37^\circ \\
(2) & \quad 53^\circ \\
(3) & \quad \cos^{-1}(-3/4) \\
(4) & \quad \cos^{-1}(-4/3)
\end{align*}
\]

17. A stone projected at an angle of 60º from the ground level strikes at an angle of 30º on the roof of a building of height \( h = 30 \text{m} \). Find the speed of projection(in m/s) of the stone.

\[
\begin{align*}
(1) & \quad 30 \\
(2) & \quad 40 \\
(3) & \quad 50 \\
(4) & \quad 60
\end{align*}
\]

18. A body of mass 2 kg is situated at a height 5 m above the ground. It's potential energy is reported as 70 J. Potential energy of a 3 kg body situated at height 1m above ground will be reported.

\[
\begin{align*}
(1) & \quad 30 \text{ J} \\
(2) & \quad 21 \text{ J} \\
(3) & \quad -15 \text{ J} \\
(4) & \quad \text{zero}
\end{align*}
\]
19. Two spheres of equal masses are attached to a string of length 2m as shown in the figure. The string and the spheres are then whirled in a horizontal circle about O at a constant rate. What is the value of the ratio: 
\[ \frac{\text{Tension in the string between } P \text{ and } Q}{\text{Tension in the string between } P \text{ and } O} \]?

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

20. A smooth uniform rod of length L and mass M has two identical beads of negligible size, each of mass m, which can slide freely along the rod. Initially, the two beads are at the centre of the rod and the system is rotating with angular velocity \( \omega_0 \) about its axis perpendicular to the rod and passing through its mid-point (see figure). There are no external forces. When the beads reach the ends of the rod, the angular velocity of the system is:

(1) \( \frac{M \omega_0}{M + 3m} \)  (2) \( \frac{M \omega_0}{M + 6m} \)  (3) \( \frac{(M + 6m) \omega_0}{M} \)  (4) \( \omega_0 \)

21. Find the angle between two vectors \( \mathbf{A} = 2\mathbf{i} + j - k \) and \( \mathbf{B} = i - k \).

(1) 40°  (2) 30°  (3) 20°  (4) 10°

22. Ratio of weight of a man in a stationary lift and weight of a man in a lift moving downward with an acceleration is 3:2 then acceleration of lift is:

(1) g / 3  (2) g / 2  (3) g  (4) 2 g
23. A mass on spring oscillates up and down. As the mass moves downward from its highest point to its equilibrium point:

1. The net force is downward, the net work done on the mass is negative and the mass speeds up
2. The net force is upward, the net work done on the mass is negative and the mass slows down
3. The net force is downward, the net work done on the mass is positive and the mass speeds up
4. The net force is upward, the net work done on the mass is negative and the mass speeds up

24. A thin uniform bar lies on a frictionless horizontal surface and is free to move in any way on the surface. Its mass is 0.300 kg and length is 2 m. Two particles each of mass 0.100 kg are moving on the same surface and towards the two ends of the bar in the direction perpendicular to the bar such that one with velocity 10 m/s towards one end and the other with velocity 5 m/s towards the other end. If collision between particles and bar is completely elastic and both particles strike with the bar simultaneously. The velocity of centre of mass of the bar after the collision is:

1. 3 m/s  
2. 4 m/s  
3. 5 m/s  
4. none of these

25. A thin wire of length $l$ and uniform linear mass density $\rho$ is bent into a circular loop with centre O and radius $r$ as shown in the figure. The moment of inertia of the loop about the axis $XX'$ is:

1. $\frac{3\rho l^3}{8\pi r}$  
2. $\frac{\rho l^3}{16\pi r^2}$  
3. $\frac{3\rho l^3}{8\pi r^2}$  
4. $\frac{\rho l^3}{8\pi r^2}$

26. Find the magnitude of the unknown forces X and Y if sum of all forces is zero.

1. 4, 8  
2. 5, 10  
3. 4, 10  
4. 5, 5
27. Two objects A and B each of mass m are connected by a light inextensible string. They are restricted to move on a frictionless ring of radius R in a vertical plane (as shown in fig). The objects are released from rest at the position shown. Then, the tension in the cord just after release is–

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

28. A force of magnitude of 30 N acting along $\hat{i} + \hat{j} + \hat{k}$, displaces a particle from point (2, 4, 1) to (3, 5, 2). The work done during this displacement is

(1) 90 J  (2) 30 J  
(3) $30\sqrt{3}$ J  (4) $30/\sqrt{3}$ J.

29. A mass ‘m’ moves with a velocity ‘v’ and collides inelastically with another identical mass in rest. After collision the 1st mass moves with velocity $v/\sqrt{3}$ in a direction perpendicular to the initial direction of motion. Find the speed of the 2nd mass after collision.

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

30. A thin rod of length L and mass M is held vertically with one end on the floor and is allowed to fall. Find the velocity of the other end when it hits the floor, assuming that the end on the floor does not slip:

(1) $\sqrt{3g}L$  (2) $\sqrt{3gL}$  
(3) $L/\sqrt{3g}$  (4) $g/3L$

31. A particle is projected from a horizontal plane (x–z plane) such that its velocity vector at time t is given by $\vec{v} = ai + (b - ct)j$. Its range on the horizontal plane is given by:

(1) $ba/c$  (2) $2ba/c$  
(3) $3ba/c$  (4) None
32. A body is placed on a rough inclined plane of inclination $\theta$. As the angle $\theta$ is increased from $0^\circ$ to $90^\circ$ the contact force between the block and the plane.
   (1) remains constant
   (2) first remains constant then decreases
   (3) first decreases then increases
   (4) first increases then decreases

33. A body of mass 10 kg is released from a tower of height 20 m and body acquires a velocity of 10 m/s after falling through the distance 20 m. The work done by the push of the air on the body is:
   (Take $g = 10 \text{ m/s}^2$)
   (1) 1500 J (2) 1800 J
   (3) –1500 J (4) –1800 J

34. A block of mass 0.50 kg is moving with a speed of 2.00 m/s on a smooth surface. It strikes another mass of 1.00 kg and then they move together as a single body. The energy loss during the collision is
   (1) 1.00 J (2) 0.67 J
   (3) 0.34 J (4) 0.16 J

