



Code-A\_Phase-1 (HA)

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MM : 720

NCERT Booster Test Series-RM(P1)2324-T01A (HA)

Time : 200 Min.

**Topics Covered:**

**Physics:** Units & Measurements, Motion in a Straight Line, Motion in a Plane

**Chemistry:** Some Basic Concepts of Chemistry, Structure of Atom

**Botany:** Cell: The Unit of Life, Cell Cycle and Cell Division, The living world

**Zoology:** Structural Organisation in Animals–Animal Tissues, Biomolecules

**General Instructions :**

1. There are two sections in each subject, i.e. **Section-A & Section-B**. You have to attempt all **35 questions** from Section-A & only **10 questions** from Section-B out of **15**.
2. Each question carries **+4 marks**. For every wrong response, **-1 mark** shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.
3. Use blue/black ballpoint pen only to darken the appropriate circle.
4. Mark should be dark and completely fill the circle.
5. Dark only one circle for each entry.
6. Dark the circle in the space provided only.
7. Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

**PHYSICS**

**SECTION-A**

1. Parsec is a unit of
  - (1) Time
  - (2) Mass
  - (3) Length
  - (4) Luminous intensity
2. Which of the following numbers has least number of significant figure?
  - (1) 80.267
  - (2) 0.80200
  - (3) 0.0807
  - (4) 0.80760
3. Find the dimensional formula of  $\frac{A}{B}$  in given expression  $W = \frac{A+x}{B}$ , where  $W$  = work done,  $x$  = position
  - (1)  $[M L T^{-2}]$
  - (2)  $[M L^2 T^{-2}]$
  - (3)  $[M L^3 T^{-2}]$
  - (4)  $[M T^{-2}]$
4. If percentage error in measurement of side of a cube is 2% and in its mass is 3%. The percentage error in measurement of its density is
  - (1) 5%
  - (2) 7%
  - (3) 9%
  - (4) 2%

5. Which of the following is dimensionless?
- Gravitational constant
  - Boltzmann's constant
  - Magnification of mirror
  - Stefan's constant
6. One centimeter on the main scale of Vernier calipers is divided into 10 equal parts. If 10 divisions of vernier scale coincide with 8 small divisions of the main scale, the least count of the Caliper is
- 0.01 cm
  - 0.02 cm
  - 0.05 cm
  - 0.005 cm
7. A physical equation is given by  $v = \alpha[4 - e^{-\beta x t}]$  where  $v$  is speed,  $x$  is displacement and  $t$  is time. S.I unit of  $\beta^2$  will be
- $[MLT^{-2}]$
  - $[M^{-1}T^{-2}L^3]$
  - $[M^0L^{-2}T^{-2}]$
  - $[M^{-1}L^{-2}T^1]$
8. **Assertion (A)** : The unit of plane angle and solid angle is same.  
**Reason (R)** : The unit of plane angle and solid angle is radian.
- Both assertion and reason are true and the reason is the correct explanation of the assertion.
  - Both assertion and reason are true but reason is not the correct explanation of the assertion.
  - Assertion is true but reason is false.
  - Assertion and reason both are false
9. A wave function expressing the displacement ( $y$ ) as a function of its position ( $x$ ) and time ( $t$ ) is given as  $y = P \log (Qx + e^{-Rt})$ . Which of the following expressions has dimensions different from other?
- $yR$
  - $PR$
  - $\frac{R}{Q}$
  - $QR$
10. The value 20 J of energy is to be converted into new system of unit in which mass is measured in multiple of  $\alpha$  kg, length in multiple of  $\beta$  m and time in multiple of  $\gamma$  s is
- $\frac{\alpha\beta^2}{20\gamma^2}$
  - $\frac{\alpha\beta\gamma}{20}$
  - $\frac{20\gamma^2}{\alpha\beta^2}$
  - $\frac{20\alpha\beta^2}{\gamma^2}$
11. Two trains each 800 m long are travelling in opposite direction with velocity of 36 km/h. The time of crossing is
- 80 s
  - 40 s
  - 22.22 s
  - 11.11 s
12. A balloon is going vertically upwards with a velocity of  $20 \text{ ms}^{-1}$ . When it is 60m above the ground, a stone is released from it. The time taken by the stone to reach the ground is ( $g = 10 \text{ ms}^{-2}$ )
- 2 s
  - 4 s
  - 8 s
  - 6 s
13. Position of a particle moving along x-axis is given by  $x = 3t^2 + 4t - 3$  where  $x$  is in m. Instantaneous velocity of the particle at  $t = 2$  s is
- 6 m/s
  - 12 m/s
  - 17 m/s
  - 16 m/s
14. A person driving a car with a speed of 54 km/h, suddenly sees a cow on the road. If the distance moved by car before the person applies brakes is 5 m, then reaction time of the person is
- 0.5 s
  - 0.33 s
  - 0.67 s
  - 1 s

15. The ratio of displacement in  $n^{\text{th}}$  seconds to  $n$  second for a particle starting from rest and uniform acceleration is

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

16. The velocity of body is given as  $v = 20 + 0.1t^2$ . The body is undergoing

- (1) Uniform retardation
- (2) Uniform acceleration
- (3) Non uniform acceleration
- (4) Zero acceleration

17. A boy completes one round of a circular track of radius 20 m in 50 seconds. The displacement at the end of 4 minute 10 second will be

- (1) 40 m
- (2) 20 m
- (3)  $80\pi$  m
- (4) Zero

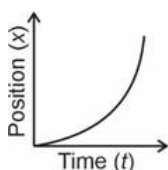
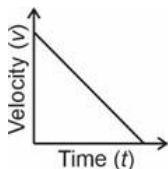
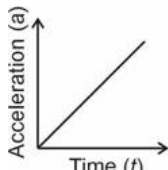
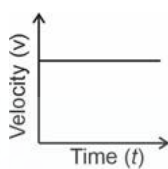
18. A stone is projected vertically upward with a speed 30 m/s from the top of a tower. If it strikes the ground with a speed of  $10\sqrt{13}$  m/s, then height of tower is [ $g = 10 \text{ m/s}^2$ ]

- (1) 10 m
- (2) 15 m
- (3) 30 m
- (4) 20 m

19. An object is subjected to retardation,  $\frac{dv}{dt} = -5\sqrt{v}$  which has initial velocity of  $4 \text{ ms}^{-1}$ . The time taken by the object to come to rest would be

- (1) 2 s
- (2)  $\frac{4}{5}$  s
- (3)  $\frac{5}{4}$  s
- (4)  $\frac{1}{2}$  s

20. An object is moving along x-direction in four ways. Match the following in column-I with column-II

Column-I	Column-II
A. 	(p) Non-uniform velocity
B. 	(q) Uniform velocity
C. 	(r) Positive (non-zero) acceleration
D. 	(s) Negative (non-zero) acceleration

- (1) A(r), B(s), C(p), D(q)
- (2) A(p, r), B(p, s), C(p, r), D(q)
- (3) A(p, s), B(r), C(p, r), D(q)
- (4) A(q, r), B(p, s), C(r), D(q)

