MHT CET 2026 PCB Apr 23 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. Given $\vec{A} = 2\hat{i} - 2\hat{j} + 8\hat{k}$ and $\vec{B} = 2\hat{i} - m\hat{j} + 8\hat{k}$, if $\vec{A}$ and $\vec{B}$ have the same direction, the value of m is

(A) 1 (B) 2

(C) 3 (D) 4

2. If the mass of the object is measured as $m = (7 \pm 0.14)$ kg and the density is measured as $\rho = (5 \pm 0.25)$ kg/m^3 respectively. The percentage error in the measurement of volume is

(A) 3% (B) 5%

(C) 7% (D) 9%

3. A train accelerates from rest at a constant rate 'p' for some time (attains velocity 'v') and then retards to rest at the constant rate 'q'. If the total distance covered by the train is 's', then the velocity 'v' of the train is

(A) $\left(\left(\frac{p+q}{2pq}\right) \times s\right)^{\frac{1}{2}}$ (B) $\left(\left(\frac{p-q}{2pq}\right) \times s\right)^{\frac{1}{2}}$

(C) $\left(\left(\frac{2pq}{p+q}\right) \times s\right)^{\frac{1}{2}}$ (D) $\left(\left(\frac{2pq}{p-q}\right) \times s\right)^{\frac{1}{2}}$

4. A ball of mass 'm' is attached to the end of a string having length 'l'. The ball is rotated in a horizontal circle about a vertical axis. The maximum tension that a string can bear is 'T'. The maximum angular velocity of the ball is

(A) $\sqrt{\frac{T}{ml}}$ (B) $\sqrt{\frac{ml}{T}}$

(C) $\sqrt{\frac{T}{3ml}}$ (D) $\sqrt{3Tml}$

5. The spring is initially in an equilibrium condition. Initially it is stretched by length l and the work done is U_1. Again, it is stretched by length $\frac{7l}{2}$, when the work done is U_2, the value of U_2 is

(A) $\frac{7}{2}U_1$ (B) $\frac{49}{4}U_1$

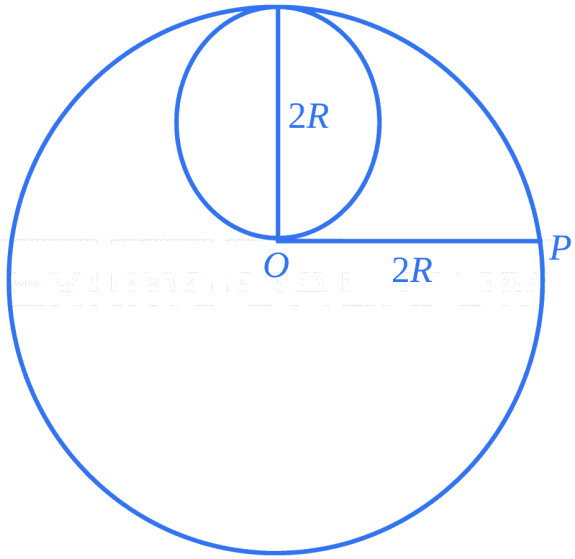
(C) $\frac{2}{7}U_1$ (D) $\frac{4}{49}U_1$

6. On a friction-less surface, a block of mass M moving at speed v collides elastically with another block (of mass M) initially at rest. After collision, the first block moves at an angle θ to its initial direction and has speed $\frac{v}{3}$. The speed of the second block after collision is

(A) $\frac{3v}{4}$ (B) $\frac{\sqrt{3}v}{2}$

(C) $\frac{2\sqrt{2}v}{3}$ (D) $\frac{3v}{\sqrt{2}}$

7. A very thin, uniform disc is made by removing a small disc of diameter $2R$ from a bigger (thin, uniform) disc of uniform mass density, mass M, and radius $2R$, as shown in the figure. The M.I. of this remaining part about an axis passing through point O and perpendicular to the plane of the figure is



(A) $\frac{9MR^2}{8}$ (B) $\frac{11MR^2}{9}$

(C) $\frac{13MR^2}{8}$ (D) $\frac{15MR^2}{9}$

8. A stone of mass m, tied to the end of a string, is whirled around in a horizontal circle. The length of the string is reduced gradually, keeping the angular momentum of the stone about the centre of the circle constant. Then, the tension in the string is given by $T = ar^n$, where 'a' is constant, r is the instantaneous radius of the circle. Then n is equal to

