MHT CET 2026 PCB Apr 26 Shift 1 Question Paper

Conducted by the State Common Entrance Test Cell, Maharashtra

Time Allowed: 180 Minutes **Total Questions: 200** **Maximum Marks: 200**

General Instructions

(i) This **PCB** paper is from **MHT CET 2026**, conducted by the **State Common Entrance Test Cell, Maharashtra**.

(ii) Answer all **200 multiple choice questions**: **50 Physics**, **50 Chemistry** and **100 Biology**.

(iii) Each question offers **four choices**, with **one correct answer**.

(iv) Allow **90 minutes for Physics and Chemistry together**, followed by **90 minutes for Biology**. The first group closes before the second opens.

(v) Every correct answer earns **1 mark**.

(vi) There is **no negative marking**. Unanswered questions score zero.

1. If $\vec{A} = \vec{B} + \vec{C}$ and magnitudes of $\vec{A}, \vec{B}$ and $\vec{C}$ are 5, 4 and 3 units respectively. The angle between $\vec{A}$ and $\vec{C}$ is

(A) $\left(\frac{\pi}{2}\right)^c$ (B) $\cos^{-1}(4/5)$

(C) $\sin^{-1}(3/4)$ (D) $\cos^{-1}(3/5)$

2. A body travels uniformly a distance of (20 ± 0.2) m in a time (4.0 ± 0.4) s. The percentage error in the value of velocity is

(A) 8 % (B) 11 %

(C) 4 % (D) 16 %

3. A particle is projected at 60° to the horizontal with kinetic energy 'K'. The kinetic energy at the highest point is $\left(\cos 60^0 = \frac{1}{2}\right)$

(A) K (B) $\frac{K}{\sqrt{2}}$

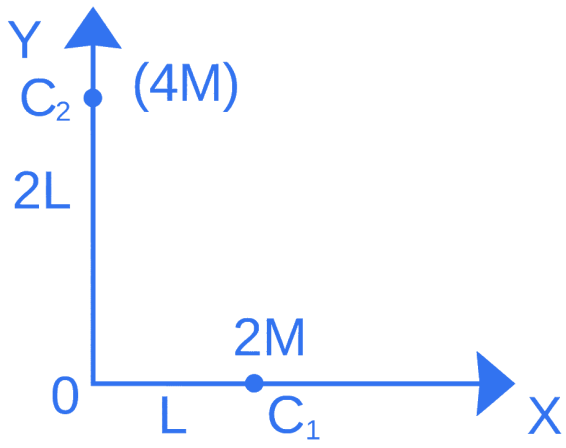
(C) $\frac{K}{2}$ (D) $\frac{K}{4}$

4. A cord is wound round the circumference of wheel of radius r. The axis of the wheel is horizontal and moment of inertia about it is I. A weight mg is attached to the end of the cord and falls from rest. After falling through a distance h, the angular velocity of the wheel will be

(A) $\sqrt{2gh}$ (B) $\left[\frac{2mgh}{I+2mr^2}\right]^{\frac{1}{2}}$

(C) $\left[\frac{2mgh}{I+mr^2}\right]^{\frac{1}{2}}$ (D) $\left[\frac{2gh}{I+2mr}\right]^{\frac{1}{2}}$

5. A composite system of two uniform rods of same metal are shown in the figure. Lengths of rods are as shown in figure. The co-ordinates of the centre of mass of the system of rods are



(A) $\left(\frac{L}{6}, \frac{4L}{3}\right)$ (B) $\left(\frac{L}{6}, \frac{2L}{3}\right)$

(C) $\left(\frac{L}{3}, \frac{2L}{3}\right)$ (D) $\left(\frac{L}{4}, \frac{2L}{3}\right)$

6. 10,000 small balls each weighing 1 gram strike 1 cm^2 area per second with a velocity 100 m/s in a normal direction and rebound with the same velocity. The value of pressure on the surface will be

(A) 2×10^3 N/m^2 (B) 2×10^5 N/m^2

(C) 10^7 N/m^2 (D) 2×10^7 N/m^2

7. Moment of inertia of a disc about its own axis is I. Its moment of inertia about a tangential axis in its plane is

(A) $2I$ (B) $\frac{3I}{2}$

(C) $3I$ (D) $\frac{5I}{2}$

8. A disc has mass 'M' and radius 'R'. The axis of rotation passes through a point P in the plane of the disc, which is at a distance 'x' $(x < R)$ from the center of the disc and perpendicular to the plane of the disc. M.I. of disc about the axis of rotation is found to be MR^2. The value of 'x' is

(A) $2R$ (B) $\sqrt{2}\,R$

(C) $\frac{R}{\sqrt{2}}$ (D) $\frac{R}{2}$

9. By how many times the energy of a satellite has to be increased to shift it from an orbit of radius 'r' to $\frac{5}{2}r$?

(A) 0.6 times (B) 0.8 times

(C) 0.4 times (D) 0.3 times

10. The excess pressure inside a spherical drop of water is four times the other drop of water. Their respective mass ratio is

(A) 1 : 4 (B) 8 : 1

(C) 1 : 64 (D) 1 : 16

11. A tank of height 'A' is completely filled with water. A hole is made on one side of the wall at a depth 'b' below the water surface. The distance from the bottom of the wall at which the emerging stream of water strikes the surface of floor is

(A) $5\sqrt{b(A-b)}$ (B) $4\sqrt{b(A-b)}$

(C) $3\sqrt{b(A-b)}$ (D) $2\sqrt{b(A-b)}$

12. In case of liquid flowing on horizontal surface the flow of liquid becomes unsteady, when Reynolds number R_n is

(A) less than 499 (B) between 500 to 999

(C) between 1000 to 2000 (D) greater than 2001

13. A cylindrical rod with one end in a steam chamber and the other end in ice results in melting of 0.1 gram of ice per second. If the rod is replaced by another with half the length and double the radius of the first, the thermal conductivity of the material of second rod is $\left(\frac{1}{4}\right)^{th}$ that of first, the rate at which ice melts in gram per second will be (Latent heat of ice = 80 cal/g)

(A) 3.2 (B) 1.6

(C) 0.2 (D) 0.1

14. In thermodynamic processes, which one of the following statements is 'NOT' correct ?

(A) In an isothermal process, temperature remains constant.

(B) In an adiabatic process, Pv^{γ} = constant.

(C) In an isochoric process, pressure remains constant.

(D) In an adiabatic process, there is no exchange of heat with the surroundings.

15. A gas for which $\gamma = 5/3$ ($\gamma = C_p/C_v$) is heated at constant pressure. The percentage of heat supplied used for external work is

(A) 20 % (B) 40 %

(C) 60 % (D) 80 %

16. Two litre of an ideal gas at 42°C is heated at a constant pressure to 357°C. Then the final volume is

(A) 6L (B) 2L

(C) 4L (D) 3.5 L

17. The temperature at which the mean kinetic energy of the molecules of gas is $\left(\frac{1}{4}\right)^{th}$ of the mean kinetic energy of its molecules at 147°C is

(A) 105 K (B) −147 K

(C) 173°C (D) −105°C

18. If the maximum velocity in S.H.M. is 'V' then the average velocity during motion from one extreme to other extreme position will be

(A) $\frac{V}{\pi}$ (B) $\frac{2V}{\pi}$

(C) $\frac{4V}{\pi}$ (D) $\frac{8V}{\pi}$

19. The average acceleration of a particle performing S.H.M. over two complete oscillations is (A = amplitude, ω = angular frequency)

(A) $\frac{A\omega^2}{2}$ (B) zero

(C) $A\omega^2$ (D) $2A\omega^2$

20. Two uniform strings X and Y made of same material made to vibrate under same tension. If the second overtone of string X is equal to the third overtone of string Y and the radius of string X is thrice that of string Y. The ratio of length of string X to that of Y is

(A) 1 : 8 (B) 1 : 6

(C) 1 : 3 (D) 1 : 4

21. Three waves of equal frequency having amplitudes 13 μm, 6 μm, 5 μm arrive at a given point with successive phase difference of $\pi/2$. The amplitude of the resultant wave is (in μm) ($\cos 90^\circ = 0$, $\cos \pi = -1$)

(A) 15 (B) 10

(C) 8 (D) 4

22. A simple harmonic progressive wave is represented as $Y = 0.04 \sin \pi(2t - 0.02x)$ m. At a given instant of time, the phase difference between two particles 10 m apart is (in radian)

(A) π (B) $\frac{\pi}{2}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{5}$

23. A progressive wave is given by $Y = 6 \sin(3t - 2x)$ m. On this wave, how far away are the two points having phase difference of 45° ?