35. What is the torque of force $\mathbf{F} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ acting at a point $\mathbf{r} = 3\hat{i} + 2\hat{j} + 3\hat{k}$ about the origin?
   (1) $6\hat{i} - 6\hat{j} + 12\hat{k}$
   (2) $-6\hat{i} + 6\hat{j} - 12\hat{k}$
   (3) $17\hat{i} - 6\hat{j} - 13\hat{k}$
   (4) $-17\hat{i} + 6\hat{j} + 13\hat{k}$

36. 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 'a' brings it to rest. In this process the average speed of the car is:
   (1) $\frac{aT}{4}$
   (2) $\frac{3aT}{2}$
   (3) $\frac{aT}{2}$
   (4) $aT$

37. A monkey is sitting on the pan of a spring balance which is placed on an elevator. The maximum reading of the spring balance will be when:
   (1) The elevator is stationary
   (2) The string of the elevator breaks and it drops freely towards the earth.
   (3) The elevator is accelerated downwards
   (4) The elevator is accelerated upwards
38. In the figure, the ball A is released from rest when the spring is at its natural (unstretched) length. For the block B of mass M to leave contact with the ground at some stage, the minimum mass of A must be-

(1) 2M
(2) M
(3) M/2
(4) A function of M and the force constant of the spring.

39. A cannon ball is fired with a velocity 200 m/sec at an angle of 60° with the horizontal. At the highest point of its flight, it explodes into 3 equal fragments, one going vertically upwards with a velocity 100 m/sec, the second one falling vertically downwards with a velocity 100 m/sec. The third fragment will be moving with a velocity

(1) 100 m/sec in the horizontal direction
(2) 300 m/sec in the horizontal direction
(3) 300 m/sec in a direction making an angle of 60° with the horizontal
(4) 200 m/sec in a direction making an angle of 60° with the horizontal

40. The angular momentum of a moving body remains constant if:

(1) net external force is applied
(2) net pressure is applied
(3) net external torque is applied
(4) net external torque is not applied

41. A body thrown vertically upwards with an initial velocity u reaches maximum height in 6 seconds. The ratio of the distance travelled by the body in the first second and the seventh second is:

(1) 1 : 1
(2) 11 : 1
(3) 1 : 2
(4) 1 : 11
42. A particle of mass \( m \), initially at rest, is acted upon by a variable force \( F \) for a brief interval of time \( T \). It begins to move with a velocity \( u \) after the force stops acting. \( F \) is shown in the graph as a function of time. The curve is a semicircle then –

\[
\begin{align*}
(1) \quad u &= \frac{\pi F_0^2}{2m} \\
(2) \quad u &= \frac{\pi F_0 T}{4m} \\
(3) \quad u &= \frac{\pi T^2}{8m} \\
(4) \quad u &= \frac{F_0 T}{2m}
\end{align*}
\]

43. A particle is projected with a speed \( v_0 = \sqrt{gR} \). The coefficient of friction between the particle and the hemispherical plane is \( \mu = 0.5 \). Then, the initial acceleration of the particle is:

\[
\begin{align*}
(1) \quad g &\uparrow \\
(2) \quad g &\downarrow \\
(3) \quad 2g &\uparrow \\
(4) \quad 2g &\downarrow
\end{align*}
\]

44. Center of mass of a system of three particles of masses 1, 2, 3 kg is at the point \((1 \text{ m}, 2 \text{ m}, 3 \text{ m})\) and center of mass of another group of two particles of masses 2 kg and 3 kg is at point \((-1 \text{ m}, 3 \text{ m}, -2 \text{ m})\). Where a 5 kg particle should be placed, so that center of mass of the system of all these six particles shifts to center of mass of the first system?

\[
\begin{align*}
(1) \quad (1 \text{ m}, -3 \text{ m}, 2 \text{ m}) \\
(2) \quad (3 \text{ m}, 3 \text{ m}, 2 \text{ m}) \\
(3) \quad (-1 \text{ m}, 2 \text{ m}, 3 \text{ m}) \\
(4) \quad (3 \text{ m}, 1 \text{ m}, 8 \text{ m})
\end{align*}
\]

45. A homogeneous disc with a radius 0.2 m and mass 5 kg rotate around an axis passing through its centre. The angular velocity of the rotation of the disc as a function of time is given by the formula \( \omega = 2 + 6t \). The tangential force applied to the rim of the disc is:

\[
\begin{align*}
(1) \quad 1 \text{ N} & \\
(2) \quad 2 \text{ N} & \\
(3) \quad 3 \text{ N} & \\
(4) \quad 4 \text{ N}
\end{align*}
\]
46. The compound AB crystallizes in a cubic lattice in which both A and B atoms have coordination numbers of 8. To what crystal class does the unit cell belong?
   (1) CsCl structure  (2) NaCl structure
   (3) ZnS structure  (4) Al₂O₃ structure

47. The degree of dissociation of PCl₅ (α) obeying the equilibrium; PCl₅ ⇌ PCl₃ + Cl₂ is related to the pressure at equilibrium by:
   (1) \( \alpha \propto P \)
   (2) \( \alpha \propto \frac{1}{P} \)
   (3) \( \alpha \propto \frac{1}{P^2} \)
   (4) \( \alpha \propto P^2 \)

48. An aqueous solution containing 5% by weight of urea and 10% by weight of glucose. Freezing point of solution is \([K_f\text{ for }H_2O = 1.86 K/mol}\) kg]
   (1) 2.78º C  (2) –2.78º C
   (3) –5.96º C  (4) 5.96º C

49. Calculate the reported result and number of significant figure of (41.6325 – 41.612) :
   (1) 0.0205, 4  (2) 0.020, 3
   (3) 0.020, 2  (4) 0.0205, 3

50. Chloroform has \( \Delta H_{\text{vaporization}} = 29.2 \text{ kJ/mol} \) and boils at 61.2ºC. What is the value of \( \Delta S_{\text{vaporization}} \)?
   for chloroform?
   (1) 87.3 J/mol-K  (2) 477.1 J/mol-K
   (3) -87.3 J/mol-K  (4) -477.1 J/mol-K

51. A solid has a structure in which W atoms are located at the corners of a cubic lattice. O atom at the center of the edges and Na atom at center of the cube. The formula for the compound is
   (1) NaWO₂  (2) NaWO₃
   (3) Na₂WO₃  (4) NaWO₄