(A) 1 (B) -2

(C) -3 (D) 4

9. Imagine a new planet having the same density as that of earth, but it is 3 times bigger than the earth in size. If the acceleration due to gravity on the surface of earth is g and that on the surface of the planet is g_1, then g_1 is equal to

(A) $3g$ (B) $9g$

(C) $27g$ (D) $\frac{g}{9}$

10. Which of the following is NOT TRUE?
a. Any increase in temperature of liquid decreases its angle of contact for a given solid-liquid pair.
b. When a soluble substance is dissolved in water, the surface tension of water decreases.
c. When a sparingly soluble substance is mixed with water, the surface tension of water decreases.
d. When insoluble impurity is added into water, surface tension of water decreases.

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

11. A cube floats in water with $\left(\frac{1}{3}\right)^{th}$ part outside the surface of water. The same cube floats in another liquid with $\left(\frac{3}{4}\right)^{th}$ part outside the liquid. If the density of liquid is ρ, then the value of ρ in g/cc is (ρ_w = density of water = 1 g/cc)

(A) $\frac{2}{3}$ (B) $\frac{4}{3}$
(C) $\frac{8}{3}$ (D) $\frac{10}{3}$

12. A small steel ball of mass m and density 7.85 g/cm^3 is dropped in a container filled with glycerin (density = 1.26 g/cm^3). Its velocity becomes constant after some time. The viscous force acting on the ball is {g = acceleration due to gravity}

(A) $mg\left(\frac{659}{785}\right)$ (B) $mg\left(\frac{785}{126}\right)$
(C) $mg\left(\frac{126}{781}\right)$ (D) $mg\left(\frac{126}{785}\right)$

13. If the radiant heat absorbed by the body is 75% of the incident heat and if the coefficient of the reflection is 0.15, then the coefficient of transmission is

(A) 0.15 (B) 0.13
(C) 0.10 (D) 0.09

14. Assume that the temperature of the surface of the sun is 5000 K and the surface temperature of another virtual star is 2500 K. The power radiated by a virtual star is 30 times the power radiated by the sun. The radius of a virtual star in terms of the radius of the sun is {Treat both the sun and the virtual star as a black body}

(A) $\sqrt{30}r_{sun}$ (B) $2\sqrt{30}r_{sun}$
(C) $3\sqrt{30}r_{sun}$ (D) $4\sqrt{30}r_{sun}$

15. The initial temperature of a body is 80°C. If its temperature falls to 64°C in 5 minutes and in the next 10 minutes to 52°C, then the temperature of the surroundings is

(A) 35°C (B) 42.6°C
(C) 48°C (D) 26°C

16. The second law of thermodynamics deals with the transfer of
a. only work.
b. momentum.
c. heat.
d. only pressure.

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

17. Carnot engine has an efficiency of $\frac{1}{7}$. When the temperature of the sink is reduced by 60 K, its efficiency is doubled. The temperature of the source is

(A) 47°C (B) 147°C
(C) 43°C (D) 143°C

18. An ideal mono-atomic gas is heated at constant pressure. The fraction of the total energy applied which increases the internal energy for the gas is

(A) $\frac{3}{5}$ (B) $\frac{5}{3}$
(C) $\frac{7}{5}$ (D) $\frac{5}{7}$

19. A pendulum clock is running slow. In order to correct it, we should
a. reduce the amplitude of the oscillation.
b. increase the mass of the bob.
c. reduce the length of the pendulum.
d. take the pendulum at the equator to decrease the value of acceleration due to gravity.

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

20. The U tube of uniform bore of cross-sectional area A has been set up vertically with open ends facing up. Now M gram of a liquid of density d is poured into it. The column of liquid in this tube will oscillate with a period T. The period is

(A) $2\pi\sqrt{\frac{MA}{gd}}$ (B) $2\pi\sqrt{\frac{M}{2Agd}}$
(C) $2\pi\sqrt{\frac{M}{g}}$ (D) $2\pi\sqrt{\frac{M}{gdA}}$

21. The displacement of a wave is given by $y = 0.004 \sin(200t - 2x)$, in SI units. This wave represents a wave

(A) of wavelength one metre.