(A) $\frac{\pi}{16}$m (B) $\frac{\pi}{8}$m

(C) $\frac{\pi}{4}$m (D) $\frac{\pi}{2}$m

24. The source is emitting sound of frequency 'n'. A source and a listener both are moving towards each other with a speed equal to $\left(\frac{V}{3}\right)$, where V is the speed of sound. The frequency heard by the listener will be

(A) $\frac{n}{3}$ (B) $\frac{n}{2}$

(C) $2n$ (D) $3n$

25. The electric potential 'V' as a function of distance x (in metre) is $V = 4x^2 + 6x - 8$ volt. Electric field at $x = 2$ m is

(A) -11 V/m (B) -22 V/m

(C) -16 Vm (D) -8 V/m

26. Two charges q_1 and q_2 are separated with distance 'd' and placed in a medium of dielectric constant 'k'. The equivalent distance between charges in air for the same electrostatic force is

(A) $\frac{d}{\sqrt{k}}$ (B) $\sqrt{\frac{k}{d}}$

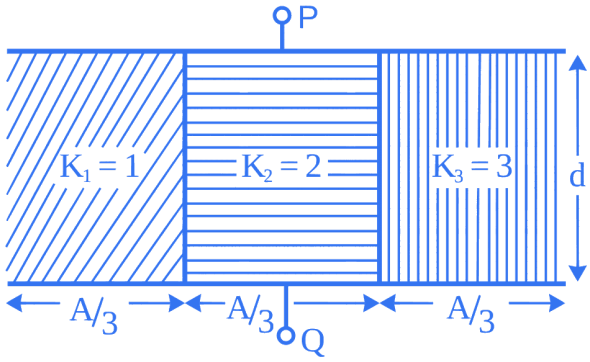
(C) $d\sqrt{k}$ (D) $k\sqrt{d}$

27. Assume that the electric field $\vec{E} = 30x^2\hat{i}$ exists in space. Then the potential difference $V_A - V_O$, where 'V_O' is the potential at the origin and 'V_A' is the potential at $x = 2$ m, is

(A) -120 V (B) 80 V

(C) 120 V (D) -80 V

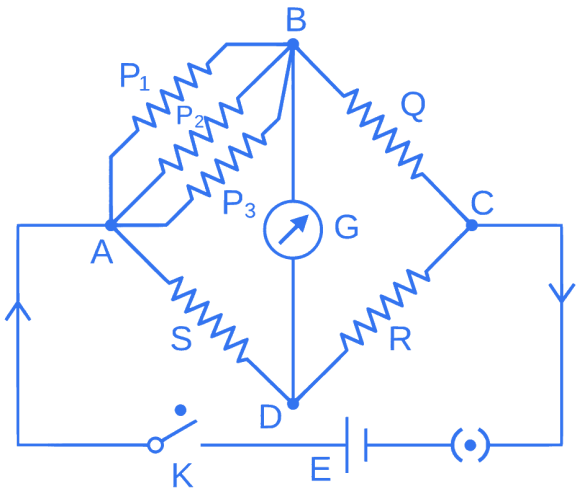
28. The equivalent capacitance between 'P' and 'Q' is [A-area of each plate, d-separation between the plates, ϵ_0 -permittivity of free space]



(A) $\frac{A\epsilon_0}{d}$ (B) $\frac{2A\epsilon_0}{d}$

(C) $\frac{3A\epsilon_0}{d}$ (D) $\frac{4A\epsilon_0}{d}$

29. In a Wheatstone's bridge, three resistance 'Q', 'R' and 'S' are connected in three arms and first arm is formed by three resistances 'P_1', 'P_2' and 'P_3' in parallel. The condition for the bridge to be balanced is



(A) $\frac{P_1P_2P_3/(P_1P_2+P_2P_3)}{Q} = \frac{S}{R}$

(B) $\frac{P_1P_2P_3/(P_2P_3+P_1P_3+P_1P_2)}{Q} = \frac{S}{R}$

(C) $\frac{P_1P_2P_3/(P_2P_3+P_1P_3+P_1P_2)}{Q} = \frac{R}{S}$

(D) $\frac{P_1P_3+P_1P_2}{P_1P_2P_3Q} = \frac{S}{R}$

30. A galvanometer can be converted into a voltmeter of certain range by connecting a resistance of 990 Ω in series with it. When the resistance of 480 Ω is connected in series, the range is halved. The resistance of the galvanometer is

(A) 20 Ω (B) 30 Ω

(C) 40 Ω (D) 50 Ω

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31. A circular coil having 'n' turns, each of radius 'r' carries a current 'I'. The magnetic field at a distance $x = \sqrt{8}\,r$ from its centre along axis of the coil is (μ_0 = permeability of free space)

(A) $\frac{\mu_0 nI}{54\,r}$ (B) $\frac{\mu_0 nI}{27\,r}$

(C) $\frac{\mu_0 nI}{64\,r}$ (D) $\frac{\mu_0 nI}{36\,r}$

32. The magnitude of the magnetic induction (B) at a point on the axis at a large distance 'r' from the centre of a circular coil of 'n' turns and area 'A' carrying current ' i ' is given by $x \times 10^{-7}$ SI unit. The value of x is ($\mu_0 = 4\pi \times 10^{-7}$ SI unit)

(A) $\frac{niA}{r^3}$ (B) $\frac{2niA}{r^3}$

(C) $\frac{2ni}{Ar^3}$ (D) $\frac{nA}{ir^3}$

33. A magnetizing field of 10^3 A/m produces a magnetic flux density 4π T in an iron rod. The relative permeability of the rod will be (permeability of free space $\mu_0 = 4\pi \times 10^{-7}$ SI units)

(A) 10^4 (B) 10^5

(C) 10^3 (D) 10^6

34. In an a.c. generator, a rectangular coil of 1000 turns each having area $\frac{10^{-2}}{\pi}$ m^2 is rotated at 180 r.p.m. about an axis perpendicular to a uniform magnetic field of magnitude 2 T. The maximum value of e.m.f. produced will be

(A) 60 V (B) 120 V

(C) 180 V (D) 200 V

35. The value of mutual inductance of two coils is 6 mH. The current in one of the coil changes from 7 A to 2 A in 0.2 second, so that e.m.f. is induced in the other coil. If the resistance of the coil is 6 Ω, the value of induced charge passing through the coil is

(A) 3 mC (B) 5 mC

(C) 7 mC (D) 9 mC

36. A series LCR circuit is connected to a source of alternating e.m.f. of 50 V. The potential difference across inductor and capacitor is 80 V and 50 V respectively. The potential difference across the resistor is