21. A particle cover first  $\frac{1}{3}$ rd distance with speed  $v_1$  and remaining distance with speed  $v_2$ . Then the average speed of the particle during journey is

- (1)  $\frac{v_1 v_2}{v_1 + v_2}$
- (2)  $\frac{3v_1 v_2}{v_1 + 2v_2}$
- (3)  $\frac{3v_1 v_2}{2v_1 + v_2}$
- (4)  $\frac{v_1 + v_2}{v_1 v_2}$

22. The velocities of two objects A and B are  $\vec{V}_A = 2\hat{i} + 4\hat{j}$  and  $\vec{V}_B = 3\hat{i} - 7\hat{j}$ . Then velocity of A as observed by B is

- (1)  $5\hat{i} - 3\hat{j}$
- (2)  $\hat{i} - 11\hat{j}$
- (3)  $-\hat{i} + 11\hat{j}$
- (4)  $3\hat{i} - 5\hat{j}$

23. The relation  $x = 3t^2 - 12t + 12$  describes the position of a particle in one direction where  $x$  is in meters and  $t$  in sec. The magnitude of displacement of particle from  $t = 0$  to the instant when its velocity becomes zero, is
- 24 meters
  - 12 meters
  - 5 meters
  - zero
24. In case of a projectile, projected at an angle of  $30^\circ$ , the angle between instantaneous velocity and acceleration at the highest point is
- $30^\circ$
  - $60^\circ$
  - $90^\circ$
  - $45^\circ$
25. The vector sum of the forces 10 N and 6 N can be
- 2 N
  - 8 N
  - 18 N
  - 20 N
26. If  $\vec{A} = 0.3\hat{i} + 0.5\hat{j} + x\hat{k}$  is a unit vector, then the value of  $x$  is
- $\sqrt{0.34}$
  - $\sqrt{0.66}$
  - $\sqrt{0.64}$
  - $\sqrt{0.33}$
27. A particle moves in a circle of radius 25 cm at 2 rev/s. The acceleration of particle in  $\text{m/s}^2$  is
- $\pi^2$
  - $2\pi^2$
  - $4\pi^2$
  - $8\pi^2$
28. The equation of motion of a projectile is  $y = 12x - \frac{3}{4}x^2$ . What is the range of projectile? ( $y$  and  $x$  are in meter)
- 12 m
  - 8 m
  - 48 m
  - 16 m
29. A grasshopper can jump a maximum horizontal distance of 3.6 m. He spends negligible time on the ground. The horizontal distance travelled by the grasshopper in 10 s in the above case is ( $g = 10 \text{ m/s}^2$ )
- $5\sqrt{2}\text{m}$
  - $10\sqrt{2}\text{m}$
  - $20\sqrt{2}\text{m}$
  - $30\sqrt{2}\text{m}$
30. A particle is moving in a circular path of radius  $r$ . Its magnitude of displacement after moving through an angle of  $60^\circ$  is
- $r$
  - $\frac{25r}{12}$
  - $2r$
  - $\frac{12r}{25}$
31. Rain is falling vertically downwards with a speed of 6 m/s. A person rides a bicycle with a speed of 8 m/s. the direction in which he should hold the umbrella is
- $53^\circ$  with horizontal
  - $57^\circ$  with horizontal
  - $37^\circ$  with horizontal
  - $37^\circ$  with vertical
32. A swimmer can swim with a velocity of 2.5 m/s relative to water. If the width of river is 1.2 km, the shortest time in which he can reach the other bank is \_\_\_\_\_ (Velocity of water flow = 2 m/s)
- 6 minute
  - 8 minute
  - 4 minute
  - 16 minute
33. A plane is flying horizontally at 98 m/s releases an object which reaches the ground in 10 s. The angle made by the velocity of object with horizontal when it hits the ground is ( $g = 9.8 \text{ m/s}^2$ )
- $53^\circ$
  - $60^\circ$
  - $37^\circ$
  - $45^\circ$

34. A projectile reaches half of its maximum height at a certain instant of time and reaches again at the same point 10 s later. The maximum height achieved by the projectile is ( $g = 10 \text{ ms}^{-2}$ )
- (1) 250 m
  - (2) 300 m
  - (3) 500 m
  - (4) 600 m
35. If force (F), velocity (u) and time (T) are taken as fundamental quantities, then dimension of length is
- (1)  $[F u T]$
  - (2)  $[F^0 u T]$
  - (3)  $[F u^{-1} T^{-1}]$
  - (4)  $[F^{-1} u T^{-1}]$

## SECTION-B

36. The speed of a particle moving in a circle of radius  $r = 2 \text{ m}$  varies with time  $t$  as  $v = t^2$  where  $t$  in second and  $v$  in  $\text{ms}^{-1}$ . The net acceleration of particle at  $t = 2 \text{ s}$  is

- (1)  $\sqrt{10} \text{ ms}^{-2}$
- (2)  $\sqrt{80} \text{ ms}^{-2}$
- (3)  $\sqrt{40} \text{ ms}^{-2}$
- (4)  $\sqrt{60} \text{ ms}^{-2}$

37. A person moves 30 m north, then 20 m east, then  $30\sqrt{2} \text{ m}$  south west. His displacement is

- (1) 14 m south-west
- (2) 28 m south
- (3) 10 m west
- (4) 15 m east

38. If  $\left| \vec{A} + \vec{B} \right| = \left| \vec{A} \right| = \left| \vec{B} \right|$ , then angle between  $\vec{A}$  and  $\vec{B}$  will be

- (1)  $0^\circ$
- (2)  $120^\circ$
- (3)  $45^\circ$
- (4)  $60^\circ$

39.

A vector  $\vec{A}$  is rotated by a small angle  $\Delta\theta$  radians to get a new vector  $\vec{B}$ . The value of  $\left| \vec{B} - \vec{A} \right|$  is

- (1)  $\left| \vec{A} \right| \Delta\theta$
- (2)  $\left| \vec{A} \right| \left( 1 - \frac{\Delta\theta^2}{2} \right)$
- (3)  $\left| \vec{A} \right| \left( 1 - \frac{\Delta\theta}{2} \right)$
- (4) Zero

40. A projectile is thrown at an angle  $\theta$  with the horizontal with speed  $u$ . After some time, it makes an angle  $\alpha$  with the horizontal. The speed of the projectile at that instant is

- (1)  $\frac{u \cos \theta}{\cos \alpha}$
- (2)  $u(\cos \theta + \cos \alpha)$
- (3)  $\frac{u \cos \alpha}{\cos \theta}$
- (4)  $u(\cos \theta - \cos \alpha)$

41. Slope of velocity-time graph and area under velocity-time graph represents respectively

- (1) Distance, Acceleration
- (2) Acceleration, Displacement
- (3) Displacement, Velocity
- (4) Acceleration, Velocity