(B) traveling with a velocity of 100 m/s in the positive x-direction.

(C) of frequency 100 Hz.

(D) traveling with a velocity of $\frac{100}{\pi}$ m/s in negative x-direction.

22. A sonometer wire vibrating in two loops is in resonance with a tuning fork. If tension applied to the string is increased to 16 times the original tension and length of the wire is doubled. It can still be in resonance with the tuning fork provided it vibrates in

(A) one loop

(B) two loops

(C) three loops

(D) four loops

23. A pipe closed at end vibrating in the fourth overtone is in unison with the open pipe vibrating in its fourth overtone. The ratio of $l_c : l_o$ is {l_c = vibrating length of closed pipe, l_o = vibrating length of open pipe}

(A) 5 : 6

(B) 7 : 8

(C) 9 : 10

(D) 11 : 12

24. A train moves towards a stationary observer with speed 20 m/s. The train sounds a whistle and its frequency heard by the observer is f_1. When the train moves away from the platform at a speed of 20 m/s, the frequency heard is f_2. If the speed of sound is 340 m/s, then $\frac{f_2}{f_1}$ is

(A) $\frac{7}{8}$

(B) $\frac{8}{7}$

(C) $\frac{9}{8}$

(D) $\frac{8}{9}$

25. A charge Q is distributed over the two concentric hollow spheres of radii r and R $(R > r)$ such the surface densities are equal. The potential at the common centre is {$K = \frac{Q}{4\pi\epsilon_0}$, ϵ_0 = permittivity of free space}

(A) $\frac{KR}{r}$

(B) $\frac{K(r+R)}{(R^2+r^2)}$

(C) $\frac{K(R^2+r^2)}{(R+r)}$

(D) $\frac{K(r+R)}{(R^3+r^3)}$

26. The positively charged particle is released from the rest in a uniform electric field. The electric potential energy of the charge
a. decreases because the charge moves along the electric field.
b. decreases because the charge moves opposite the electric field.
c. remains constant because the electric field is uniform.
d. increases because the charge moves along the electric field.

(A) c

(B) d

(C) a

(D) b

27. Two point charges $8q$ and $2q$ are located at $x = 0$ and $x = L$ respectively. The location of a point on the X-axis from origin, at which the net electric field is zero, is x. Value of x is equal to

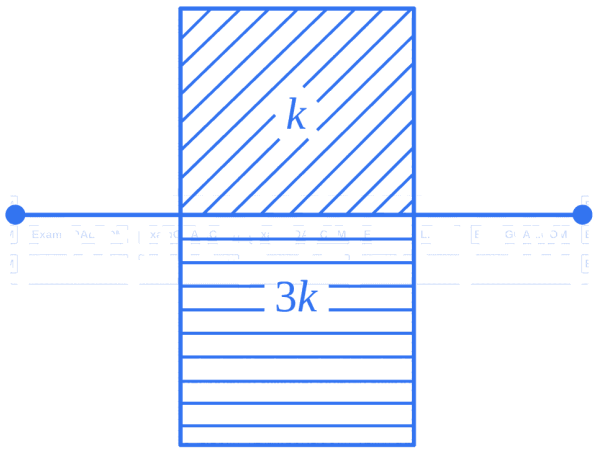
(A) $\frac{2L}{3}$

(B) $\frac{3L}{2}$

(C) $\frac{L}{3}$

(D) $\frac{L}{2}$

28. The air capacitor has a capacitance of 2 μF. Now the space between two plates of capacitor is filled with two dielectrics as shown in the figure. The capacitance of the capacitor is (in μF) {'d' is the distance between two plates of the capacitor}