(A) 80 V (B) 70 V

(C) 50 V (D) 40 V

37. A step down transformer connected to an a.c. mains of 220 V is made to operate at 5.5 V, 44 W lamp. The current in the primary circuit is (Ignore power losses)

(A) 0.22 A (B) 0.4 A

(C) 0.2 A (D) 0.25 A

38. In a series LCR circuit $R = X_L = 2X_C$. The impedance of the circuit and phase difference between 'V' and 'I' respectively will be

(A) $\frac{R}{2}, \tan^{-1}(0.5)$ (B) $\frac{\sqrt{5}}{2}\,R, \tan^{-1}(0.5)$

(C) $\frac{\sqrt{5}}{2}\,R, \tan^{-1}(0.2)$ (D) $\frac{R}{2}, \tan^{-1}(0.2)$

39. In an AC circuit, the current is $I = 100\sin(5t)$ A. The value of I_{rms} is

(A) zero A (B) $50\sqrt{2}$ A

(C) 25 A (D) $25\sqrt{2}$ A

40. The Brewster's angle for the air-glass interface is $(54.74)^\circ$. If a ray of light going from air to glass strikes at an angle of incidence 45°, then the angle of refraction is
$\left(\tan(54.74)^\circ = \sqrt{2},\ \sin 45 = 1/\sqrt{2}\right)$

(A) $\sin^{-1}(\sqrt{2})$ (B) $\sin^{-1}\left(\frac{1}{2}\right)$

(C) $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$ (D) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

41. A beam of white light is allowed to pass through convex lens parallel to principal axis, the different colours of light converge at different points on the principal axis after refraction. This is called

(A) spherical aberration (B) polarisation

(C) scattering (D) chromatic aberration

42. A circular beam of light having diameter 'd' falls on a plane liquid surface from air. The angle of incidence is 45° and refractive index of liquid is 'n'. The diameter of the refracted beam is
$\left(\cos 45^0 = 1/\sqrt{2},\ \sin 45^0 = 1/\sqrt{2}\right)$

(A) $(2n^2 - 1)d$ (B) $\frac{\sqrt{2n^2-1}}{n}\,d$

(C) d (D) $\frac{\sqrt{n^2-1}}{n}\,d$

43. In the Young's double slit experiment, the intensity of light at a point on the screen where the path difference is λ is 'K', λ being the wavelength of light used. The intensity at a point where path difference is $\frac{\lambda}{6}$ will be $\left[\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}\right]$

(A) $\frac{K}{6}$ (B) $\frac{K}{4}$

(C) $\frac{K}{2}$ (D) $\frac{3K}{4}$

44. An electron of mass m and charge e initially at rest gets accelerated by a constant electric field E. The de-Broglie wavelength of the electron at time t is (h = Planck's constant)

(A) $\frac{h}{eEt}$ (B) $\frac{eEt}{h}$

(C) $\frac{eE}{ht}$ (D) $\frac{ht}{eE}$

45. The wavelength λ_e of an electron and λ_P of a photon of same energy E are related as

(A) $\lambda_P \alpha \sqrt{\lambda_e}$ (B) $\lambda_P \alpha \frac{1}{\lambda_e}$

(C) $\lambda_P \alpha \lambda_e^2$ (D) $\lambda_P \alpha \lambda_e$

46. The angular momentum of an electron in Bohr's hydrogen atom having energy -0.544 eV is (h = Planck's constant)

(A) $\frac{7h}{2\pi}$ (B) $\frac{5h}{2\pi}$

(C) $\frac{3h}{\pi}$ (D) $\frac{h}{\pi}$

47. The wavelength of radiation emitted is 'λ' when an electron jumps from second to first orbit of hydrogen atom. For the electron to jump from third to first orbit of hydrogen atom, the wavelength of radiation emitted will be

(A) $\frac{16}{25}\lambda$ (B) $\frac{9}{16}\lambda$

(C) $\frac{27}{32}\lambda$ (D) $\frac{20}{27}\lambda$

48. For two inputs A and B and output Y, the Boolean expression for NOR gate is

(A) $Y = \overline{A \cdot B}$ (B) $Y = A \cdot \overline{B}$

(C) $Y = \overline{A + B}$ (D) $Y = \overline{A} + B$

49. Out of the following what is used to detect the intensity of light ?

(A) LED in forward bias. (B) Photodiode in forward bias.

(C) LED in reverse bias. (D) Photodiode in reverse bias

50. For an n-type semiconductor, the relation between the number density 'n_h' and 'n_e' is

(A) $n_e = n_h$ (B) $n_h << n_e$

(C) $n_h >> n_e$ (D) $n_h = n_e = 0$

51. A coordination complex contains 2.6 % of Mg. Find the number of Mg atoms in 5.0 g of this sample.
(gram atomic mass of Mg = 24 g)

(A) 1.5×10^{21} (B) 3.26×10^{21}
(C) 2.82×10^{21} (D) 4.3×10^{21}

52. How many total number of s and p electrons are respectively present in Cl^- ?

(A) 6 and 11 (B) 6 and 12
(C) 2 and 7 (D) 11 and 6

53. Which of the following molecules shows sp^3d hybridisation?

(A) PCl_5 (B) SO_2
(C) BF_3 (D) CO_2

54. The volume occupied by a given mass of gas at 298 K is 35 mL at 1 atmospheric pressure. Calculate the volume of the gas if pressure is decreased to 0.75 atmosphere at constant temperature.

(A) 46.66 mL (B) 42.7 mL
(C) 50.2 mL (D) 49.2 mL

55. Calculate ΔH for a reaction, $2X_{(g)} + Y_{(g)} \rightarrow 2Z_{(g)}$ at 298 K if $\Delta U = -10.5$ kJ and $R = 8.314$ J K^{-1} mol^{-1}.

(A) -14.45 kJ (B) -12.98 kJ
(C) 10.50 kJ (D) 11.00 kJ

56. What is the enthalpy of formation of HF if bond enthalpies of H-H, F-F and H-F bonds are 434 kJ/mol, 158 kJ/mol and 565 kJ/mol respectively. ?

(A) -267 kJ/mol (B) -269 kJ/mol
(C) -271 kJ/mol (D) -276 kJ/mol

57. The relationship between ΔH and ΔU for the reaction, $PCl_3(g) + Cl_2(g) \rightarrow PCl_5(g)$ is given as

(A) $\Delta H = \Delta U + 2RT$ (B) $\Delta H = \Delta U - 2RT$
(C) $\Delta H = \Delta U + RT$ (D) $\Delta H = \Delta U - RT$

58. Calculate the solubility product of $Ca(OH)_2$ if solubility of it is $\sqrt{3}$ mol dm^{-3} at 25°C.

(A) 3 (B) $3\sqrt{3}$
(C) 27 (D) $12\sqrt{3}$

59. What amount of NaOH should be dissolved in a 500 mL solution, so that the p^H of solution is 12 at 298 K ?

(A) 1 g (B) 2 g
(C) 0.2 g (D) 0.4 g

60. Which from the following is Lewis base?

(A) $AlCl_3$ (B) BF_3
(C) H_2O (D) H^+

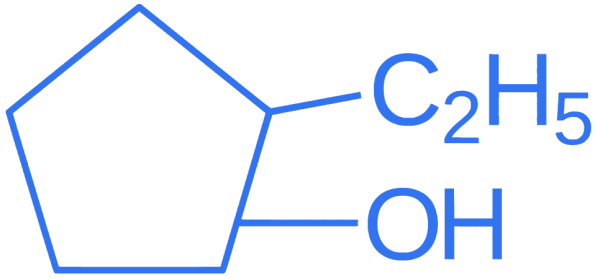
61. Consider the following compounds :
$\underline{K}O_2, H_2\underline{O}_2$ and $H_2\underline{S}O_4$
The oxidation state of the underlined elements in them are respectively,