52. The strongest Bronsted base in the following anion is:
   (1) CN⁻  (2) Cl⁻  (3) I⁻  (4) Br⁻

53. The ionization constant of a monobasic acid HA is. If a 0.025 molal aqueous solution of acid freezes at \(-0.060ºC\), (assuming molality = molarity). \( K_f(\text{H}_2\text{O}) = 1.86 \text{ kg mol}^{-1} \text{ K} \).
   (1) \( 3 \times 10^{-3} \)  (2) \( 4 \times 10^{-2} \)
   (3) \( 6 \times 10^{-4} \)  (4) \( 5 \times 10^{-5} \)
54. The chloride of metal has the formula MCl₃. The formula of its phosphate will be:
   (1) M₂P₂O₇  (2) MPO₄
   (3) M₃PO₄  (4) M(PO₄)₂

55. Consider the reaction at 300 K
   H₂(g) + Cl₂(g) \rightarrow 2HCl(g); \Delta H^\circ = -185 kJ
   If 2 mole of H₂ completely react with 2 mole of Cl₂ to form HCl. What is \Delta U^\circ for this reaction?
   (1) 0  (2) -185 kJ  (3) 370 kJ  (4) -370 kJ

56. Platinum crystallizes in a face-centered cubic crystal with a unit cell length 'a'. The distance between nearest neighbors is:
   (1) a  (2) a/2  (3) a/2²  (4) a/4²

57. Given that K_w for water is 10⁻¹³M² at 62°C, compute the sum of pOH and pH for a neutral aqueous solution at 62°C
   (1) 7.0  (2) 13.30  (3) 14.0  (4) 13.0

58. If the total vapour pressure of the liquid mixture A and B is given by the equation:
   P = 180X_A + 90 mm Hg then the ratio of the vapour pressure of the pure liquids A and B is given by
   (1) 3 : 2  (2) 4 : 1  (3) 3 : 1  (4) 6 : 2

59. 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) C₂H₆N₂  (2) C₃H₄N
   (3) C₂H₄N₂  (4) C₃H₆N₃

60. Supposing the energy of fourth shell for hydrogen atom is -25 a.u (arbitrary unit). What would be its potential energy in ground state?
   (1) -200  (2) -50  (3) -800  (4) -400

61. Na and Mg crystallise in b.c.c. and f.c.c. type crystals respectively, then the number of atoms of Na and Mg present in the unit cell of their crystal respectively is:
   (1) 4 and 2  (2) 9 and 14
   (3) 14 and 9  (4) 2 and 4
62. At 90°C, pure water has [H⁺] = 10⁻⁶ M, if 100 mL of 0.2 M HCl is added to 200 mL of 0.1 M KOH at 90°C then pH of the resulting solution will be (1) 5 (2) 6 (3) 7 (4) 4

63. At the freezing point of a solution containing nonvolatile solute, the following are in equilibrium (1) liquid solvent, solid solvent (2) liquid solvent, solid solute (3) liquid solute, solid solute (4) liquid solute, solid solvent

64. The enthalpy of the reaction,

\[ H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(g) \] is \( \Delta H_1 \) and that of

\[ H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(l) \] is \( \Delta H_2 \) then (1) \( \Delta H_1 > \Delta H_2 \) (2) \( \Delta H_1 + \Delta H_2 = 0 \) (3) \( \Delta H_1 < \Delta H_2 \) (4) \( \Delta H_1 = \Delta H_2 \)

65. One energy difference between the states \( n = 2 \) and \( n = 3 \) is \( E \) eV in hydrogen atom. The ionization potential of H atom is (1) 3.2 E (2) 5.6 E (3) 7.2 E (4) 13.2 E

66. Missing of one monovalent cation and one monovalent anion from the crystal lattice is called: (1) Ionic defect (2) Crystal defect (3) Schottky defect (4) Frenkel defect

67. What is the molar solubility of \( \text{Ag}_2\text{CO}_3 \) (Ksp = 4 \times 10⁻¹³) in 0.1 M Na₂CO₃ solution? (1) \( 10^{-6} \) (2) \( 10^{-7} \) (3) \( 2 \times 10^{-6} \) (4) \( 2 \times 10^{-7} \)

68. Which of the following property of small drop of mercury can be used to explain the spherical shape of mercury droplets? (1) viscosity (2) surface tension (3) capillary effect (4) vapour pressure

69. 2 mole of zinc is dissolved in HCl at 25°C the work done in open vessel is (1) \(-2.477 \) kJ (2) \(-4.955 \) kJ (3) 0.0489 kJ (4) 2.477 kJ

70. Ratio of time period of electron in first and third orbit of H-atom would be (1) 1 : 18 (2) 1 : 27 (3) 1 : 2 (4) 27 : 1

---

62. 90°C पर, 100 मिलीलीटर में [H⁺] = 10⁻⁶ M हैं, सन 200 मिलीलीटर के 0.1 M KOH के 200 मिलीलीटर के 90°C में मिलने वाले एंट्रोपी का विलक्षण होगा (1) 5 (2) 6 (3) 7 (4) 4

63. अम्ल और न्यायिक युग व तत्वों के हिंदु कृष्ण द्वारा प्रतीक्षित नहीं हैं, का नाम अब यह प्रश्न नहीं होता है (1) द विला के ठीक साधन के (2) द विला के ठीक साधन के (3) द विला के ठीक साधन के (4) द विला के ठीक साधन के

64. आयातित्रिक एंट्रोपी के प्रश्न हैं (1) 1 : 18 (2) 1 : 27 (3) 0.0489 kJ (4) 2.477 kJ

65. द विला के ठीक साधन के (1) 1 : 18 (2) 1 : 27 (3) 0.0489 kJ (4) 2.477 kJ

66. कृष्ण द्वारा प्रतीक्षित नहीं हैं (1) अनेक दोहे (2) कृष्ण द्वारा प्रतीक्षित नहीं हैं (3) 2 × 10⁻⁶ (4) 2 × 10⁻⁷

67. अम्ल से कृष्ण द्वारा प्रतीक्षित नहीं हैं (1) 10⁻⁶ (2) 10⁻⁷ (3) 2 × 10⁻⁶ (4) 2 × 10⁻⁷