(A) $2k$

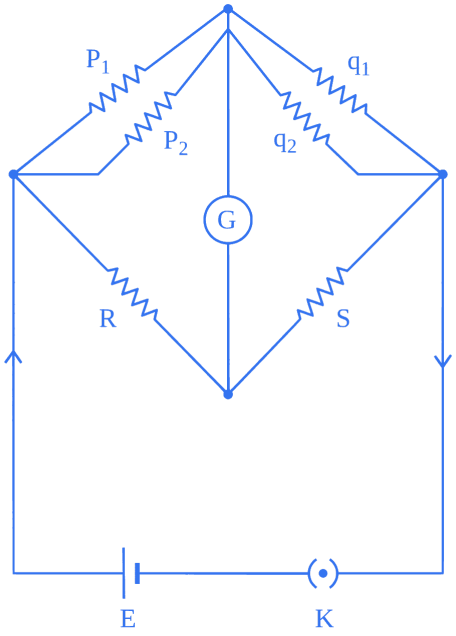
(B) $4k$

(C) $6k$

(D) $8k$

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29. In Wheatstone bridge, resistance P is formed by a parallel combination of p_1 and p_2. The Q resistance is formed by a parallel combination of q_1 and q_2. The remaining two resistances are R and S respectively, and in the balanced condition, $\frac{R}{S}$ is



(A) $\frac{(p_1p_2)}{(q_1q_2)(p_1+p_2)}$ (B) $\frac{(p_1p_2)(q_1+q_2)}{(q_1q_2)(p_1+p_2)}$
(C) $\frac{(q_1q_2)(q_1+q_2)}{(p_1p_2)(p_1+p_2)}$ (D) $\frac{(p_1p_2)(q_1+q_2)}{(p_1+p_2)}$

30. In a potentiometer experiment, the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2 Ω, the balancing length becomes 120 cm. The internal resistance of the cell is

(A) 1 Ω (B) 0.5 Ω
(C) 4 Ω (D) 2 Ω

31. Two concentric coils, each of radius equal to 2π cm are placed at right angle to each other. If 3 A and 4 A are the currents flowing through the two coils, respectively. The magnetic induction (in Wb/m^2) at the centre of the coils will be { $\mu_0 = 4\pi \times 10^{-7}$ SI unit}

(A) 5×10^{-5} (B) 12×10^{-5}
(C) 7×10^{-5} (D) 10^{-5}

32. An electron is projected with uniform velocity along the axis of a current carrying long solenoid. Which of the following is true?
a. The electron will be accelerated along the axis.
b. The electron path will be circular about the axis.
c. The electron will experience a force at 45° to the axis and hence execute a helical path.
d. The electron will continue to move with uniform velocity along the axis of the solenoid.

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

33. A paramagnetic sample shows a net magnetization of 8 A/m when placed in an external magnetic field of 0.6 T at a temperature of 4 K. When the same sample is placed in an external magnetic field of 0.2 T at a temperature of 16 K, the magnetization (in $\frac{A}{m}$) will be

(A) $\frac{2}{3}$ (B) $\frac{32}{3}$
(C) 6 (D) 2.4

34. When four inductors of the same inductances L are connected in series, and I is the current passing through the circuit. The energy stored in the circuit is

(A) LI^2 (B) $2LI^2$
(C) $3LI^2$ (D) $4LI^2$

35. A magnetic field induction is changing in magnitude at a constant rate $\frac{dB}{dt}$. The plane of a circular loop of radius r of copper wire (mass m and radius a) is placed perpendicular to the field. The induced current in the loop is {ρ = specific resistance, δ = density of copper}

(A) $\frac{2\pi\rho\delta}{m}\frac{dB}{dt}$ (B) $\frac{m}{2\pi\rho\delta}\frac{dB}{dt}$
(C) $\frac{m}{4\pi\rho\delta}\frac{dB}{dt}$ (D) $\frac{4\pi\rho\delta}{m}\frac{dB}{dt}$

36. The output of a step-down transformer is measured to be 56 V when connected to 14 W light bulb. The value of peak current is (in A)

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{1}{\sqrt{3}}$
(C) $\frac{1}{2\sqrt{2}}$ (D) $\frac{1}{3\sqrt{2}}$

37. In the LCR series circuit, an alternating e.m.f. e and current i are given by the equation $e = 100\ \sin(100t)V$ and $i = 100\ \sin\left(100t + \frac{\pi}{3}\right)\ mA$.
The average power dissipated in the circuit will be
$\{\sin(\pi/3) = 3^{0.5}/2,\ \cos(\pi/3) = 1/2\}$