(A) $+1, -2$ and $+4$ (B) $+4, -4$ and $+6$
(C) $+1, -1$ and $+6$ (D) $+2, -2$ and $+6$

62. Identify the oxide used as CO_2 adsorbent and oxygen generator from following.

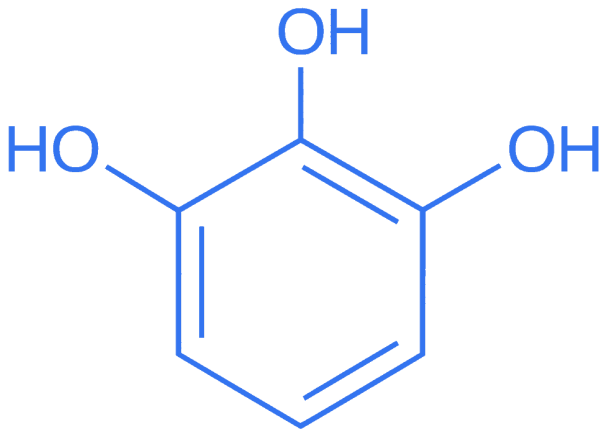
(A) Na_2O (B) Na_2O_2
(C) K_2O (D) KO_2

63. The IUPAC name of compound



(A) 2-Ethylpentanol (B) 2-Ethylpentanal
(C) 2-Ethylcyclopentanol (D) Heptan-1-ol

64. What is IUPAC name of the following organic compound?



(A) Benzene-1,2,3-triol
(B) Benzene-1,5,6-triol
(C) Benzene-1,3,5-triol
(D) Benzene-2,3,4-triol

65. Aldehydes and Ketones can be converted to alkanes using
(A). $LiAlH_4$/ H_3O^+
(B). Zn-Hg/ conc^n HCl
(C). NH_2-NH_2 / KOH in ethylene glycol
(D). $K_2Cr_2O_7$/ dil.H_2SO_4

(A) (A), (B) and (D) only.
(B) (A) and (C) only.
(C) (B) and (C) only.
(D) (A), (C) and (D) only.

66. Palladised charcoal with quinoline is known as

(A) Lucas reagent
(B) Lindlar's catalyst
(C) Lindane catalyst
(D) Tollens' reagent

67. Which of the following is NOT a principle of green chemistry?

(A) Safer Solvents and Auxiliaries
(B) Design for Energy Efficiency
(C) Atom Economy
(D) Hazardous Chemical Synthesis

68. An organic halogen compound which is used as refrigerant in refrigerators and air conditioners is

(A) BHC
(B) CCl_4
(C) CCl_2F_2
(D) $CHCl_3$

69. A compound is formed by two elements X and Y. The atoms of element Y form a hcp structure. The atoms of element X occupy 1/3 of octahedral voids. What is the formula of a compound?

(A) XY_3
(B) XY
(C) X_2Y
(D) X_2Y_3

70. Elements A and B combine to form the ionic compound A_xB_y. The anions of B are arranged in hcp array and the cations of A occupy all the octahedral voids. Determine the values of x and y.

(A) $x = 1$ and $y = 1$
(B) $x = 2$ and $y = 1$
(C) $x = 1$ and $y = 2$
(D) $x = 1$ and $y = 3$

71. What is the packing efficiency of a metal crystal if it crystallizes in a face centered cubic lattice ?

(A) 52.4%
(B) 68.0%
(C) 74.0%
(D) 60.0%

72. The osmotic pressure of barium chloride and glucose solution of the same concentration at the same temperature are respectively 0.62 atm and 0.24 atm. Calculate the van't Hoff factor of barium chloride.

(A) 2.58
(B) 2.46
(C) 2.15
(D) 2.84

73. Find the osmotic pressure of 10% (w/v) solution of sucrose at 27°C. (Molar mass of sucrose = 342 g/mol)

(A) 3.46 atm
(B) 5.87 atm
(C) 7.20 atm
(D) 8.79 atm

74. Which of the following aqueous solutions exhibits maximum freezing point depression assuming complete dissociation?

(A) 0.1 m Li_2SO_4.
(B) 0.5 m KCl.
(C) 0.05 m $Al_2(SO_4)_3$.
(D) 0.2 m $BaCl_2$.

75. Calculate the conductivity of 0.025 M $BaCl_2$ solution if the molar conductivity of salt at 25°C is 325 Ω^{-1} cm^2 mol^{-1}.

(A) $8.125 \times 10^{-2}\ \Omega^{-1}cm^{-1}$
(B) $8.125 \times 10^{-3}\ \Omega^{-1}cm^{-1}$
(C) $7.6923 \times 10^{-2}\ \Omega^{-1}cm^{-1}$
(D) $8.372 \times 10^{-2}\ \Omega^{-1}cm^{-1}$

76. Find the mass of Zn metal deposited at the cathode during the passage of 10 amperes current through its salt solution for 10 minutes. [Molar mass of Zn $= 65.4$ g mol^{-1} & For the reaction of Zn, mole ratio $= 1/2$]

(A) 1.0 g (B) 2.0 g
(C) 3.0 g (D) 4.0 g

77. Which of the following types of cells is used for electroplating?

(A) Mercury battery (B) Leclanche' cell
(C) Electrolytic cell (D) Fuel cell

78. The decomposition of $N_2O_{5(g)}$ occurs as: $2\,N_2O_{5(g)} \rightarrow 4\,NO_{2(g)} + O_{2(g)}$.
If initial concentration of $N_2O_{5(g)}$ is 1.63×10^{-2} mol L^{-1} and after 400 seconds it is 1.36×10^{-2} mol L^{-1}, calculate the rate of reaction.

(A) 3.38×10^{-6} mol L^{-1} s^{-1}
(B) 2.25×10^{-6} mol L^{-1} s^{-1}
(C) 1.78×10^{-6} mol L^{-1} s^{-1}
(D) 3.0×10^{-6} mol L^{-1} s^{-1}

79. For a first order reaction, (A) $\rightarrow$ Products, the concentration of A changes from 0.1 M to 0.025 M in 40 minutes. The rate of reaction when the concentration of A is 0.01 M is

(A) 3.47×10^{-4} M/min (B) 3.47×10^{-5} M/min
(C) 1.73×10^{-4} M/min (D) 1.73×10^{-5} M/min

80. For the reaction
$C_2H_5Br_{(l)} \rightarrow C_2H_{4(g)} + HBr$, $r = K(C_2H_5Br)$
What is order and molecularity of the reaction respectively ?

(A) $1, 2$ (B) $2, 1$
(C) $2, 2$ (D) $1, 1$

81. Identify a phenomenon from the following that the oxygen gas molecules accumulate on the surface of tungsten by means of chemical bonds.

(A) Physisorption (B) Chemisorption
(C) Sorption (D) Desorption

82. Which from following gases when absorbed by concentrated sulphuric acid forms oleum ?

(A) SO_3 (B) Cl_2
(C) N_2O (D) Br_2

83. Which of the following is existing oxoacid of fluorine?

(A) HFO (B) HFO_2
(C) HFO_3 (D) HFO_4

84. Identify inner transition element from following.

(A) Sm (B) Pd
(C) Cd (D) Au

85. Lanthanoide series (15 elements) starts from which of the following element?

(A) Actinium (Ac) (B) Cerium (Ce)
(C) Lanthanum (La) (D) Thorium (Th)

86. The IUPAC name of $[CoCl(NH_3)_5]Cl_2$ is:

(A) Pentaamminechlorocobalt(III) chloride
(B) Pentaamminecobalt(III) chloride
(C) Pentaamminechlorocobalt(II) chloride
(D) Chloropentaamminecobalt(III) dichloride

87. What is coordination number of central metal ion in cisplatin ?

(A) 2 (B) 4
(C) 6 (D) 8

88. Chlorobenzene reacts with Mg in dry ether to give a compound A, which further reacts with ethanol to give B. Identify B.