42. When Rahul walks up a stationary escalator, he takes 20 s to reach the top. While when he walks up a moving escalator, he takes 10 s to reach the top. The time taken by him to reach the top when he stands still on the moving escalator is  
 (1) 40 s  
 (2) 10 s  
 (3) 20 s  
 (4) 30 s
43. A car accelerates from rest at constant rate  $2 \text{ m/s}^2$  for some time. Then it retards at constant rate  $4 \text{ m/s}^2$  and comes to rest. If the total time of motion be 3 s, then total distance travelled by car is  
 (1) 4 m  
 (2) 6 m  
 (3) 2 m  
 (4) 3 m
44. The position of a particle is given by  $x = (4 - t^2) \text{ m}$ . The distance travelled by particle in first 4 second is  
 (1) 8 m  
 (2) 16 m  
 (3) 6 m  
 (4) 18 m
45. The velocity of a particle is given by  $v = 4t^3 - 13t^2 + 12t + 5$   
 The acceleration of the particle is zero at  
 (1)  $\frac{2}{3} \text{ s}$   
 (2)  $\frac{3}{2} \text{ s}$   
 (3)  $\frac{3}{4} \text{ s}$   
 (4) Both (1) and (2)
46. A: When a physical quantity moves from one system of unit to another system of unit, its numerical value may change.  
 R: The product of numerical value and unit for a measured quantity remain constant.  
 (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion  
 (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion  
 (3) Assertion is true statement but Reason is false  
 (4) Both Assertion and Reason are false statements
47.  $\left(P + \frac{a}{V^2}\right)(V - b) = RT$  is equation of real gas. The dimensions of the constant  $ab$  is  
 (1)  $[M L^5 T^{-2}]$   
 (2)  $[M L^2 T^{-2}]$   
 (3)  $[M L^8 T^{-2}]$   
 (4)  $[M L^4 T^{-2}]$
48. Dimensional formula of coefficient of viscosity is  
 (1)  $[MLT^{-2}]$   
 (2)  $[ML^2T^{-1}]$   
 (3)  $[ML^{-1}T^{-1}]$   
 (4)  $[M^0L^{-1}T^{-1}]$
49. If maximum percentage error in mass, length and time is  $a\%$ ,  $b\%$  and  $c\%$  respectively, then the maximum percentage error in power is  
 (1)  $(a + 2b + 3c)\%$   
 (2)  $(a + 2b - 3c)\%$   
 (3)  $(a - 2b + 3b)\%$   
 (4)  $(a + 2b + 2c)\%$
50. Force on a particle is given by  $F = P \sin\theta + Q \cos Rt$ , where  $t$  is time. The dimensional formula of  $\frac{R}{PQ}$  is  
 (1)  $[M^{-1}L^{-2}T^3]$   
 (2)  $[M^{-2}L^{-2}T^3]$   
 (3)  $[M^{-2}L^2T^{-3}]$   
 (4)  $[M^{-1}L^{-2}T^{-3}]$

## SECTION-A

51. Number of electrons in 1.7 g of  $\text{NH}_3$  is  
 (1)  $N_A$   
 (2)  $0.1 N_A$   
 (3)  $0.02 N_A$   
 (4)  $\frac{N_A}{2}$
52. An element X has the following isotopic composition:  
 $^{120}\text{X} : 60\%$ ,  $^{122}\text{X} : 30\%$ ,  $^{119}\text{X} : 10\%$   
 The weighted average atomic mass of the naturally occurring element X will be :  
 (1) 121.2 u  
 (2) 120.5 u  
 (3) 119.8 u  
 (4) 120.1 u
53. Law of multiple proportions is not applicable to the pair of  
 (1)  $\text{H}_2\text{O}$  and  $\text{H}_2\text{O}_2$   
 (2)  $\text{CO}_2$  and  $\text{CH}_4$   
 (3)  $\text{CO}$  and  $\text{CO}_2$   
 (4)  $\text{CH}_4$  and  $\text{C}_2\text{H}_6$
54. Mass of  $\text{CaCO}_3$  required to react completely with 100 mL of 0.5 M  $\text{H}_2\text{SO}_4$  is  
 (1) 10 g  
 (2) 5 g  
 (3) 15 g  
 (4) 25 g
55. Consider the following observation for  $\text{CO}_2$  sample
- |                  | % of carbon | % of oxygen |
|------------------|-------------|-------------|
| Natural sample   | 27.27       | 72.73       |
| Synthetic sample | 27.27       | 72.73       |
- The above observation is in accordance to  
 (1) Law of multiple proportions  
 (2) Law of definite proportions  
 (3) Law of conservation of mass  
 (4) Gay-Lussac's law of gaseous volume
56. If the mass ratio of  $\text{O}_2$  and  $\text{N}_2$  is 4 : 7, then the ratio of their moles is  
 (1) 4 : 7  
 (2) 1 : 2  
 (3) 3 : 5  
 (4) 4 : 5
57. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave C = 40% and H = 6.67%. The empirical formula of the compound would be  
 (1)  $\text{HCO}$   
 (2)  $\text{H}_2\text{CO}$   
 (3)  $\text{HC}_2\text{O}$   
 (4)  $\text{H}_2\text{C}_2\text{O}$
58. The mass of  $3.01 \times 10^{24}$  atoms of triatomic gas is 80 g. The molecular mass of gas is  
 (1) 240  
 (2) 40  
 (3) 26.67  
 (4) 48
59. If 24 g of carbon is mixed with 80 g of oxygen, then amount of  $\text{CO}_2$  produced is  
 (1) 2 mol  $\text{CO}_2$   
 (2) 44 g  $\text{CO}_2$   
 (3) 1 mol  $\text{CO}_2$   
 (4) 22 g  $\text{CO}_2$
60. The number of significant figures in 1.008 is  
 (1) 2  
 (2) 4  
 (3) 3  
 (4) 1
61. Percentage purity of 150g of  $\text{CaCO}_3$  sample which gives 5.6 litre  $\text{CO}_2$  at STP on complete decomposition is  
 (1) 11.33%  
 (2) 16.67%  
 (3) 23.77%  
 (4) 33.33%
62. Volume of oxygen required for complete combustion of 1 L  $\text{C}_2\text{H}_6$  at S.T.P. is  
 (1) 2.5 L  
 (2) 7 L  
 (3) 3.5 L  
 (4) 2 L
63. The molality of 9.8% w/w  $\text{H}_2\text{SO}_4$  solution is  
 (1) 2 m  
 (2) 1.1 m  
 (3) 2.2 m  
 (4) 0.5 m