(A) 7 W (B) 3.5 W
(C) 5 W (D) 2.5 W

38. If the r.m.s. current in an a.c. circuit is 5 A, having frequency 50 Hz. The value of current $\frac{1}{300}$ s after its value becomes zero (in A) is
$\{\sin(\pi/3) = (3)^{0.5}/2\}$

(A) $5\sqrt{2}$ (B) $5\sqrt{\frac{3}{2}}$
(C) $\frac{5}{6}$ (D) $\frac{5}{\sqrt{2}}$

39. In a series LCR circuit, the resistance (R), inductive reactance $X_L = 2R$ and capacitive reactance $X_C = R$. The impedance of the circuit is

(A) R (B) $2R$
(C) $2^{0.5}R$ (D) $3^{0.5}R$

40. The thin prism having refracting angle 10° is made of glass of refractive index 1.42. This prism is combined with another thin prism of glass of refractive index 1.7. This combination produces dispersion without deviation. The refracting angle of the second prism is

(A) 4° (B) 6°
(C) 8° (D) 10°

41. Four polaroids are placed at an angle θ with the optic axis of the preceding one. If unpolarised light of intensity 'I' falls on the first polaroid, the intensity of light transmitted from the fourth polaroid is
$[\cos\theta = X]$

(A) $\frac{IX^2}{2}$ (B) $\frac{IX^4}{4}$
(C) $\frac{IX^6}{2}$ (D) $\frac{IX^8}{4}$

42. An interference is observed due to two coherent sources, A and B, separated by a distance 4λ along the Y-axis, where λ is the wavelength of the source. Source B is at the origin. A detector D is moved along the positive X-axis. The number of points on the X-axis, excluding $x = 0$ and $x \to \infty$, at which maxima will be observed, is

(A) 3 (B) 4
(C) 5 (D) 6

43. In the case of the photo-electric effect, which of the following sentences is NOT TRUE?
a. The photo-electrons are emitted only when the frequency of incident radiation is greater than the threshold frequency.
b. There is no time lag between incidence of light and emission of electrons.
c. The rate of photo-electric emission is independent of the intensity of incident radiation.
d. The maximum kinetic energy of emitted photo-electrons depends on the frequency of incident radiation.

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

44. An electron of mass m and a photon have the same energy E. The ratio of de-Broglie wavelengths associated with them $\left(\frac{\lambda_e}{\lambda_p}\right)$ is {c = velocity of light}

(A) $\sqrt{\frac{E}{2m}}$ (B) $c\sqrt{2mE}$
(C) $\frac{1}{c}\sqrt{\frac{2m}{E}}$ (D) $\frac{1}{c}\sqrt{\frac{E}{2m}}$

45. In an interference experiment, interference was observed using waves associated with electrons having de-Broglie wavelength λ. The electrons are produced by using an electron-gun having the potential difference 'V'. To increase the fringe width in an interference pattern,

(A) the slit separation is increased. (B) the screen is moved closer to interfering slits.
(C) electron gun voltage be increased. (D) electron gun voltage be decreased.

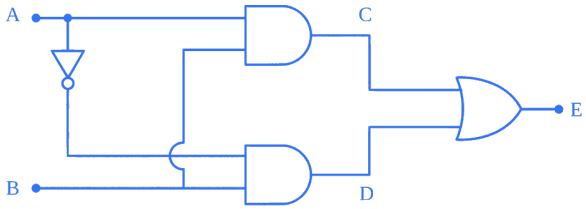
46. In a given reaction,
$^{A}_{Z}X \to {}^{A}_{Z+1}Y \to {}^{A-4}_{Z-1}K \to {}^{A-4}_{Z-1}K$
the radioactive radiations are emitted in the sequence of

(A) $\alpha,\ \beta,\ \gamma$ (B) $\gamma,\ \beta,\ \alpha$
(C) $\beta,\ \alpha,\ \gamma$ (D) $\gamma,\ \alpha,\ \beta$

47. A radio isotope X with a half life 1.4×10^8 year, decays to Y, which is stable. A sample of rock from a cave was found to contain X and Y in the ratio 1 : 7. The age of rock (in year) is