(A) Phenol (B) Benzene
(C) Ethyl benzene (D) Phenyl ether

89. Identify best method for preparation of Alkyl fluoride from following

(A) Finkelstein reaction (B) Swartz reaction
(C) Sandmeyer's reaction (D) Wurtz reaction

90. Base catalyzed aldol condensation occurs with

(A) 2,2-dimethyl propanal (B) Propanal
(C) Benzaldehyde (D) 2,2-dimethyl propanal and Benzaldehyde

91. What type of compound the aniline is?

(A) 2^0 and aliphatic (B) 1^0 and aliphatic
(C) 2^0 and aromatic (D) 1^0 and aromatic

92. Which of the following is least alkaline ?

(A) O_2N-C_6H_4-NH_2 (B) CH_3O-C_6H_4-NH_2

(C) $C_6H_5C_6H_4$-NH_2 (D) $C_6H_5NH_2$

93. Which of the following compounds is converted to sulfanilic acid by sulfonation?

(A) Benzene

(B) N-Methylmethanamine

(C) Aniline

(D) Phenol.

94. IN a chemical reaction Aniline is treated with $NaNO_2$ and HCl to form a compound X. When X is further hydrolyzed by supplying heat it forms compound Z. Identify Z in this reaction.

(A) Ar-OH (B) Ar-NO_2

(C) Ar-Cl (D) Ar-COOH

95. Identify the activity of ammonia due to the presence of lone pair of electrons in it, from following.

(A) Act as a Lewis acid (B) Act as a Lewis base

(C) Act as a reducing agent (D) Act as an oxidizing agent

96. Identify the product formed when glucose is treated with dil. HNO_3.

(A) Saccharic acid (B) Oxalic acid

(C) Gluconic acid (D) Malonic acid

97. Which of the following is non reducing sugar?

(A) Fructose (B) Maltose

(C) Sucrose (D) Lactose

98. Identify the biodegradable polymer from the following:

(A) Nylon-2-Nylon-6 (B) PVC

(C) Polyethylene (D) Teflon

99. The starting material used for the preparation of Dacron is

(A) ε - caprolactam (B) Ethylene molecules

(C) Ethylene glycol and terephthalic acid (D) Isoprene

100. Identify the chemical used to slow down the browning action of cut fruit.

(A) SO_3 (B) SO_2

(C) H_2SO_4 (D) Na_2CO_3

101. A nervous system is lacking in _____

(A) gorilla
(B) cockroach
(C) *Hydra*
(D) sponges

102. Given below are two statements:
Statement I - Gemmule is an internal bud formed in the body of coelenterate.
Statement II - The amoebocytes of the gemmule form protective covering membrane on the outer-side.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

103. Which one of the following is INCORRECT about root hairs?

(A) They are cytoplasmic extensions of epiblema cells.
(B) They are unbranched.
(C) They are very delicate.
(D) They are permanent.

104. Given below are two statements about guard cells of stomata in plants.
Statement I - In monocotyledonous plants, guard cells are usually dumbbell shaped.
Statement II - In *Cyperus*, a monocot plant, the guard cells are also kidney shaped.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

105. Complete the following equation :
$ADP + ip + ? - K\ cal \rightarrow ATP$

(A) 6.5
(B) 7.0
(C) 7.3
(D) 8.3

106. Match the types of biomolecules given in Column I with their types or characters given in Column II.

Column- I	**Column- II**
A) Amylose	I) Disaccharide
B) Fructose	II) Simple lipid
C) Maltose	III) Starch
D) Wax	IV) Fruit sugar

Choose the correct option.

(A) A - III, B - I, C - IV, D - II
(B) A - III, B - IV, C - I, D - II
(C) A - III, B - II, C - I, D - IV
(D) A - II, B - I, C - IV, D - III

107. Match the types of biomolecules given in Column I with their examples given in Column II.

Column- I	**Column- II**
A) Simple lipid	I) Oleic acid
B) Derived lipid	II) Palmitic acid
C) Unsaturated fatty acid	III) Wax
D) Saturated fatty acid	IV) Sterol

Choose the correct option.

(A) A - II, B - III, C - I, D - IV
(B) A - III, B - IV, C - II, D - I
(C) A - III, B - IV, C - I, D - II
(D) A - II, B - IV, C - III, D - I

108. During cell division, spindle fibres get attached at _____.

(A) SAT body
(B) Secondary constriction
(C) Chromatids
(D) Kinetochore

109. The value of root pressure is about _____ to _____ bars which is enough to pump water to a height of 10 to 20 meters in plants.

(A) $+1$ to $+2$
(B) $+10$ to $+20$
(C) -1 to -2
(D) -10 to -20

110. Which one of the following does NOT favour absorption of water in plants?

(A) Low concentration of solutes in soil water.
(B) Increased transpiration rates.
(C) Presence of capillary water.
(D) Poorly aerated soil.

111. Water can easily rise in capillaries due to the following EXCEPT _____.

(A) high surface tension
(B) high specific heat
(C) high adhesive force
(D) high cohesive force

112. The process of separation of amino group from amino acid is called _____.

(A) amidation
(B) denitrification
(C) deamination
(D) denaturation

113. Which one of the following elements is relatively immobile in plants?

(A) Sulphur
(B) Nitrogen
(C) Magnesium
(D) Potassium

114. Which one of the following is NOT a trace element in plants?

(A) Magnesium
(B) Copper
(C) Cobalt
(D) Chlorine

115. Given below are two statements regarding nitrogen fixation in plants.
Statement I - Nitrogen fixing bacteria use high energy to fix each molecule of nitrogen to form ammonia, which is an exothermic reaction.
Statement II - Chemoautotrophic bacteria obtain energy during nitrification of ammonia into nitrate, which is an endothermic reaction.
In the light of the above statements, select the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

116. Select the set of correct statements regarding ETS in aerobic respiration.
A. F_1 catalyses the synthesis of ATP from ADP.
B. Protons are channeled from outer chamber of mitochondria into inner chamber by F_0 part of oxysome.
C. Cytochrome C acts as mobile electron carrier transferring electrons from Complex V and IV.
D. Cytochrome C is a small, calcium containing protein tightly associated with inner membrane.
E. Cytochrome C acts as mobile electron carrier transferring electrons from complex III to IV.
Select the correct option

(A) A, B and C only
(B) A, C and D only
(C) C and D only
(D) A, B and E only

117. Which one of the following conversion in glycolysis shows formation of water molecules from the substrate?

(A) Fructose 6 phosphate $\rightarrow$ Fructose 1,6 diphosphate
(B) Phosphoenolpyruvate $\rightarrow$ Pyruvic acid
(C) 2 Phosphoglycerate $\rightarrow$ 2 Phosphoenolpyruvate
(D) Glyceraldehyde 3 phosphate $\rightarrow$ 1,3 diphosphoglycerate

118. How many ATP molecules are utilized in the glycolysis of a glucose molecule?

(A) 8
(B) 6
(C) 4
(D) 2

119. Identify the correct sequence of cytochromes involved in ETS.

(A) Cyt $c \rightarrow$ Cyt $bc_1 \rightarrow$ Cyt $a \rightarrow$ Cyt a_3
(B) Cyt $bc_1 \rightarrow$ Cyt $c \rightarrow$ Cyt $a \rightarrow$ Cyt a_3
(C) Cyt $a \rightarrow$ Cyt $c \rightarrow$ Cyt $bc_1 \rightarrow$ Cyt a_3
(D) Cyt $a_3 \rightarrow$ Cyt $c \rightarrow$ Cyt $a \rightarrow$ Cyt bc_1

120. What is the site of Krebs cycle in mitochondria?

(A) Matrix
(B) Outer membrane
(C) Oxysomes
(D) Cristae

121. Match the plant hormones given in Column I with the scientists who isolated them given in Column II.

Column- I	Column- II
A) Auxin	I) Yabuta and Sumiki
B) Gibberellin	II) Denny, Gane and Crocker
C) Cytokinin	III) Kogl and Smit
D) Ethylene	IV) Skoog and Miller

Choose the correct option.