68. निम्नलिखित उत्तर से किस उत्तर से किस उत्तर तक हैं (1) स नत (2) पृथ्वी त्व तव (3) के चि का प्रत ी ी (4) बाह्यता व

69. 25°C पलक पर 2 मी. लिपि का है। (1) \(-2.477 \) kJ (2) \(-4.955 \) kJ (3) 0.0489 kJ (4) 2.477 kJ

70. H-प्रमांड के प्रत के म. (1) 1 : 18 (2) 1 : 27 (3) 1 : 2 (4) 27 : 1
71. If a compound (oxide) have hcp arrangement and the cations M occupy two-third octahedral voids. The formula of the compound is :
   (1) $M_3O$ (2) $M_3O_2$
   (3) $M_2O_3$ (4) $M_3O_4$

72. Which of the following is lewis acid
   (1) $BF_3$ (2) $Cl^-$
   (3) $H_2O$ (4) $NH_3$

73. For a fixed number of moles of a gas at constant volume, the pressure of the gas increases with rise of temperature due to
   (1) Increase in average molecular speed
   (2) Increase rate of collisions amongst molecules
   (3) Increase in molecular attraction
   (4) Decrease in mean free path

74. If the bond energies of $H-H$, $Br-Br$ and $H-Br$ are 433, 192 and 364 kJ mol$^{-1}$ respectively, $\Delta H^\circ$ for the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ is
   (1) $-261 \text{ kJ}$
   (2) $+103 \text{ kJ}$
   (3) $+261 \text{ kJ}$
   (4) $-103 \text{ kJ}$

75. In chromium atom number of electrons which have $n = 2$ and $\ell = 1$ is :
   (1) 6
   (2) 4
   (3) 2
   (4) 1

76. At 444°C, the equilibrium constant $K$ for the reaction $2AB(g) \rightleftharpoons A_2(g) + B_2(g)$ is $\frac{1}{64}$. The degree of dissociation of AB will be -
   (1) 10%
   (2) 20%
   (3) 30%
   (4) 50%

77. Which is a buffer solution -
   (1) $CH_3COOH + CH_3COONa$
   (2) $CH_3COOH + CH_3COONH_4$
   (3) $CH_3COOH + NH_4Cl$
   (4) $NaOH + NaCl$

78. What would be the ratio of mean square velocity of hydrogen gas at 50 K and that of oxygen at 800 K?
   (1) 1/1
   (2) 2/3
   (3) 4/5
   (4) 16/7

71. यदि क्षीर पदार्थ में में आ व बइड घटों के द ज्यादा न (h.c.p.) से रचना बनाना है तो $M$ क्षीर- जिन्हें अक्ट फलसी खिंचक लों जो घर हो रहे हुए हों। तब घर गिडक देने होंगे -
   (1) $M_3O$ (2) $M_3O_2$
   (3) $M_2O_3$ (4) $M_3O_4$

72. निम्न में से कौन लू र समेत है -
   (1) $BF_3$ (2) $Cl^-$(3) $H_2O$ (4) $NH_3$

73. फिद्र राजन जिन ने उक्त तैयारी लों के लिये गई खाद्य वाले ने पहुंचने जहां है।
   (1) अंग्रेजी सिखकरवा गई ने पहुंचने जहां लगा
   (2) अंग्रेजी सिखकरवा जहां देखा ने पहुंचने जहां ने पहुंचने जहां
   (3) अंग्रेजी सिखकरवा देखा ने पहुंचने जहां
   (4) अंग्रेजी सिखकरवा जहां देखा ने पहुंचने जहां

74. जदू है वह ब्रा-ब्रा अंग्रेजी सिखकरवा जहां देखा ने पहुंचने जहां -
   (1) $CH_3COOH + CH_3COONa$
   (2) $CH_3COOH + CH_3COONH_4$
   (3) $CH_3COOH + NH_4Cl$
   (4) $NaOH + NaCl$

78. $H_2$ मग सका ता $O_2$ क आ द जेएंगी सका ता $O_2$ के सके वर्ग मा घमू लव ग का अनुप नहीं होगा -
   (1) 1/1
   (2) 2/3
   (3) 4/5
   (4) 16/7
79. For a reaction, \( \Delta H = -40 \text{kJ} \) and \( \Delta S = -50 \text{J/K} \). At what temperature range will it change from spontaneous to non-spontaneous?

(1) 0.8 K to 1K 
(2) 799 K to 800 K 
(3) 800 K to 811 K 
(4) 799 K to 801 K

80. An electron in a hydrogen atom in its ground state absorbs 2 times as much energy as the minimum required for it to escape from the atom. The kinetic energy of the emitted electron is:

(1) 13.6 eV 
(2) 20.4 eV 
(3) 6.8 eV 
(4) 27.2 eV

81. Before equilibrium is set up for the chemical reaction \( \text{N}_2\text{O}_4(g) \rightarrow 2\text{NO}_2(g) \), vapour density \( d \) of the gaseous mixture was measured. If \( D \) is the theoretical value of vapour density, variation of \( \alpha \) with \( D/d \) is given by the graph. What is value \( D/d \) at point A?

(1) 0 
(2) 0.5 
(3) 1 
(4) 1.5

82. For a binary ideal liquid solution, the total pressure of the solution is given as:

(1) \( P_{\text{total}} = P_A^o + (P_A^o - P_B^o)X_B \)
(2) \( P_{\text{total}} = P_B^o + (P_A^o - P_B^o)X_A \)
(3) \( P_{\text{total}} = P_B^o + (P_B^o - P_A^o)X_A \)
(4) \( P_{\text{total}} = P_B^o + (P_B^o - P_A^o)X_B \)

83. 20cc of \( \text{CO}_2 \) are passed over red hot coke. The volume of \( \text{CO} \) evolved is:

(1) 10 cc 
(2) 20 cc 
(3) 30 cc 
(4) 40 cc

84. Which of the following is not equal to zero in a cyclic process?

(1) \( \Delta G \) 
(2) \( \Delta w \) 
(3) \( \Delta S \) 
(4) \( \Delta H \)
85. Five valence electrons of P\textsuperscript{15} are labelled as $\text{AB}$ \textbf{3s}$
\text{XYZ}$.