(A) 1.96×10^8 (B) 3.92×10^8
(C) 4.20×10^8 (D) 8.40×10^8

48. The truth table for the given circuit is



(A)

A	B	E
0	0	1
0	1	0
1	0	1
1	1	0

(B)

A	B	E
0	0	1
0	1	0
1	0	0
1	1	0

(C)

A	B	E
0	0	0
0	1	1
1	0	0
1	1	1

(D)

A	B	E
0	0	0
0	1	1
1	0	1
1	1	0

49. Dark current in a photo-diode depends on the

(A) concentration of majority carriers.
(B) concentration of minority carriers.
(C) applied voltage.
(D) frequency of the incident light.

50. Current through a reverse biased p-n junction, increases abruptly at

(A) 0.0 V
(B) 0.8 V
(C) break-down voltage.
(D) knee voltage.

51. Calculate the mass of potassium chlorate required to liberate 6.72 dm^3 of oxygen at STP. [Molar mass of potassium chlorate = 122.5 g mol^{-1}]

(A) 12.25 g
(B) 24.5 g
(C) 36.75 g
(D) 49 g

52. Calculate the energy per mole of photons of red light with a wavelength 750 nm. [$h = 6.626 \times 10^{-34}$ Js, $C = 3 \times 10^8$ m/s.]

(A) 1.596×10^5 J
(B) 2.534×10^5 J
(C) 2.916×10^5 J
(D) 3.138×10^7 J

53. Which of the following species is paramagnetic?

(A) N_2
(B) Li_2
(C) F_2
(D) N_2^+

54. Calculate the work done in terms of dm^3 bar when 200 ml of ethylene gas and 150 ml of HCl gas were allowed to react at 1 bar pressure.

(A) 0.10
(B) 0.15
(C) 0.20
(D) 0.25

55. A force of 450 N acts on a surface area of 15 cm^2. Find the pressure exerted.

(A) 3.0×10^4 Pa
(B) 3.0×10^5 Pa
(C) 4.5×10^4 Pa
(D) 4.5×10^5 Pa

56. Calculate the enthalpy of formation of HCl if bond enthalpies of H – H, Cl – Cl and H – Cl bonds are 434 kJ mol^{-1}, 242 kJ mol^{-1} and 431 kJ mol^{-1}, respectively.

(A) 245 kJ mol^{-1}
(B) -93 kJ mol^{-1}
(C) -245 kJ mol^{-1}
(D) 93 kJ mol^{-1}

57. Which of the following processes is an example of decrease in entropy?

(A) Dissolution of solid iodine in water
(B) Formation of liquid water from hydrogen and oxygen gas
(C) Dissociation of hydrogen molecules into atoms
(D) Decomposition of calcium carbonate on heating

58. The solubility product of Ag_2CrO_4 is 4×10^{-12}. What is the amount of Ag_2CrO_4 in gram present in 100 ml its saturated solution? (molar mass of Ag_2CrO_4 = 331.73 g/mol).

(A) 3.3173×10^{-2} g
(B) 3.3173×10^{-3} g
(C) 3.3173×10^{-4} g
(D) 3.3173×10^{-5} g

59. The pH of HCl and H_2SO_4 is same at same temperature. What is the ratio of molar concentration of HCl to H_2SO_4?

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

60. Which from the following is NOT a buffer solution?

(A) CH_3COOH + CH_3COONa in water.
(B) $NH_4OH + NH_4Cl$ in water.
(C) $HCOOH + HCOONa$ in water.
(D) $CH_3COOH + NaCl$ in water.

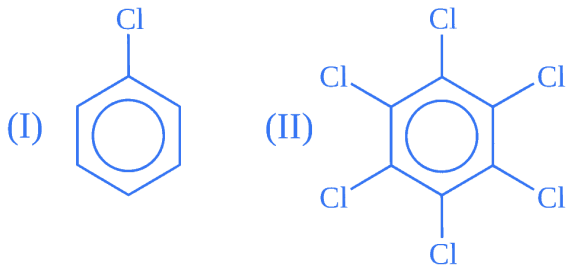
61. Which of the following is true regarding oxidation?