(A) A - III, B - I, C - IV, D - II
(B) A - I, B - III, C - II, D - IV
(C) A - IV, B - II, C - I, D - III
(D) A - IV, B - III, C - II, D - I

122. Accelerated pace of growth is observed in plants during _____.

(A) cell division
(B) cell elongation
(C) cell maturation
(D) cell differentiation

123. How many of the following plants are day neutral plants (DNP)?
Dahlia, Pea, Aster, Tobacco, Wheat, Poppy, Tomato, Cotton, Soybean, Sugarbeet, Cabbage, Maize, Balsam, Spinach

(A) Three
(B) Four
(C) Five
(D) Six

124. Match the type of cells in Column I with their secretion in Column II.

Column- I	Column- II
A) Chief cells	I) Pancreatic juice
B) Acinar cells	II) Bile juice
C) Parietal cells	III) Proenzyme pepsinogen
D) Hepatic cells	IV) Intrinsic factor for absorption of B_{12}

Choose the correct option.

(A) A - II, B - IV, C - III, D - I
(B) A - III, B - I, C - IV, D - II
(C) A - II, B - III, C - IV, D - I
(D) A - I, B - IV, C - III, D - II

125. The three major parts of the stomach are _____

(A) upper cardiac, central body, lower pylorus
(B) upper pylorus, central fundus, lower cardiac
(C) upper cardiac, central pylorus, lower body
(D) upper cardiac, central pylorus, lower fundus.

126. Select the INCORRECT statement regarding digestion in large intestine.

(A) Mucosa does not produce any enzyme.
(B) Carbohydrates are fermented by bacterial action.
(C) Carbohydrate digestion ends in production of indole, skatole and H_2S.
(D) Bacteria synthesize vitamin B and vitamin K

127. Bile is stored in _____.

(A) urinary bladder
(B) gall bladder
(C) colon
(D) caecum

128. Given below are two statements:
Statement I - During digestion, the disaccharides are broken down in the large intestine.
Statement II - Disaccharides are insoluble in water.
In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

129. We can voluntarily change our pattern of breathing because the respiratory centre _____.

(A) in medulla oblongata controls breathing voluntarily
(B) in medulla oblongata has connections with the cerebral cortex
(C) is situated in cerebrum
(D) in medulla oblongata and pons are connected with each other

130. Match the Column- I with Column- II.

Column- I (Disorder)	Column- II (Symptoms)
A) Emphysema	I) Difficulty in breathing, constriction of bronchioles
B) Laryngitis	II) Breakdown of alveoli and shortness of breath.
C) Pneumonia	III) Inflammation of vocal cords and hoarseness of voice.
D) Asthma	IV) Mild to severe inflammation of lungs, fever and chest pain

Choose the correct option.

(A) A - II, B - III, C - IV, D - I
(B) A - II, B - III, C - I, D - IV
(C) A - IV, B - I, C - II, D - III
(D) A - III, B - IV, C - I, D - II

131. Select the INCORRECT statement.

(A) The pCO_2 of blood in pulmonary capillaries is 40 mm Hg before oxygenation.
(B) The pCO_2 of blood entering the pulmonary capillaries is 45 mm Hg.
(C) Oxyhaemoglobin decreases the pH of blood.
(D) Increase in pCO_2 of blood and decrease in pH of blood allows HbO_2 to dissociate, and release O_2 in tissues.

132. With reference to working of heart, complete the analogy.
Pace setter : $\underline{x}$ :: Pacemaker : $y-$

(A) x- AV node y- SA node
(B) x- SA node y- AV node
(C) x- SA node y- Bundle of His
(D) x- Bundle of His y- SA node

133. The blood shed during menstrual phase does NOT clot due to presence of

(A) Zona lysin
(B) thromboplastin
(C) prothrombin
(D) fibrinolysin

134. Serum bilirubin values have diagnostic importance in jaundice because _____

(A) it is produced by break down of haemoglobin.
(B) it is soluble in water.
(C) fat soluble bilirubin is toxic to brain.
(D) it causes acid reflux.

135. Match the type of blood group with the person/s who discovered it and the year of discovery.

Blood group	Discovered by	Year
A. A, B and O	I. Decastello and Sturli	(i) 1902
B. AB	II. Karl Landsteiner	(ii) 1940
C. Rh	III. Landsteiner and Wiener	(iii) 1900

(A) A - II - (iii), B - I - (i), C - III - (ii)
(B) A - I - (i), B - II - (ii), C - III - (iii)
(C) A - II - (iii), B - III - (ii), C- I - (i)
(D) A - I -(ii), B - II - (iii), C - III -(i)

136. Given below are two statements:
Statement I - Granulocytes do not divide after their formation.
Statement II - Agranulocytes can divide by mitosis after their formation.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

137. The aortic arch gives out three arteries viz. _____.

(A) innominate, right common carotid and left subclavian
(B) brachiocephalic, left common carotid and left subclavian
(C) brachiocephalic, left common carotid and right subclavian
(D) innominate, left common carotid and right subclavian

138. Select the INCORRECT statement.
The T.S. of an artery shows _____.

(A) thicker tunica externa and tough layer of collagen fibres
(B) thinner tunica media and wider lumen.
(C) tesselations in the angular margin around the lumen
(D) lack of valves.

139. Number of nephrons in a human being is about _____

(A) Total one million in both the kidneys
(B) One million in each kidney
(C) Total one billion in both the kidneys
(D) One billion in each kidney

140. What is the osmolarity of the primary urine in the cortex of kidney?

(A) 300 m Osmol L^{-1}
(B) 600 m Osmol L^{-1}
(C) 900 m Osmol L^{-1}
(D) 1200 m Osmol L^{-1}

141. Which one of the following is INCORRECT about chronic kidney disease?

(A) It is progressive and generally irreversible.
(B) It happens suddenly after severe bleeding.
(C) There is decline in glomerular filtration rate.
(D) It can be detected by reduced kidney size.

142. Given below are two statements:
Statement I - Renal cortex is the outer, peripheral, red coloured and granular region which contains malpighian bodies, convoluted tubules and blood vessels.
Statement II - Renal medulla is the inner region of the kidney with a pale red colour and striated appearance, which mainly consists of loops of Henle and collecting ducts.
In the light of the above statements, select the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

143. Glial cells which regulate maintenance of Blood Brain Barrier are _____.

(A) ependymal cells
(B) microglia
(C) astrocytes
(D) oligodendrocytes

144. Select the correct statements regarding parasympathetic nervous system.
a) Cranial out flow consists of branches from III, VII, IX and X cranial nerves.
b) Pre-ganglionic fibers are short and post-ganglionic fibers are long.
c) Acetylcholine is produced at the terminal end of pre-ganglionic fibers.
d) It accelerates peristalsis and micturition
e) It controls body activities during fight or flight response.