64. Mass of NaOH solution required (50% (w/w)) to neutralize 2 litre of 1 M  $\text{H}_2\text{SO}_4$  solution is
- (1) 160 g
  - (2) 320 g
  - (3) 80 g
  - (4) 40 g
65. Given below are two statements one is labelled as Assertion (A) and the other is labelled as Reason (R).  
**Assertion (A):** 0.031 has four significant figures.  
**Reason (R):** Zeros preceding to first non-zero digit are significant.  
In the light of above statements choose the correct answer.
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
  - (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
  - (3) (A) is true but (R) is false
  - (4) Both (A) and (R) are false
66. If mass percentage of  $\text{Zn}^{2+}$  in a biomolecule is 0.04% then minimum molecular mass of the biomolecule will be (Atomic mass of Zn = 65.4 u)
- (1)  $1.6 \times 10^5$  u
  - (2)  $3.2 \times 10^3$  u
  - (3)  $3.2 \times 10^4$  u
  - (4)  $1.6 \times 10^6$  u
67. Which of the following concentration terms depends upon temperature?
- (1) Molality
  - (2) Molarity
  - (3) (w/w) %
  - (4) Mole fractions
68. Consider the following statements about cathode rays:
- (a) They are negatively charged particles
  - (b) The characteristics of cathode rays do not depend upon the material of electrodes used.
  - (c) They start from anode and move towards cathode.
- The correct statements are:
- (1) (a) and (b) only
  - (2) (b) and (c) only
  - (3) (a) and (c) only
  - (4) (a), (b) and (c)
69. Which of the following particles has maximum de-Broglie wavelength if all are moving with same speed?
- (1) Electron
  - (2) Neutron
  - (3) Proton
  - (4) Alpha particle
70. Choose the correct option from the following:  
**Statement I :** The radius of 2nd orbit of He atom is 1.058 Å.  
**Statement II :** Splitting of spectral line in electrical field is called Stark effect.
- (1) Statement I is correct but statement II is incorrect
  - (2) Statement I is incorrect but statement II is correct
  - (3) Both statements are incorrect
  - (4) Both statements are correct
71. In a sample of H atom, total number of spectral lines obtained during transition of electron from 4<sup>th</sup> excited state to ground state is
- (1) 5
  - (2) 4
  - (3) 10
  - (4) 6
72. Bohr theory is not applicable for
- (1) H
  - (2)  $\text{He}^+$
  - (3)  $\text{Li}^{2+}$
  - (4)  $\text{Be}^{2+}$
73.  $\text{Li}^+$  is isoelectronic with which of the following ions?
- (1)  $\text{H}^+$
  - (2)  $\text{Na}^+$
  - (3)  $\text{B}^{3+}$
  - (4)  $\text{He}^+$
74. The wave number of radiation whose wavelength is 5000 Å is
- (1)  $2 \times 10^8 \text{ m}^{-1}$
  - (2)  $2 \times 10^6 \text{ m}^{-1}$
  - (3)  $2.4 \times 10^4 \text{ m}^{-1}$
  - (4)  $4.1 \times 10^6 \text{ m}^{-1}$



75. Assertion : Proton is ionised hydrogen atom.  
Reason :  $\alpha$ -particle is the unionized helium atom.
- Both Assertion & Reason are true and the reason is the correct explanation of the assertion
  - Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
  - Assertion is true statement but Reason is false
  - Both Assertion and Reason are false statements
76. Out of the following set of quantum numbers, choose the one which does not exist
- $n = 1, l = 0, m = 0, s = -\frac{1}{2}$
  - $n = 4, l = 0, m = 0, s = +\frac{1}{2}$
  - $n = 3, l = 3, m = 0, s = +\frac{1}{2}$
  - $n = 3, l = 0, m = 0, s = -\frac{1}{2}$
77. Total number of electrons in P atom having magnetic quantum number value zero is
- 15
  - 10
  - 6
  - 9
78. Radius of nucleus is about
- $10^{-5}$  m
  - $10^{-10}$  m
  - $10^{-15}$  m
  - $10^{-21}$  m
79. Charge/mass ratio is maximum for
- Electron
  - Proton
  - Neutron
  - $\alpha$ -particle
80. The total number of nodes in  $4p$  orbital is
- 1
  - 2
  - 3
  - 4
81. Maximum kinetic energy of photoelectrons emitted when a light of frequency  $1.1 \times 10^{12}$  Hz is irradiated on a metal surface whose threshold frequency is equal to  $1.0 \times 10^{11}$  Hz, is ( $h = 6.6 \times 10^{-34}$  J s)
- $6.6 \times 10^{-25}$  J
  - $1.8 \times 10^{-21}$  J
  - $5.1 \times 10^{-20}$  J
  - $6.6 \times 10^{-22}$  J
82. The longest wavelength of Paschen series of  $\text{Li}^{2+}$  ion is
- $\frac{4}{3R}$
  - $\frac{16}{7R}$
  - $\frac{7R}{16}$
  - $\frac{36}{R}$
83. If a particle of mass 0.5g is moving with a velocity of 200 m/s then the wavelength associated with the particle is ( $h = 6.625 \times 10^{-34}$  Js)
- $6.625 \times 10^{-32}$  m
  - $6.625 \times 10^{-33}$  m
  - $6.625 \times 10^{-34}$  m
  - $6.625 \times 10^{-36}$  m
84. Which of the following phenomenon does not support the particle nature of electromagnetic radiation?
- Photoelectric effect
  - Line spectrum of hydrogen
  - Interference
  - Blackbody radiation
85. The de Broglie wavelength of the electron in the first orbit of  $\text{Li}^{2+}$  ion is (Given Bohr radius,  $a_0 = 52.9$  pm)
- $105.8 \pi$  pm
  - $52.9 \pi$  pm
  - $35.3 \pi$  pm
  - $158.7 \pi$  pm

## SECTION-B

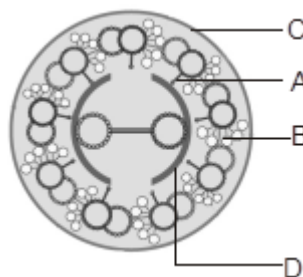
86. When 100 ml of 17% (w/v) solution of  $\text{AgNO}_3$  is mixed with 100 ml of 5.85% (w/v)  $\text{NaCl}$  solution, the mass of precipitate formed will be ( $\text{Ag} = 108$ ,  $\text{N} = 14$ ,  $\text{Na} = 23$ ,  $\text{Cl} = 35.5$ )
- 14.35 g
  - 27.5 g
  - 8.35 g
  - 11.35 g
87. The atomic 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?
- y
  - 2y
  - $\frac{y}{4}$
  - $\frac{y}{2}$
88. 32 g of methyl alcohol is present in 132 g of an aqueous solution. The molality of methyl alcohol in the solution is
- 5 m
  - 8 m
  - 12 m
  - 10 m
89. Identify the incorrect match
- Multiple Prefix
- $10^{-18}$  atto
  - $10^{-15}$  pico
  - $10^{-21}$  zepto
  - $10^{-9}$  nano
- (1)
  - (2)
  - (3)
  - (4)
90. Which among the following contains highest number of atoms?
- 16 g of  $\text{CH}_4$
  - 1 g molecule of  $\text{NH}_3$
  - 22.4 L of  $\text{C}_2\text{H}_4$  at STP
  - $6.02 \times 10^{23}$  molecules of  $\text{CO}_2$
91. A : Both 12 g of carbon and 27 g of aluminium will have  $6.02 \times 10^{23}$  atoms.  
R : Gram atomic mass of an element contains Avogadro number of atoms.
- Both Assertion & Reason are true and the reason is the correct explanation of the assertion
  - Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
  - Assertion is true statement but Reason is false
  - Both Assertion and Reason are false statements
92. Number of He atoms present in 40 amu of the helium gas is
- 20
  - 10
  - 40
  - 4
93. 11.2 L of  $\text{CO}_2$  gas at STP contains as many molecules as present in
- 300 g of  $\text{C}_2\text{H}_6$
  - 45 g of  $\text{H}_2\text{C}_2\text{O}_4$
  - 4.5 g of  $\text{H}_2\text{O}$
  - 98 g of  $\text{H}_2\text{SO}_4$
94. Kinetic energy of the electron in the second orbit of  $\text{He}^+$  ion will be
- 3.4 eV
  - 13.6 eV
  - 54.4 eV
  - 6.8 eV
95. The orbital diagram in which a Aufbau principle is violated is
- $\begin{array}{|c|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \uparrow & \\ \hline 2s & 2p & & \end{array}$
  - $\begin{array}{|c|c|c|c|} \hline \uparrow & \uparrow\downarrow & \uparrow & \uparrow \\ \hline 2s & 2p & & \end{array}$
  - $\begin{array}{|c|c|c|c|} \hline \uparrow\downarrow & \uparrow & \uparrow & \uparrow \\ \hline 2s & 2p & & \end{array}$
  - $\begin{array}{|c|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \uparrow & \uparrow \\ \hline 2s & 2p & & \end{array}$
96. Correct order of energy of 2s orbital of the given atoms is
- $E_{2s}(\text{K}) > E_{2s}(\text{Na}) > E_{2s}(\text{H})$
  - $E_{2s}(\text{H}) > E_{2s}(\text{K}) > E_{2s}(\text{Na})$
  - $E_{2s}(\text{H}) > E_{2s}(\text{Na}) > E_{2s}(\text{K})$
  - $E_{2s}(\text{K}) > E_{2s}(\text{H}) > E_{2s}(\text{Na})$