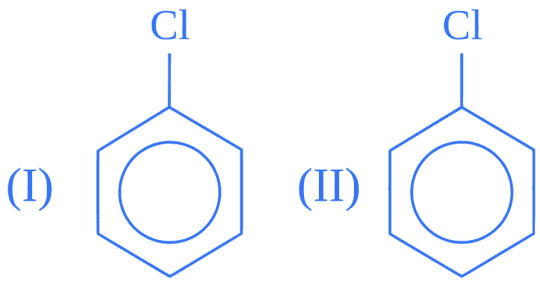
(A) loss of electron by an atom.
(B) gain of electron by an atom.
(C) addition of electron to an atom.
(D) addition of electropositive elements.

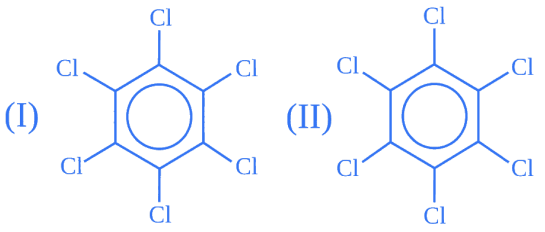
62. Which of the following is the formula of the third higher homologue of CH_3-CH_2-COOH?

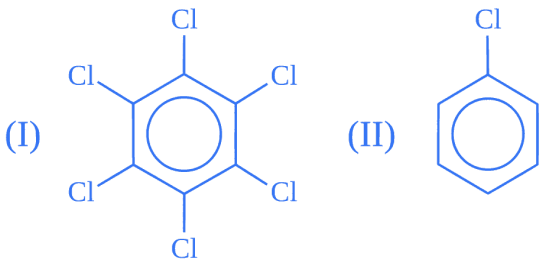
(A) CH_3-CH_2-CH_2-COOH
(B) CH_3-CH_2-CH_2-CH_2-COOH
(C) CH_3-CH_2-CH_2-CH_2-CH_2-COOH
(D) CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-COOH

63. Identify the products when benzene reacts with chlorine in the presence of (I) Fe and (II) anhydrous $AlCl_3$ respectively from the following.

(A) 

(B) 

(C) 

(D) 

64. According to green chemistry, which of the following features is NOT favored by the catalyst?

(A) Increase selectivity
(B) Increase in waste
(C) Reduce reaction times
(D) Reduce energy demands

65. Which of the following exhibits non-stoichiometric metal deficiency?

(A) All metals
(B) Alkali metals only
(C) Transition metals only
(D) Alkaline earth metals only

66. Match **List I** with **List II**

List I (Crystalline Solids)	**List II (Examples)**
(A). Ionic Solid	(I). CO_2
(B). Covalent Solid	(II). K_2SO_4
(C). Molecular Solid	(III). K
(D). Metallic Solid	(IV). Quartz

Choose the **correct** answer from the options given below:

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

67. Which of the following crystal systems has the lowest number of Bravais lattices?

(A) Cubic
(B) tetragonal
(C) Triclinic
(D) orthorhombic

68. An aqueous solution of acetic acid has a molality of 0.1 m. If the percent dissociation of acetic acid in water is 1.35%, calculate the depression in freezing point of the solution. (K_f for water $= 1.86\ ^\circ C\ kg\ mol^{-1}$)

(A) 0.189 °C
(B) 0.084 °C
(C) −0.189 °C
(D) 0.118 °C

69. The molal elevation constant for water is $0.52\ ^\circ C\ kg\ mol^{-1}$. Find out the boiling point of solution when 6.0 g of urea is dissolved in 200 g of water. (molar mass of urea = 60 g/mol)

(A) 110.28 °C
(B) 100.26 °C
(C) 50.14 °C
(D) 0.26 °C

70. For a solution containing a non-volatile solute in a volatile solvent, which of the following relationships is correctly represented?

(A) $P_1 < P_1^0$
(B) $T_b < T_b^0$
(C) $T_f > T_f^0$
(D) $T_f = T_f^0$

71. What is standard decrease in Gibbs energy for the following cell?
$Al_{(s)}|Al^{+3}_{(1M)} \parallel Cd^{+2}_{(1M)}|Cd$
if $E^\circ Al^{+3}/Al = -1.66$ V, $E^\circ Cd^{+2}/Cd = -0.40$ V

(A) −12.36 kJ
(B) −123.6 kJ
(C) −729.54 kJ
(D) −119.274 kJ

72. Find the molar conductivity of 0.001M $AgNO_3$ solution if the conductivity of it is $1.2 \times 10^{-4}\ \Omega^{-1}\ cm^{-1}$.