(A) a and b
(B) b and c
(C) a and d
(D) d and e

145. Organ of Corti is an example of _____

(A) Statoreceptor
(B) Phonoreceptor
(C) Photoreceptor
(D) Mechanoreceptor

146. CSF of the brain is drained out from brain to the outside by _____.

(A) foramen of Luschka and foramen of Magendie
(B) foramen of Monroe and duct of Sylvius
(C) foramen of Luschka and foramen ovalis
(D) foramen ovalis and foramen of Magendie

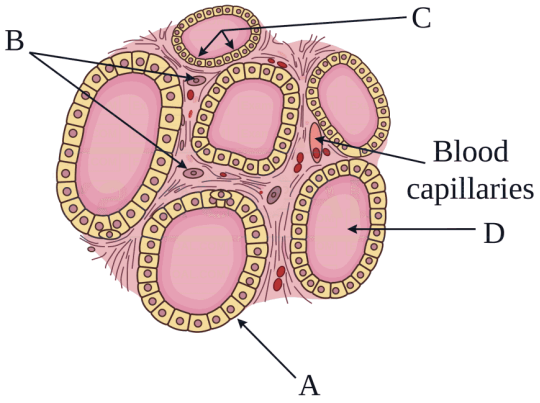
147. Match the pair.

Column- I (Name of Hormone)	**Column- II (Source of secretion)**
A) ADH	I) Juxta glomerular apparatus
B) Erythropoietin	II) Atrial wall of Heart
C) ANP	III) Hypothalamus
D) Renin	IV) Kidney

Choose the correct option.

(A) A - III, B - IV, C - I, D - II
(B) A - III, B - IV, C - II, D - I
(C) A - IV, B - II, C - I, D - III
(D) A - IV, B - II, C - III, D - I

148. In the following diagram, what does A, B, C and D indicate?



(A) A - Parafollicular cells, B - Leydig cells, C - Follicle, D - Colloid

(B) A - Parafollicular cells, B - Stroma, C - Trophoblasts, D - Colloid

(C) A - Follicle, B - Parafollicular cells, C - Follicular cells, D - Colloid

(D) A - Trophoblasts, B - Colloid, C - Follicular cells, D - Stroma

149. Complete the analogy about the germinal layer from which it is formed.
Adrenal cortex : X :: Adrenal medulla : Y

(A) X - Mesoderm Y - Ectoderm

(B) X - Mesoderm Y - Endoderm

(C) X - Ectoderm Y - Endoderm

(D) X - Ectoderm Y - Mesoderm

150. Calcitonin is secreted by the _____.

(A) parathyroid gland

(B) thyroid gland

(C) thymus gland

(D) adrenal medulla

151. The _____ is also called as Collip's hormone.

(A) Calcitonin

(B) Parathormone

(C) Thyroxine

(D) Relaxin

152. Given below are two statements.
Statement I - Fusion of two compatible gametes is involved in asexual reproduction.
Statement II - Asexual reproduction results in the production of genetically identical progeny from a single organism which inherits the genes of parents.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.

(B) Both statement I and statement II are incorrect.

(C) Statement I is correct but statement II is incorrect.

(D) Statement I is incorrect but statement II is correct.

153. Match the categories of apomixis given in Column I with examples given in Column II.

Column- I	**Column-II**
A) Non-recurrent	I) Lemon
B) Adventive	II) *Nicotiana*
C) Recurrent	III) *Taraxacum*

Choose the correct option.

(A) A - II, B - I, C - III

(B) A - III, B - I, C - II

(C) A - III, B - II, C - I

(D) A - I, B - II, C - III

154. Given below are two statements.
Statement I - In anther, each cell of sporogenous tissue is capable of giving rise to microspore tetrad.
Statement II - A wall of mature anther which contains four layers develops from a sporogenous tissue.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.

(B) Both statement I and statement II are incorrect.

(C) Statement I is correct but statement II is incorrect.

(D) Statement I is incorrect but statement II is correct.

155. During grafting, the part of the rooted plant is called _____ to which the part of the stem containing more than one bud is joined.

(A) stock

(B) scion

(C) corm

(D) bulb

156. Identify the correct ratio of microspore mother cells, vegetative cells, generative cells and male gametes produced in a microsporangium, if 40 pollen grains are released from it.

(A) 1 : 1 : 1 : 1
(B) 1 : 2 : 2 : 1
(C) 2 : 1 : 1 : 4
(D) 1 : 4 : 4 : 8

157. Formation of the megaspore from the megaspore mother cell involves a _____.

(A) meiosis only
(B) mitosis only
(C) mitosis followed by meiosis
(D) meiosis followed by mitosis

158. Given below are two statements.
Statement I - The external genitalia of female contains two thin folds called labia majora which forms hood-like covering around clitoris.
Statement II - The vestibular glands are homologous to the Cowper's gland of the male reproductive system.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

159. Select the INCORRECT statement about the human ovarian follicle.

(A) Primary follicle has multi-layered wall of follicular cells.
(B) The primordial ovarian follicles arise from egg nest.
(C) The immature ova arise from cells of ventral endoderm of yolk sac.
(D) The large scale destruction of primordial follicles during phase of growth is called atresia.

160. The process of fertilization of a human egg can be confirmed by the presence of _____.

(A) perivitelline space
(B) 1^{st} polar body
(C) 2^{nd} polar body
(D) germinal vesicle

161. Which of the following is hormone releasing IUD?

(A) Cu -T
(B) Cu - 7
(C) LNG - 20
(D) Multiload 375

162. According to Mendel, a gamete generally contains _____.

(A) two alleles of a gene
(B) one allele of a gene
(C) multiple alleles of a gene
(D) all alleles of a gene

163. A cross between two plants resulted in the formation of tall and dwarf offsprings in the ratio of 3:1. The genotypes of their parents will be _____.

(A) TT and TT
(B) TT and tt
(C) Tt and Tt
(D) tt and tt

164. How many pair/s of contrasting characters in the pod of pea were considered by Mendel in his experiments?

(A) 1
(B) 2
(C) 4
(D) 7

165. Match the phenomenon in Column I with the Scientist who suggested it in Column II

Column I (Phenomenon)	**Column II (Scientist)**
(A) Linkage	(I) Sutton and Boveri
(B) Chromosomes	(II) Gregor John Mendel
(C) Chromosomal Theory of Inheritance	(III) T. H. Morgan
(D) Principles of Heredity	(IV) W. Waldeyer

(A) A - IV, B - III, C - II, D - I
(B) A - III, B - II, C - IV, D - I
(C) A - II, B - III, C - IV, D - I
(D) A - III, B - IV, C - I, D - II

166. Point mutation is _____

(A) change in gene
(B) change in one chromosome
(C) change in morphology of many chromosomes
(D) aneuploidy

167. *E. coli* cells infected with bacteriophages having radioactive phosphorus are grown on medium containing normal phosphorus and sulphur and their daughter cells are centrifuged. What will be detected in the supernatant after centrifugation?

(A) Normal sulphur
(B) Radioactive sulphur
(C) Normal phosphorus
(D) Radioactive phosphorus

168. The enzyme / proteins that prevent/s re-coiling of the separated strands of DNA during replication is _____.

(A) topoisomerase
(B) helicase
(C) SSB proteins
(D) polymerase

169. Given below are two statements:
Statement I - Avery, Mc Carty and Mac Leod first evidenced to prove the DNA is a genetic material.
Statement II - Hershey and Chase used *Streptococcus pneumoniae* to confirm the nature of the transforming principle.
In the light of the above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

170. Wobble hypothesis is useful to explain the _____ property of genetic code.

(A) universality
(B) non - ambiguity
(C) polarity
(D) degeneracy

171. In lac operon, which of the following acts as inducer and bind to repressor?

(A) Glucose
(B) Lactose
(C) Galactose
(D) Sucrose

172. Select the INCORRECT statement regarding stabilizing selection.

(A) It acquires mean character value.
(B) Tends to eliminate both the phenotypic extremes.
(C) Population is adapted to its environment.
(D) This kind of selection is seen in African seed cracker finches.