97. Orbital angular momentum of electron present in a  $3p$  orbital is  
 (1)  $\sqrt{12}\hbar$   
 (2)  $\sqrt{6}\hbar$   
 (3)  $\sqrt{2}\hbar$   
 (4)  $4\hbar$
98. Angular momentum of electron in the third orbit of hydrogen atom is  
 (1)  $\frac{h}{2\pi}$   
 (2)  $\frac{2h}{3\pi}$   
 (3)  $\frac{3h}{2\pi}$   
 (4)  $\frac{h}{3\pi}$
99. If the shortest wavelength of Lyman series of H atom is  $x$ , then the wavelength of the first line of Balmer series of H atom will be  
 (1)  $\frac{9x}{5}$   
 (2)  $\frac{5x}{9}$   
 (3)  $\frac{5x}{36}$   
 (4)  $\frac{36x}{5}$
100. Correct order of wavelength of the given radiations is  
 (1) Radiowaves > IR > Microwave  
 (2) IR > Microwave > Radiowaves  
 (3) Radiowaves > Microwave > IR  
 (4) Microwave > Radiowaves > IR

## BOTANY

## SECTION-A

101. Select the **correct** statements w.r.t. plasma membrane.  
 (a) Tail of lipid is polar whereas head is non-polar  
 (b) Integral proteins are totally or partially buried in the membrane  
 (c) In human, the membrane of the RBC has approximately 40 percent protein and 52 percent lipids  
 (d) Proteins move laterally within overall bilayer of lipid  
 (1) (a) and (b)  
 (2) (b) and (c)  
 (3) (a) and (c)  
 (4) (b) and (d)
102. Read the statements and select **correct** option.  
 A. The *cis* and the *trans* face of Golgi apparatus are entirely different and are not interconnected.  
 B. Golgi apparatus remains in close association with endoplasmic reticulum.  
 C. Cisternae in Golgi apparatus are stacked parallel to each other.  
 (1) Only statement A is incorrect.  
 (2) Statements A and C are correct.  
 (3) All statements A, B and C are correct.  
 (4) Statements A and B are incorrect.
103. Read the following statements and select the option which is appropriate w.r.t. lysosomes.  
 (a) Are rich in hydrolytic enzymes.  
 (b) Enzymes are optimally active at high pH  
 (1) Both (a) and (b) are correct  
 (2) Only (b) is correct  
 (3) Only (a) is correct  
 (4) Both (a) and (b) are incorrect
104. Observe the diagram given below and choose the **correct** option.



- (1) A – Radial spoke, B – Interdoulet bridge, C – Central sheath, D – Plasma membrane  
 (2) A – Central spoke, B – Interdoulet bridge, C – Central Microtubule, D – Plasma membrane  
 (3) A – Radial spoke, B – Interdoulet bridge, C – Central sheath, D – Central Microtubule  
 (4) A – Radial spoke, B – Interdoulet bridge, C – Plasma membrane, D – Central sheath

105. Mesosome helps in all **except**

- (1) Cell wall formation
- (2) DNA replication
- (3) Photosynthesis
- (4) Respiration

106. "New cells arise from pre-existing cells" was explained by

- (1) Robert Hooke
- (2) Theodor Schwann
- (3) Matthias Schleiden
- (4) Rudolf Virchow

107. Thick and tough glycocalyx found in some bacteria is called

- (1) Slime layer
- (2) Mesosome
- (3) Capsule
- (4) Lamellae

108. The plasmid DNA

- (1) Is found in all eukaryotes
- (2) Confers certain unique phenotypic characters to bacteria
- (3) Is the genetic material of prokaryotes
- (4) Is larger than genomic DNA

109. Chlorophyll pigment is present in the \_\_\_\_\_ of chloroplast

- (1) Thylakoids and stroma
- (2) Matrix
- (3) Thylakoids
- (4) Stroma

110. On the basis of his studies, who concluded that the presence of cell wall is a unique character of the plant cells.

- (1) Matthias Schleiden
- (2) Theodor Schwann
- (3) George Palade
- (4) Rudolf Virchow

111. Select the **incorrect** statement w.r.t. vacuoles.

- (1) Single membranous organelle
- (2) Contains water, sap and excretory products
- (3) Occupies upto 90% of volume of the plant cell
- (4) Tonoplast facilitates the transport of a number of ions passively into the vacuole

112. Select the **incorrectly** matched pair.

(1)	Bacterial flagellum	–	Filament, Hook and basal body
(2)	Primary cell wall in plants	–	Incapable of growth
(3)	White blood cells	–	Amoeboid
(4)	Ribosomes	–	Non-membrane bound organelles

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

113. Select the **correct** option w.r.t. function performed by the cell organelle shown in the below figure.




- (1) Protein synthesis and secretion
- (2) Formation of glycoproteins and glycolipids
- (3) ATP formation
- (4) Digestion of proteins and carbohydrates

114. Nucleolus is site for

- (1) Active ribosomal RNA synthesis
- (2) Messenger RNA synthesis
- (3) Transfer RNA synthesis
- (4) DNA replication

115. Interkinesis is

- (1) Phase between karyokinesis and cytokinesis
- (2) Characterised by replication of DNA and RNA
- (3) A metabolic stage between telophase I and prophase II
- (4) Followed by prophase I always