\textbf{If the spin quantum numbers of B and Z is } $+\frac{1}{2}$, the group of electron with three of the quantum number (n, $\ell$, m) same are.

(1) AB, XYZ, BY  (2) AB
(3) XYZ, AZ  (4) AB, XYZ

86. For the gas phase reaction:

$$C_2H_4(g) + H_2(g) \rightleftharpoons C_2H_6(g);$$

$\Delta H = -32.7 \text{Kcal}$ carried out is a vessel, the equilibrium concentration of $C_2H_4$ can be increased by :

(1) Increasing temperature  (2) Decreasing pressure
(3) Removing some $H_2$  (4) All of these

87. One molal solution of a carboxylic acid in benzene shows the elevation of boiling point of 1.518 K. The degree of association for dimerization of the acid in benzene is ($K_b$ for benzene = 2.53 K kg mol$^{-1}$):

(1) 60%  (2) 70%  (3) 75%  (4) 80%

88. The equivalent mass of a divalent metal is 31.82. The mass of single atom is ?

(1) $32.77 \times 6.02 \times 10^{23}$ g
(2) $63.64 \times 6.02 \times 10^{23}$ g
(3) $3.634$ g
(4) $\frac{63.64}{6.023 \times 10^{23}}$ g

89. During melting of an ice slab at 273 K at 1 atm pressure :

(1) Zero work is done on the ice-water system by the atmosphere  (2) Positive work is done by the ice-water system on the atmosphere
(3) The entropy of the ice-water system decreases  (4) The internal energy of the ice-water system increase

90. An atom has 35 nucleons and has atomic number equal to 17. The number of electrons with n = 2, m = 0 in it is :

(1) 2  (2) 4  (3) 6  (4) 3
91. Given below is a diagrammatic sketch of germinal layers. Identify the part labelled A, B, C and D select the right option respectively to:

<table>
<thead>
<tr>
<th>Part-A</th>
<th>Part-B</th>
<th>Part-C</th>
<th>Part-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Ectoderm</td>
<td>Endoderm</td>
<td>Mesoderm</td>
<td>Mesoglea</td>
</tr>
<tr>
<td>(2) Endoderm</td>
<td>Ectoderm</td>
<td>Mesoglea</td>
<td>Mesoderm</td>
</tr>
<tr>
<td>(3) Ectoderm</td>
<td>Endoderm</td>
<td>Mesoglea</td>
<td>Mesoderm</td>
</tr>
<tr>
<td>(4) Endoderm</td>
<td>Ectoderm</td>
<td>Mesoderm</td>
<td>Mesoglea</td>
</tr>
</tbody>
</table>

92. What is true about given figure?

1. Worm like marine animals with cylindrical body
2. Worm like fresh water animals with flat body
3. Body divided into proboscis, collar and trunk
4. Both (1) and (3)

93. Out of following which structure does not have non-Keratinized stratified squamous epithelium?

1. Pharynx
2. Oesophagus
3. Cornea of eye
4. Epidermis

94. Stored food of red algae is similar to:

1. Chitin
2. Mannitol
3. Amylopectin and glycogen
4. Glycogen and chitin
95. The domain Eukarya includes all of the following EXCEPT:
(1) protozoa (2) mushrooms (3) bears (4) Blue green algae

96. An infectious agent that appears to have no nucleic acid is a
(1) Bacterium (2) Bacteriophage (3) Viroid (4) Prion

97. Which one function is not concerned with given diagram?
(1) Frequently observed in the cells activity involved in protein synthesis and secretion
(2) They are extensive and continuous with the outer membrane of the nucleus
(3) Major site of synthesis of steroid
(4) Major site of protein synthesis in cell

98. Organelle showing polymorphic nature and autolysis also shows
(1) Its origin at maturing face of Goigi complex
(2) Glycosiation
(3) Hormone synthesis and modification
(4) Root hair formation

99. In maize and banana, inflorescence is
(1) Spadix (2) Spike (3) Catkin (4) Corymb

100. Find out the Zwitterionic form–
(1) $H\text{N—CH—COO}^\ominus$ (2) $H\text{N—CH—COO}^\ominus$
(3) $H\text{N—CH—COOH}$ (4) Both (1) & (2)

101. Which of the following is not correct about Lamprey?
(1) Closed circulation
(2) Lamprey is marine but migrate for spawning to fresh water
(3) Sucking and circular mouth without jaw
(4) Larval stage absent in their life cycle
102. Find out the false statement–

(1) Class reptilia, aves and mammals have two pairs limb and are thus grouped under tetrapoda
(2) Class reptilia, aves and mammals are together called amniota
(3) Class reptilia, aves and mammals have metanephric kidney
(4) Class reptiles, aves, mammals have 10 pairs of cranial nerves

103. The alimentary canal of cockroach is made up of the following parts. Arrange them in an order beginning from mouth.
Crop, Gizzard, Oesophagus, Mesenteron, colon, Rectum, ileum, Mouth.

(1) Mouth – Crop – Oesophagus – Gizzard Mesenteron – Colon – ileum – rectum
(2) Mouth – Oesophagus – Crop – Gizzard – Mesenteron – Colon – ileum – rectum

104. Examine the figures A, B, C, D. In which one of the four options all the items A, B, C and D are correct?

(A) Frond
(B) Air bladder
(C) Frond
(D) Branches
105. How many of the following list of organisms possess cell wall
Diatoms, Cyanobacteria, Chlorella, Chlamydomonas, Spirogyra, Nostoc, Anabaena, Archaea, PPLO, Dinoflagellates, Gonyaulax.