173. Similarity of bone structure in the forelimbs of many vertebrates is an example of _____.

(A) convergent evolution
(B) geographical isolation
(C) homologous organs
(D) adaptive radiation

174. Given below are two statements.
Statement I - Marsupials diversified into different habitats of Australia which evolved from a common ancestor.
Statement II - Early mammals were huge whale-like animals.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

175. Oldest theory of origin of life is _____.

(A) Theory of origin of species
(B) Theory of panspermia
(C) Theory of germplasm
(D) Theory of special creation

176. Heroin is derived from _____

(A) *Cannabis sativa*
(B) *Erythroxylum coca*
(C) *Papaver somniferum*
(D) *Atropa belladonna*

177. Given below are two statements.
Statement I - Sporozoites of *Plasmodium* reproduce asexually to produce merozoites.
Statement II - Zygote of *Plasmodium* within the erythrocytes transforms into oocyst.
In the light of above statements, choose the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

178. Person recovering from attack of measles develops _____ to measles, for the life time.

(A) natural acquired passive immunity
(B) artificial acquired passive immunity
(C) natural acquired active immunity
(D) artificial acquired active immunity

179. Match the Column I and the Column II Considering crop variety and their resistance to diseases.

Column I	Column II
(A) Wheat- Himgiri	(I) White rust
(B) Brassica - Pusa Swarnim	(II) Curl blight black rot
(C) Cauliflower - Pusa Shubra	(III) Tobacco mosaic virus
(D) Chilli - Pusa Sadabahar	(IV) Leaf and Stripe rust

(A) A - IV, B - II, C - I, D - III
(B) A - IV, B - I, C - II, D - III
(C) A - I, B - III, C - IV, D - II
(D) A - III, B - II, C - I, D - IV

180. Which one of the following is INCORRECT about organic fertilizers and biofertilizers?

(A) Former is formed from product or dead material of biological origin.
(B) Organic fertilizers increase fertility of soil while latter helps in nitrogen fixation
(C) Biofertilizers include use of live bacterial or fungal organisms to enrich the nutrient quality of soil.
(D) It includes addition of inorganic minerals in definite proportion in the field.

181. The microbes which are used as biocontrol agents of pests include _____.

(A) bacteria, fungi, algae and protozoans
(B) bacteria, virus, viroids and prions
(C) bacteria, fungi, protozoans and viruses
(D) bacteria, lichens, fungi and algae

182. During secondary treatment of sewage, the masses of bacteria held together by fungal hyphae to form mesh like structures called _____.

(A) activated sludge
(B) primary sludge
(C) flocs
(D) anaerobic biomass

183. Microbial source for the production of enzyme invertase is _____.

(A) *Aspergillus niger*
(B) *Candida lipolytica*
(C) *Saccharomyces cerevisiae*
(D) *Trichoderma konigii*

184. In biotechnology, the transfer of rDNA into the cloning host bacterium is assisted by _____

(A) divalent $Mg(++)$
(B) divalent $Ca(++)$
(C) monovalent Cl^-
(D) monovalent OH^-

185. Originally, restriction endonucleases (REN) are named so because they _____

(A) restrict DNA replication in host bacterium.
(B) cut the DNA strands at specific restriction site.
(C) destroy viral DNA to restrict the potential growth of virus in bacteria.
(D) restrict the translocation of viral DNA to prevent viral protein formation.

186. During PCR cycle, the temperature range in the step of annealing is _____.

(A) $40 - 60\ ^\circ C$
(B) $70 - 75\ ^\circ C$
(C) $90 - 98\ ^\circ C$
(D) $65 - 85\ ^\circ C$

187. Match the transgenic crop in Column I with the inserted gene in Column II. Choose the correct option

Column I	Column II
(A) Canola	(I) Metallothionein
(B) Tomato	(II) Chalcone isomerase
(C) Sugarbeet	(III) Sucrose:sucrose fructosyl transferase
(D) Rice	(IV) γ - tocopherol methyl transferase

(A) A - IV, B - III, C - II, D - I
(B) A - IV, B - I, C - III, D - II
(C) A - III, B - IV, C - I, D - II
(D) A - IV, B - II, C - III, D - I

188. An important vector useful for carrying new genes into many types of plants is obtained from _____.

(A) *Cyanobacterium*
(B) *Salmonella spp*
(C) *Agrobacterium spp*
(D) *Bacillus*

189. Match the Pairs

Column- I (Type of Interaction)	Column- II (Mechanism involved)
A) Competition	I) loss of digestive system
B) Prey - predation	II) feeding efficiency of one species is reduced due to interference of other species
C) Mutualism	III) Co-evolution in plants and animals
D) Endoparasitism	IV) Camouflage for concealment

Choose the correct option.

(A) A - IV, B - III, C - I, D - II
(B) A - II, B - IV, C - III, D - I
(C) A - IV, B - III, C - II, D - I
(D) A - II, B - IV, C - I, D - III

190. Identify the correct equation with respect to diagram below, which depicts decrease in population density.



(A) $P > Q$
(B) $P < Q$
(C) $P = Q$
(D) $P \propto Q$

191. Select the statement which explains the commensalism best.

(A) One species is benefited, other is harmed.
(B) Both species are benefited.
(C) One species is benefited, other is neither harmed nor benefited.
(D) Both species harm each other.

192. Which one of the following is a detritivore?

(A) Frog
(B) Snake
(C) Leech
(D) Earthworm

193. Which one of the following pyramid in oceanic ecosystem is inverted?

(A) Pyramid of age
(B) Pyramid of numbers
(C) Pyramid of biomass
(D) Pyramid of energy

194. Some amount of carbon dissolved into oceanic water remains as sediments of carbon in the sea in the form of _____ and is removed from circulation.

(A) carbonates of Na and K
(B) carbohydrate
(C) carbonates of Ca and Mg
(D) carbonic acid

195. Nature of change in community during succession is _____

(A) orderly, sequential and parallel with the changes in the physical environment.
(B) independent of the changes in the physical environment.
(C) constant change irrespective of environmental changes.
(D) independent of the community.

196. Arctic tundra, coniferous forest and grassland are examples of _____.

(A) Community
(B) Niche
(C) Biomes
(D) Population

197. The three major hierarchical and interrelated levels of biodiversity are _____.

(A) genetic, somatic and environmental
(B) geographic, climatic and aquatic
(C) interspecific, intraspecific and ecological
(D) intergeneric, intraspecific and interspecific

198. Given below are two statements regarding species diversity.
Statement I - Species diversity deals with species richness and species evenness.
Statement II - India is the only country rich in species diversity.
In the light of the above statements, select the correct option given below:

(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

199. Which of the following is NOT the source of methane released to atmosphere?

(A) Cattle field
(B) Bio-gas plant
(C) Paddy field
(D) Fire extinguisher

200. According to Central Pollution Control Board (CPCB), particulate matter of which size is responsible for causing the greatest harm to humans?

(A) 2.5 μm or less in diameter.
(B) 4.5 μm or more in diameter.
(C) 5 μm to 7 μm in diameter
(D) 10 μm or more in diameter.

- End of Question Paper -