- 116.** When karyokinesis is **not** followed by cytokinesis, it results in the
- Entrance of the cell into  $G_0$  phase
  - Formation of cell plate
  - Haploid stage of the cell
  - Formation of syncytium
- 117.** Which one of the following phases is **not** the part of interphase of cell cycle?
- $G_1$  phase
  - M phase
  - S phase
  - $G_2$  phase
- 118.** During \_\_\_\_\_, bivalent of chromosomes formed.
- Pachytene
  - Leptotene
  - Diplotene
  - Zygotene
- 119.** The centromere is situated close to one end forming one extremely short and one very long arm in
- Telocentric chromosome
  - Metacentric chromosome
  - Acrocentric chromosome
  - Sub-metacentric chromosome
- 120.** Splitting of centromeres and separation of chromatids occurs at
- Telophase
  - Anaphase
  - Prophase
  - Metaphase
- 121.** During which phase of cell cycle, genetic material becomes double?
- Gap<sub>2</sub> phase
  - Synthesis phase
  - Gap<sub>1</sub> phase
  - Quiescent phase
- 122.** In an animal cell, cytokinesis is achieved by the formation of
- Cell plate
  - Furrow
  - Phragmoplast
  - Metaphase plate
- 123.** The significant contributions of equational division are all **except**
- Restores nucleo-cytoplasmic ratio
  - Increases genetic variability, important for evolution
  - Responsible for growth of multicellular organisms
  - Helps in repair and regeneration process
- 124.** If it takes 20 hours to complete the cell cycle of a cell, approximately for how much time duration its interphase is going to last?
- 19 hours
  - 15 hours
  - 10 hours
  - 1 hour
- 125.** The widely accepted, improved model of the structure of cell membrane, called the fluid-mosaic model was proposed by
- Robertson
  - Singer and Nicolson
  - Ruckert
  - E. G. Balbiani
- 126.** A stage of cell-division is depicted in the given figure. Select the most appropriate option as answer, which gives **correct** identification of the stage with its characteristics.
- 
- Mitotic metaphase - Best stage to study chromosome morphology
  - Telophase II - Chromosomes move to spindle equator
  - Meiotic metaphase I - Bivalent chromosomes align on the equatorial plate
  - Meiotic metaphase II - All homologous chromosomes align at the equator
- 127.** The daughter cells produced after meiosis I
- Are genetically similar to each other
  - Are genetically similar to parent cell
  - Are genetically dissimilar to each other
  - Have same ploidy level as that of parent cell

128. Which of the following cells has both 70S and 80S ribosomes?

- (1) *Lactobacillus*
- (2) *Rhizobium*
- (3) Mesophyll cell
- (4) *Nostoc*

129. A taxonomic aid which gives actual account of habitat and distribution of various plants of given area is

- (1) Manual
- (2) Flora
- (3) Monograph
- (4) Catalogue

130. Systematics differs from taxonomy as it includes

- (1) Classification
- (2) Nomenclature
- (3) Phylogeny
- (4) Identification

131. Choose the **correct** set of specific epithets w.r.t. genus *Panthera*?

- (1) *leo*, *indica* and *tuberosum*
- (2) *nigrum*, *melongena* and *tigris*
- (3) *leo*, *pardus* and *tigris*
- (4) *leo*, *pardus* and *sapiens*

132. Select the **mismatched** pair w.r.t organism and its order

- (1) Wheat – Poales
- (2) Mango – Sapindales
- (3) Housefly – Diptera
- (4) Man – Mammalia

133. Choose the **incorrect** statement.

- (1) Consciousness is the most obvious and technically complicated feature of all living organisms.
- (2) Plants respond to external factors like light, water, temperature etc.
- (3) Prokaryotes cannot sense and respond to environmental cues.
- (4) Photoperiod affects reproduction in seasonal breeders.

134. Read the statements Assertion (A) and Reason (R) and select the **correct** option.

**Assertion (A):** Higher the category, greater is the difficulty of determining the relationship to other taxa at the same level.

**Reason (R):** Higher the taxa, more are the characteristics that the members within the taxon share.

- (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- (3) Assertion is true statement but Reason is false
- (4) Both Assertion and Reason are false statements

135. Select the **correct** sequence of taxonomic categories of mango in ascending order

- (1) *Mangifera* → Anacardiaceae → Sapindales → Dicotyledonae → Angiospermae
- (2) Angiospermae → Sapindales → Anacardiaceae → Dicotyledonae → *Mangifera*
- (3) *Mangifera* → Anacardiaceae → Dicotyledonae → Sapindales → Angiospermae
- (4) Angiospermae → Dicotyledonae → Sapindales → Anacardiaceae → *Mangifera*

## SECTION-B

136. Reserve materials in prokaryotic cells are stored in cytoplasm in the form of inclusion bodies which are

- (1) Double membrane bound structures
- (2) Non-membrane bound structures
- (3) Always associated with plasma membrane of cell
- (4) Rich in starch granules only

137. The function of fimbriae in bacteria is

- (1) To help in attachment to host tissues or to rocks
- (2) Motility
- (3) DNA replication
- (4) Secretion process



- 138.** Plant cell wall lacks
- (1) Cellulose
  - (2) Hemicellulose
  - (3) Chitin
  - (4) Pectin
- 139.** Kinetochores are
- (1) Terminal ends of chromosomes
  - (2) Present around primary constriction and help in crossing over
  - (3) Present near nuclear envelope and take part in spindle formation
  - (4) Present around centromere and provide a site for attachment to the spindle fibers
- 140.** The type of ER which is found in the cells that are actively involved in protein synthesis and secretion is
- (1) Continuous with the inner membrane of nucleus
  - (2) Associated with packaging of lipids
  - (3) Associated with 80 S ribosomes
  - (4) The main site for the synthesis of steroidal hormones
- 141.** The arrangement of axonemal microtubules in eukaryotic cilia and flagella is
- (1)  $9 + 2$
  - (2)  $9 + 0$
  - (3)  $18 + 0$
  - (4)  $27 + 2$
- 142.** An onion root cell has 16-chromosomes in its  $G_1$  phase then how many chromosomes it has in S and  $G_2$  phase respectively?
- (1) 16; 16
  - (2) 32; 32
  - (3) 8; 8
  - (4) 32; 16
- 143.** Select the **incorrect** statement w.r.t. binomial nomenclature.
- (1) The first word denoting genus starts with a capital letter
  - (2) Generic name, specific epithet and author citation collectively form binomial epithet
  - (3) The scientific name is printed in italics or underlined combinedly when hand written
  - (4) Biological names are generally taken from Latin language
- 144.** Meiosis involves   **A**   cycle(s) of DNA replication and   **B**   cycle(s) of nuclear division.  
Select the **correct** option to fill in the blanks A and B.
- (1) **A** – Single, **B** – Two
  - (2) **A** – Two, **B** – Two
  - (3) **A** – Two, **B** – Four
  - (4) **A** – Two, **B** – Single
- 145.** Arrange the following events of meiosis in their **correct** sequence of occurrence and choose the **correct** option.
- a. Chromosomal Synapsis
  - b. Dissolution of synaptonemal complex
  - c. Alignment of univalents at equator
  - d. Terminalisation of chiasmata
- (1)  $a \rightarrow b \rightarrow d \rightarrow c$
  - (2)  $a \rightarrow d \rightarrow b \rightarrow c$
  - (3)  $b \rightarrow a \rightarrow c \rightarrow d$
  - (4)  $c \rightarrow b \rightarrow a \rightarrow d$
- 146.** Read the following statements and choose the **correct** option w.r.t pachytene stage.
- a. Bivalent chromosomes clearly appear as tetrads.
  - b. Recombination nodules appear at the sites, at which crossing over occurs between non-sister chromatids of the homologous chromosomes.
  - c. Nucleolus disappears and nuclear envelope disintegrates.
  - d. Leptotene and zygotene are short lived as compared to pachytene.
- (1) a, b & d
  - (2) a & d only
  - (3) a, b & c
  - (4) a, b, c & d
- 147.** Prophase of mitosis is similar to prophase I of meiosis in/as
- a. Being short and without substages.
  - b. Being the phase where splitting of centromere takes place.
  - c. Both lack crossing over.
  - d. Nucleolus and nuclear membrane disappear at the end of both the phases.
- (1) Only d is true
  - (2) Only c & d are true
  - (3) Only a & d are true
  - (4) b, c & d are true
- 148.** Which of the following serve as quick referral system in taxonomic studies?
- (1) Herbaria
  - (2) Botanical Gardens
  - (3) Manuals
  - (4) Keys