(1) 5 (2) 2
(3) 6 (4) 10

106. Reduction in number of _________ is used as an indicator of air pollution.

(1) fungus (2) mushroom
(3) algae (4) lichen

107. Read the following statements–

(i) Golgi cisternae are concentrically arranged near the nucleus with distinct concave cis or convex maturing face.
(ii) The cis and the trans faces of the golgi body are entirely different and not inter connected.
(iii)Lipases, proteases, carbohydrases are hydrolytic enzymes.
(iv)Extrinsic proteins are present only at outer surface of plasma membrane

(1) Only (iii) incorrect
(2) Only (iii) correct
(3) Both (i) and (iii) correct
(4) Only (iv) correct

108. Most advanced family of angiosperms is :-

(1) Cruciferae (2) Cucurbitaceae
(3) Compositae (4) Euphorbiaceae

109. Mango and coconut are examples of :-

(1) Parthenocarpic fruit (2) Multiple fruit
(3) Drupe fruit (4) True fruit

110. Archidonic acid contain–

(1) 18C + 1 carbon of —COOH group.
(2) 19 C + 1 carbon of —COOH group
(3) 25 C + 1 carbon of —COOH group.
(4) 27C + 1 carbon of —COOH group.
111. Match the following columns:

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hippocampus</td>
<td>I. Fighting fish</td>
</tr>
<tr>
<td>B. Betta</td>
<td>II. Catla</td>
</tr>
<tr>
<td>C. Claris</td>
<td>III. Sea horse</td>
</tr>
<tr>
<td>D. Labeo</td>
<td>IV. Angel fish</td>
</tr>
<tr>
<td></td>
<td>V. Rohu</td>
</tr>
<tr>
<td></td>
<td>VI. Magur</td>
</tr>
</tbody>
</table>

Codes:  
A  B  C  D  
(1) III I VI V  
(2) V II IV I  
(3) III II V IV  
(4) IV I II V  

112. Ornithorhynchus, Macropus, Pteropus, Balenoptera belongs to-  
(1) Class reptilia  
(2) Class mammalia  
(3) Class aves  
(4) Class osteichthyes

113. Which type of metamorphosis is found in cockroach.  
(1) Paurometabolous  
(2) hemimetabolous  
(3) Holometabolous  
(4) Ametabolous

114. Chrysophytes include -  
(1) Diatoms and desmids (golden algae)  
(2) Dinoflagellates  
(3) Euglenoids  
(4) Slime moulds

115. National Botanical Research Institute is situated at  
(1) Howrah  
(2) Lucknow  
(3) Kew  
(4) Moscow

116. Which one of the following statements about bryophytes is true?  
(1) Flowering plants are an example of a bryophyte.  
(2) Bryophytes are believed to be the most recently evolved type of plant.  
(3) The diploid generation of bryophytes is unicellular.  
(4) Bryophytes exhibit the reproductive process referred to as alternation of generations.

117. Each centriole has a cart wheel organisation having a whorl of tubulin fibrils at periphery. These peripheral fibrils are composed of-  
(1) 27 microtubules  
(2) 9 microtubules  
(3) 18 microtubules  
(4) 11 microtubules
118. Edible part of potato is :-
   (1) Inflorescence  (2) Leaves  
   (3) Roots (4) Stem

119. The cells of phellem is impervious to water due to deposition of ____ in the cell wall.
   (1) Cutin  (2) Suberin  
   (3) Lignin (4) Wax

120. Which one is incorrect match?
   (1) Alkaloids – Morphine  
   (2) Toxins – Ricin  
   (3) Lectins – Curcumin (4) Pigments – Anthocyanin

121. Which of the following is segmented mollusc ?
   (1) Dentalium (2) Pila
   (3) Chiton (4) Neopilina

122. Coelenterata in which basic body form exhibit umbrella like appearence and are free swimming–
   (1) Polyp only  
   (2) Medusa only  
   (3) Both (1) and (2) (4) Obelia

123. Choose the correct match w.r.t Periplaneta.

<table>
<thead>
<tr>
<th>(1) Gastric caecae</th>
<th>6–8 blind tubules present at the junction of midgut and hindgut</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Mosaic vision</td>
<td>More sensitivity but less resolution</td>
</tr>
<tr>
<td>(3) Male gonapophysis</td>
<td>Chitinous symmetrical structure surrounding the male gonophore</td>
</tr>
<tr>
<td>(4) Malpighian tubule</td>
<td>They help in removal of excretory products in the form of urea from colon and rectum</td>
</tr>
</tbody>
</table>

124. Isogamous sexual reproduction is found in:
   (1) Chlamydomonas (2) Spirogyra
   (3) Volvox (4) Both (1) and (2)

125. Which of the following is true for alternation of generation ?
   (1) The sporophyte undergoes syngamy to produce spore
   (2) The gametophyte undergoes syngamy to produce spores
   (3) The sporophyte undergoes meiosis to produce spores
   (4) The gametophyte undergoes meiosis to produce gametes
126. Find the incorrect statement–
(1) Glycocalyx differs in composition and thickness in different bacteria
(2) Bacterial cell enveloped consists of a tightly bound three layered structure
(3) Chromatophores are membranous extensions into heterotrophic bacteria
(4) The ribosomes of a polysome translate the m-RNA into proteins

127. “Omnis cellula-e cellula” explains that–
(1) All living organisms are composed of cells
(2) All living organisms are composed of products of cell
(3) All cells arise from pre-existing cells
(4) A cell is capable of independent existence

128. Tulsi belongs to family
(1) Asclephidiaceae (2) Labiatae
(3) Solanaceae (4) Euphorbiaceae

129. Which of the following is incorrect regarding autumn wood?
(1) Also known as late wood
(2) Formed when Cambium is less active
(3) Fewer number of xylary elements are formed
(4) Xylem element have vessels with wide lumen

130. In one strand of DNA molecule number of phosphate molecule is 50, then what is the number of phosphate molecule in another strand?
(1) 25 (2) 100
(3) 50 (4) 150

131. Which of the following is not a fundamental character of phylum-chordata?
(1) Presence of a notochord
(2) Ventral hollow nerve cord
(3) Paired pharyngeal gill slit
(4) Dorsal hollow nerve cord

132. Which is a false statement regarding epithelial tissue?
(1) Cells are loosely packed with little intercellular matrix.
(2) Simple epithelium is composed of a single layer of cell
(3) The compound epithelium consists of 2 or more than 2 cell layers
(4) The squamous epithelium cells have irregular boundaries
133. Select the correct statement w.r.t. growth
(1) Growth in plants is definite
(2) Growth in animals is indefinite
(3) Growth in living beings is mainly intrinsic
(4) Growth is a defining property of living beings.