149. At which of the given categories, lesser is the difficulty of determining the relationship to other taxa at the same level?
- (1) Division
  - (2) Class
  - (3) Order
  - (4) Genus
150. Read the given statement.  
 "Rice is a monocot and all monocots are plants"  
 In the above statement – rice, monocot and plants are
- (1) Same taxa at same rank
  - (2) Different taxa at same rank
  - (3) Same taxa at different rank
  - (4) Different taxa at different rank

ZOOLOGY

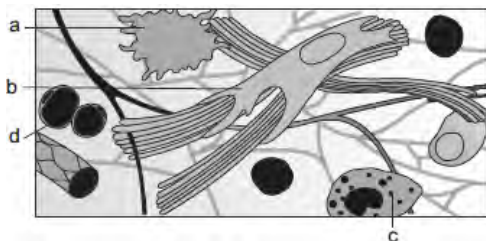
SECTION-A

151. How many nitrogen atoms are present in the structure of a substituted purine nitrogenous base which forms two hydrogen bonds with thymine?
- (1) Six
  - (2) Four
  - (3) Five
  - (4) Three
152. Which of the following is correctly related to lecithin?
- (1) It is a phosphorylated glyceride found in cell membrane
  - (2) Its structure contains three fatty acids
  - (3) Two nitrogen atoms are attached to phosphoric acid in its structure
  - (4) It is an esterified fatty acid found in nucleotides
153. A segment of ds DNA has 100 adenine and 100 cytosine residues. The total number of nucleotides and hydrogen bonds present in it respectively are
- (1) 400, 500
  - (2) 99, 500
  - (3) 400, 198
  - (4) 500, 400
154. Collagen fibres are secreted by A and these fibres are oriented differently in B connective tissue.  
 Choose the option that correctly identifies A and B respectively.
- (1) Mast cells, cartilage
  - (2) Fibroblasts, dense regular
  - (3) Fibroblasts, dense irregular
  - (4) Macrophages, dense irregular
155. 'X' is a specialised connective tissue. It is the site of production of cells of another specialised connective tissue 'Y'. Identify 'X' and 'Y' and select the **correct** option.
- (1) Matrix of 'Y' is solid, hard and non-pliable
  - (2) Matrix of 'X' is hard and pliable
  - (3) Skeletal muscles are found attached to 'X' to bring about movements
  - (4) 'X' and 'Y' both contain the semi-fluid ground substance and fibres
156. How many of the given features in the box below are present in smooth muscle fibres?
- Fusiform appearance, Uninucleated, Multinucleated, Branched appearance, Presence of striations
- Select the correct option.
- (1) One
  - (2) Two
  - (3) Three
  - (4) Four

157. Which of the following is not a multicellular gland?

- (1) Mammary gland
- (2) Goblet cell of the alimentary canal
- (3) Salivary gland
- (4) Sweat gland

158. Identify the labelled cells (a-d) in the tissue given below and select the incorrect match w.r.t. their function.



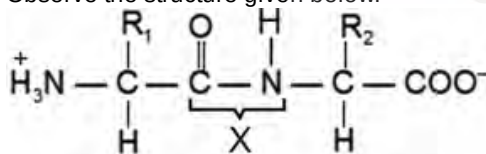
- (1) a – Engulfs debris and pathogens
- (2) b – Produces and secretes fibres
- (3) c – Secretes heparin, histamine and serotonin
- (4) d – Mediates the allergic reactions

159. Read the given statements w.r.t. simple cuboidal epithelium and choose the option which includes all **correct** statements.

- (a) It is composed of a single layer of cells.
- (b) It is commonly found in ducts of glands.
- (c) It is also present in glomerulus of nephrons in kidneys.
- (d) Its main functions are secretion and absorption.

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

160. Observe the structure given below.



X represents a/an

- (1) Ionic linkage
- (2) Peptide bond
- (3) Glycosidic bond
- (4) Ester bond

161. The organic molecule 'A' is \_\_\_\_\_% of the total cellular mass in living organisms. It consists of monomeric units that are joined together with the help of peptide bonds. Choose the option that fills the blank **correctly**.

- (1) 5 – 7
- (2) 10 – 15
- (3) 3
- (4) 2

162. A co-factor which forms coordination bonds with side chains at the active site of enzyme carboxypeptidase and with its substrate is

- (1) Calcium
- (2) Zinc
- (3) Haem
- (4) Vitamin

163. Amino acid whose 'R' group is basic in nature is

- (1) Lysine
- (2) Valine
- (3) Glycine
- (4) Serine

164. Which of the following type of structural level is exhibited by DNA in Watson-Crick model?

- (1) Primary structure
- (2) Secondary structure
- (3) Tertiary structure
- (4) Quaternary structure

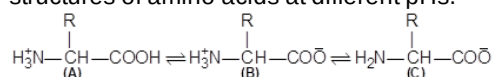
165. The acid-soluble pool obtained during chemical analysis of living tissue of an animal would contain all of the following, **except**

- (1) Lysine
- (2) GTP
- (3) Fructose
- (4) DNA

166.  $K_m$  value of an enzyme is the

- (1) Concentration of the enzyme at which enzyme attains half of the maximum velocity
- (2) Concentration of the substrate at which an enzyme attains maximum velocity
- (3) Concentration of the substrate at which enzymatic reaction attains half of the maximum velocity
- (4) Concentration of the enzyme at which enzymatic reaction attains maximum velocity

167. Identify the zwitterionic form in the given structures of amino acids at different pHs.



Choose the correct option.

- (1) Only A
- (2) Only B
- (3) Both A and C
- (4) Only C

168. A toxin among the following secondary metabolites is

- (1) Morphine
- (2) Concanavalin A
- (3) Vinblastin
- (4) Ricin

169. Fats have A melting point and remain as B at room temperature while oils have C melting point and remain as D at room temperature.