134. The given table shows classes of algae and their main characteristics. Some characteristics in this table mentioned as A, B, C and D. Observe the table and choose the option in which A, B, C and D are correctly identified :-

<table>
<thead>
<tr>
<th>Classes</th>
<th>Chlorophyceae</th>
<th>Phaeophyceae</th>
<th>Rhodophyceae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Pigments</td>
<td>Chl a, b</td>
<td>Chl a, c</td>
<td>A</td>
</tr>
<tr>
<td>Stored Food</td>
<td>Starch</td>
<td>B</td>
<td>Floridean starch</td>
</tr>
<tr>
<td>Cell Wall</td>
<td>C</td>
<td>Cellulose, algin</td>
<td>Cellulose, pectin, polysulphate ester</td>
</tr>
<tr>
<td>Flagellar Number</td>
<td>2-8</td>
<td>2</td>
<td>D</td>
</tr>
</tbody>
</table>

A B C D
(1) Chl a, e Fat & oil Peptidoglycan Many
(2) Chl a, d Mannitol, Laminarin Cellulose Absent
(3) Chl a, d Paramylum Lipoprotein One
(4) Chl a, e Glycogen Cellulose Absent

135. Match the following

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Viroid</td>
<td>i. Phosphate absorption</td>
</tr>
<tr>
<td>b. Physarum</td>
<td>ii. Fruiticose lichen</td>
</tr>
<tr>
<td>c. Usnea</td>
<td>iii. ss RNA</td>
</tr>
<tr>
<td>d. Mycorrhiza</td>
<td>iv. Slime mold</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a.</th>
<th>b.</th>
<th>c.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chl a, b</td>
<td>Chl a, c</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

135. Match the following

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Viroid</td>
<td>i. Phosphate absorption</td>
</tr>
<tr>
<td>b. Physarum</td>
<td>ii. Fruiticose lichen</td>
</tr>
<tr>
<td>c. Usnea</td>
<td>iii. ss RNA</td>
</tr>
<tr>
<td>d. Mycorrhiza</td>
<td>iv. Slime mold</td>
</tr>
</tbody>
</table>

136. Which one is not a inclusion body?
(1) Phosphate granules
(2) Cynophycean granules
(3) Glycogen granules
(4) Ribosomes
137. The stroma of chloroplast contains :-
   (a) enzymes for krebs cycle.
   (b) ribosomes similar in size and density to that of mitochondria.
   (c) enzymes for dark reaction of photosynthesis.
   (d) DNA similar to the nuclear DNA.
Choose the correct :-
   (1) b and c (2) a and d
   (3) a and b (4) b, c and d

138. What type of placentation is seen in sweat pea?
   (1) Free central (2) Axile
   (3) Basal (4) Marginal

139. During the formation of leaves and elongation of stem, some cells left behind from shoot apical meristem, they constitute–
   (1) Intercalary meristem (2) Fascicular cambium
   (3) Axillary bud (4) Secondary meristem

140. Consider the given figure :

   A and B respectively represents–
   (1) Serine, Cysteine
   (2) Tyrosine, Cysteine
   (3) Serine, Tyrosine
   (4) Tyrosine, Glutamic acid

141. The figures of four animal is given below. Identify which one has parapodia.

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

---

Time Management is Life Management
142. Tonofibrils are component of:-
(1) plasmodesmata (2) cell wall
(3) desmosomes (4) plasm membrane.

143. Members of rhodophyceae are commonly called red algae due to:
(1) Predominance of c phycoerythrin
(2) Predominance of r phycoerythrin
(3) Predominance of c phycocyanin
(4) Predominance of r phycocyanin

144. Which of the following members possess pyriform laterally biflagellate gametes
(1) Ectocarpus and Spirogyra
(2) Volvox and Chlamydomonas
(3) Sargassum and Fucus
(4) Laminaria and Polysiphonia

145. Choose the correct option in context of given diagram
(1) Represents binary fission
(2) Process occurs during unfavourable conditions
(3) A - ssDNA, B - Cell wall, C - Cell membrane
(4) They are smallest living cells

146. Important site of formation of glycoproteins and glycolipids is–
(1) Golgi apparatus (2) Lysosome
(3) Endoplasmic reticulum (4) Mitochondria

147. Identify A, B, C, D :–
(1) A → Cholestrol     B → Protein
(2) B → protein        C → Sugar
(3) C→ Protein        D → lipid bilayer
(4) D → Lipid bilayer A → Sugar
148. In the given diagram, the correct identification of (A), (B), (C) is:

(A) A-Hypogynous, B-Perigynous, C-Epigynous
(B) A-Hypogynous, B-Perigynous, C-Perigynous
(C) A-Hypogynous, B-Epigynous, C-Perigynous
(D) A-Perigynous, B-Hypogynous, C-Epigynous

149. Which of the following statement is incorrect?

(1) In dicot root cap is formed by dermatogen
(2) Root cap is absent in hydrophytes
(3) Pericycle and vascular bundle are formed by periblem
(4) Calyptrogen in monocots is formed by dermatogen

150. An anti sense strand of DNA has the following base sequence 3’–AAAAGTGACTAGTGA–5’. On transcription it produces a m–RNA. Which of the following anticodons of t–RNA recognize the third codon of this mRNA?

(A) AAA (B) CUG (C) GAC (D) CTG

151. Water canal system is found in phylum

(A) Mollusca (B) Arthropoda (C) Annelida (D) Porifera

152. Which of the following sets is not completely related to the exocrine glands secretion?

(A) Mucus, Saliva and Ear wax
(B) Mucus, Oil and Milk
(C) Saliva, Oil and Digestive enzymes
(D) Saliva, Testosterone and Milk
153. Identify the following labelled structure in given diagram

(1) A-gemmacup, B-Antheridiophore, C-Rhizoids
(2) A-Antheridiophore, B-Rhizoids, C-Gemmacup
(3) A-Archeegoniophore, B-Gemmacup, C-Rhizoids
(4) A-Archeegoniophore, B-Rhizoids, C-Gemmacup

154. Viruses can not infect
(1) Animals
(2) Other viruses
(3) Bacteria
(4) Plants

155. Endosperm in gymnosperm
(1) Produces archegonia
(2) Is triploid
(3) Is post-fertilization tissue
(4) Develops from triple fusion