	A	B	C	D
(1)	High	Liquid	Low	Solid
(2)	Low	Liquid	High	Solid
(3)	Low	Solid	High	Liquid
(4)	High	Solid	Low	Liquid

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

170. Which of the following structures is **not** a part of neuron?

- (1) Neuroglia
- (2) Axon
- (3) Dendrite
- (4) Cell body

171. Category of biomolecules which has molecular weight less than 1000 daltons but are present in retentate or acid-insoluble fraction is

- (1) Proteins
- (2) Lipids
- (3) Polysaccharides
- (4) Nucleic acids

172. How many of the following are chemically proteins?

Collagen, Trypsin, Insulin, Antibody, Receptor, GLUT-4
--

Select the correct option.

- (1) Four
- (2) Six
- (3) Five
- (4) One

173. The direct property found in muscle fibres but absent in nerve fibres, enabling muscle fibers to shorten is

- (1) Conductivity
- (2) Contractility
- (3) Excitability
- (4) Ability to provide insulation

174. Which of the following inhibitor is used in competitive inhibition of succinic dehydrogenase?

- (1) Malate
- (2) Sulpha drugs
- (3) Citrate
- (4) Malonate

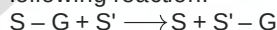
175. The chemical and physical properties of amino acids are essentially because of the

- (1) R functional groups only
- (2) R functional group and carboxyl groups only
- (3) R functional group and amino groups only
- (4) Amino group, carboxyl group and the R functional group

176. Which of the following elements is present in higher concentration in the human body than in the Earth's crust?

- (1) Magnesium
- (2) Calcium
- (3) Oxygen
- (4) Sodium

177. Select the class of enzymes involved in the following reaction.



- (1) Ligases
- (2) Oxidoreductases
- (3) Hydrolases
- (4) Transferases

178. Muscle whose functioning can be consciously controlled is present in the

- (1) Wall of heart
- (2) Wall of internal visceral organs
- (3) Arm and forearm
- (4) All striated muscles

179. Type of specialized connective tissue present in the tip of nose in humans is

- (1) Bone
- (2) Dense regular
- (3) Cartilage
- (4) Dense irregular

180. Fibres and fibroblasts are compactly arranged in

- (1) Areolar tissue
- (2) Adipose tissue
- (3) Dense connective tissue
- (4) Loose connective tissue

181. Select the **incorrect** statement.

- (1) Neuroglial cells make up more than one half of the volume of neural tissue in our body
- (2) Neuroglial cells protect and support neurons
- (3) Electrical disturbance in neural tissue travels along the length of plasma membrane of neuroglial cells
- (4) Dendrites carry nerve impulses towards the cell body

182. Choose the statement which is incorrect w.r.t the living state:

- (1) It is an equilibrium steady-state.
- (2) Living state and metabolism are synonymous.
- (3) Metabolism provides a mechanism for the production of energy.
- (4) Living process is a constant effort to prevent falling into equilibrium.

183. The dry surface of the skin and the moist surface of buccal cavity lined by

- (1) Adipose tissue
- (2) Specialized connective tissue
- (3) Compound epithelial tissue
- (4) Simple epithelial tissue

184. Which of the following cell junctions permits the passage of ions between adjacent cells?

- (1) Tight junction
- (2) Adhering junction
- (3) Gap junction
- (4) Zonula occludens

185. The cells secreting the fibres of structural proteins are absent in

- (1) Areolar tissue
- (2) Blood
- (3) Adipose tissue
- (4) Tendon

#### SECTION-B

186. The excess of nutrients that are **not** used immediately are mainly stored in

- (1) Areolar connective tissue
- (2) Adipose connective tissue
- (3) Dense regular connective tissue
- (4) Dense irregular connective tissue

187. All of the following are nucleosides, **except**

- (1) Adenosine
- (2) Guanosine
- (3) Cytosine
- (4) Thymidine

188. Choose the **odd** one w.r.t. homopolymers

- (1) Glycogen
- (2) Cellulose
- (3) Insulin
- (4) Starch

189. Select the option including the compound(s) having both carbonyl and hydroxyl groups.

- (1) Glycerol and Glucose
- (2) Glucose and Fructose
- (3) Lecithin and trihydroxy propane
- (4) Palmitic acid and Adenine

190. Comprehend the statements and choose the option that **correctly** fills the blanks A, B and C.

- (i) Adult human haemoglobin consists of   A   subunits.
- (ii)   B   subunits of  $\alpha$  type and   C   subunits of  $\beta$  type together constitute the adult human haemoglobin.

- (1) A-6, B-3, C-3
- (2) A-4, B-1, C-3
- (3) A-4, B-3, C-1
- (4) A-4, B-2, C-2

191. Read the following statements and select the **correct** option.

**Statement A:** All enzymes are proteinaceous in nature.

**Statement B:** Enzymes majorly exhibit quaternary structures which lack secondary and primary structures in any conditions.

- (1) Both statements A and B are incorrect
- (2) Only statement A is correct
- (3) Only statement B is correct
- (4) Both statements A and B are correct

192. The proteinaceous amino acid in which R-group could be a hydrogen, is

- (1) Lysine
- (2) Serine
- (3) Glycine
- (4) Glutamate

**193.** Read the statements and choose the option that **correctly** fills the blanks A and B.  
The bone cells present in lacunae are called   A  , whereas the cartilage cells present in lacunae are called   B  .

- (1) A-Osteocytes, B-Chondroclasts
- (2) A-Osteoblasts, B-Chondroclasts
- (3) A-Osteocytes, B-Chondrocytes
- (4) A-Osteoclasts, B-Chondroblasts

**194.** How many of the following structures are examples of connective tissue?

Cartilage, Bone, Tendon, Ligament, Neuroglia, Lymph

- (1) Three
- (2) Four
- (3) Five
- (4) Six

**195.** Select the **correct** statement.

- (1) All voluntary muscles are unstripped
- (2) All unstripped muscles are involuntary
- (3) All striped muscles are voluntary
- (4) All involuntary muscles are striped

**196.** All of the following are secreted by mast cells, except

- (1) Histamine
- (2) Heparin
- (3) Serotonin
- (4) Antibodies

**197.** Most enzymes get damaged at high temperatures above 40°C. However, enzymes isolated from organisms who normally live under extremely high temperatures can retain their catalytic power even at high temperatures upto

- (1) 80-90°C
- (2) 140-150°C
- (3) 180-190°C
- (4) 200-210°C

**198.** Fibres of connective tissue do **not** provide

- (1) Strength
- (2) Elasticity
- (3) Excitability
- (4) Flexibility

**199.** The epithelium that plays limited role in secretion and absorption is

- (1) Simple squamous epithelium
- (2) Simple cuboidal epithelium
- (3) Simple columnar epithelium
- (4) Compound epithelium

**200.** Read the following given statements and choose the **correct** option w.r.t. chemical analysis of living tissue.

**Statement A:** Retentate is the acid-soluble fraction.

**Statement B:** Filtrate is the acid-insoluble fraction.

- (1) Both statements are incorrect
- (2) Both statements are correct
- (3) Only statement A is correct
- (4) Only statement B is correct