156. Chiasmata become visible in :
(1) Pachytene
(2) Diakinesis
(3) Diplotene
(4) Zygotene

157. At which essential concentration of $\text{Mg}^{2+}$ ions sub units of ribosome are fused
(1) 0.0001 m
(2) 0.001 m
(3) 0.01 m
(4) 0.10 m

158. Replum is present in the ovary of flower of
(1) Sunflower
(2) Pea
(3) Lemon
(4) Mustard
159. Consider the following illustration and identify A, B, C, D and E

- Primary meristem (B) - Primary permanent tissue (C)
- Secondary meristem (D) - Redifferentiation
- Secondary permanent tissue (E)

A B C D E

1. Shoot apical meristem
2. Fascicular cambium
3. Root apical meristem
4. Intrafascicular cambium

160. Which of the following informations is true about given structure?

(1) It is an Aldo pentose sugar
(2) Is D-Ribose
(3) Reducing sugar
(4) All of the above

161. Excretory organs of Echinoderms are:

(1) Malpighian tubules  (2) Nephridia  (3) Flame cells  (4) Absent

162. Which of the following epithelium lines proximal convoluted tubule?

(1) Ciliated cuboidal  (2) Cuboidal brush border epithelium  (3) Columnar brush border epithelium  (4) Striated epithelium
163. Match column-I with column-II and selected the correct option from the codes given below

<table>
<thead>
<tr>
<th>Column - I</th>
<th>Column - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Family</td>
<td>(i) <strong>tuberous</strong></td>
</tr>
<tr>
<td>(b) Kingdom</td>
<td>(ii) Polynomials</td>
</tr>
<tr>
<td>(c) Order</td>
<td>(iii) <strong>Solanum</strong></td>
</tr>
<tr>
<td>(d) Species</td>
<td>(iv) Plantae</td>
</tr>
<tr>
<td>(e) Genus</td>
<td>(v) Solanaceae</td>
</tr>
</tbody>
</table>

1. (a)-v,  (b)-iv,  (c)-ii,  (d)-i,  (e)-iii
2. (a)-v,  (b)-iv,  (c)-i,  (d)-iii,  (e)-ii
3. (a)-i,  (b)-ii,  (c)-iii,  (d)-v,  (e)-iv
4. (a)-ii,  (b)-i,  (c)-iii,  (d)-iv,  (e)-v

164. Which of the following does not fit into any of five kingdom is/are :-

1. Viruses
2. Virioids
3. Algae
4. Both 1 and 2

165. Dendrogram is a family tree based upon

1. Adansonian taxonomy
2. β-taxonomy
3. α-taxonomy
4. Classical taxonomy

166. Identify the given diagram

Which one is true for next stage of above diagram

1. The bivalent chromosomes align on the equatorial plate
2. Sister chromatids separate
3. Nuclear membrane reappear
4. Homologous chromosome separate

167. An organelle which is surrounded by double membrane structure, contain small circular DNA molecule & ribosome and also having the site for oxidative phosphorylation :-

1. Chloroplast
2. Centriole
3. Mesosome
4. Mitochondria

168. Respiratory roots are found in -

1. Rhizopus
2. Orchids
3. Vallisneria
4. Mangrove Plants
169. When protoxylem lies towards the centre and metaxylem lies towards the periphery, then xylem is said to be—
   (1) Endarch  (2) Exarch  (3) Mesarch  (4) Centripetal

170. Steroids generally exhibit a tetracyclic ring called as—
   (1) Cyclo pentano perhydro phenantherne nucleus  
   (2) Cyclo butano perhydro phenantherne nucleus  
   (3) Cyclo propano perhydro phenantherne nucleus  
   (4) Cyclo ethano perhydro phenantherne nucleus

171. Match the Column-A to Column -B–

<table>
<thead>
<tr>
<th>Column–A</th>
<th>Column–B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Urochordata</td>
<td>(i) Salpa</td>
</tr>
<tr>
<td>(b) Cephalochordata</td>
<td>(ii) Branchiostoma</td>
</tr>
<tr>
<td>(c) Vertebrata</td>
<td>(iii) Peteromyzon</td>
</tr>
<tr>
<td>(1) a–iii, b–ii, c–i</td>
<td>(2) a–i, b–ii, c–iii</td>
</tr>
<tr>
<td>(3) a–i, b–iii, c–ii</td>
<td>(4) a–ii, b–i, c–iii</td>
</tr>
</tbody>
</table>

172. Following diagram represent which type of connective tissue ?

173. Which one of the pteridophyte is a microphyllous pteridophyte
   (1) Selagenilla  (2) Salvinia  (3) Marselia  (4) Dryopteris

174. Most elaborate sporophyte is a characteristics of
   (1) Liverwort  (2) Riccia  (3) Moss  (4) Spiraiga

175. Antheridia are absent in
   (1) Cycas  (2) Adiantum  (3) Funaria  (4) Lycopodium

176. Which one is not the function of plasma membrane extensions (w.r.t prokaryotic cell)?
   (1) They help in cell wall formation  
   (2) They help in DNA replication and cell membrane formation  
   (3) Cellular respiration  
   (4) Genetic recombination
177. Mitochondria are similar to prokaryotic cell in
(1) Structure of DNA and Types of ribosome (70 S)
(2) Divided by fission
(3) Both (1) and (2)
(4) Double membrane bound structure

178. Which of the following floral formula belongs to
family-Fabaceae?
(1) Ebr $\otimes$ $\varphi$ K$_{2+2}$ C$_{4x}$ A$_{2+4}$ G$_{(2)}$
(2) Br $\otimes$ $\varphi$ Epi$_{3–7}$ K$_{(5)}$ C$_{(4)}$ A$_{2+4}$ G$_{(2)}$
(3) Br $\%$ K$_{(5)}$ C$_{1+2+4}$ A$_{(9)+1}$ G$_{(2)}$
(4) Br $\%$ K$_{(5)}$ C$_{(5)}$ A$_{1}$ G$_{(2)}$

179. Consider the percentage weight of elements in
Earth crust and find out the incorrect match –
(1) Calcium – 3.6 %
(2) Carbon – 0.03 %
(3) Oxygen – 18.5 %
(4) Silicon – 27.7 %

180. How many peptide bonds present in a 900 amino
acid containing polypeptide chain?
(1) 175
(2) 450
(3) 879
(4) 899