(A) $120\ \Omega^{-1}\ cm^2\ mol^{-1}$. (B) $130\ \Omega^{-1}\ cm^2\ mol^{-1}$.
(C) $140\ \Omega^{-1}\ cm^2\ mol^{-1}$. (D) $150\ \Omega^{-1}\ cm^2\ mol^{-1}$.

73. Identify the correct order of increasing reducing strength of metals from following.

(A) Ag < Ni < Mg < Li (B) Li < Mg < Ni < Ag
(C) Mg < Ni < Ag < Li (D) Ni < Ag < Li < Mg

74. For first order reaction, the rate constant for the decomposition of N_2O_5 is $6 \times 10^{-4}\ s^{-1}$. Calculate half life period for decomposition in terms of seconds

(A) 1100 (B) 1225
(C) 1155 (D) 1050

75. For an elementary reaction, $2A + B \rightarrow A_2B$, if $r = k[A]^2[B]$
If the volume of a vessel is quickly reduced to half of its original volume, then the rate of reaction will be

(A) remain unchanged. (B) decreased by half.
(C) increased by eight times. (D) increased by four times.

76. An increase in the concentration of the reactants of a reaction leads to a change in

(A) heat of reaction (B) threshold energy
(C) collision frequency (D) activation energy

77. What type of colloidal system the fruit jam is?

(A) Sol (B) Gel
(C) Emulsion (D) True solution

78. Identify the catalyst used in the contact process for manufacture of sulfuric acid.

(A) Iron (B) Vanadium pentoxide
(C) Nickel (D) Platinum

79. Which of the following statements regarding inert gases is NOT true?

(A) The ionization enthalpy of each inert gas is the highest in its period.
(B) Inert gases have large negative values of electron gain enthalpy
(C) Inert gases have very low melting and boiling points.
(D) All inert gases are monoatomic in nature.

80. Consider the hydrated ions of Ti^{2+}, V^{2+}, Ti^{3+} and Sc^{3+}. Identify the correct increasing order of their spin-only magnetic moment.

(A) $Sc^{3+} < Ti^{3+} < V^{2+} < Ti^{2+}$
(B) $Sc^{3+} < Ti^{3+} < Ti^{2+} < V^{2+}$
(C) $Ti^{3+} < Ti^{2+} < Sc^{3+} < V^{2+}$
(D) $V^{2+} < Ti^{2+} < Ti^{3+} < Sc^{3+}$

81. Identify the Lanthanoid ions having half filled and completely filled 4f orbitals respectively.

(A) Eu^{2+} and Tm^{2+} (B) Sm^{2+} and Tm^{3+}
(C) Tb^{4+} and Yb^{2+} (D) Dy^{3+} and Yb^{3+}

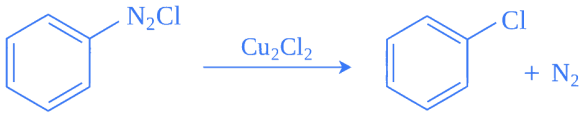
82. What is the correct IUPAC name of $K_3[Fe(CN)_6]$?

(A) Potassium hexacyanoferrate(II)
(B) Potassium hexacyanoferrate(III)
(C) Potassium ferricyanide
(D) Potassium ferrocyanide

83. Which of following ligands is present in a metal carbonyl complex?

(A) CO (B) NH_3
(C) SCN (D) CN

84.



Above reaction is known as

(A) Fittig reaction. (B) Sandmeyer reaction.
(C) Kolbe reaction. (D) Reimer-Tiemann reaction

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85. Which of the following alkyl halides gives a mixture of alkenes on dehydrohalogenation?

(A) n-propyl bromide
(B) Isopropyl bromide
(C) Secondary butyl bromide
(D) Tertiary butyl bromide

86. What is the product formed on the reduction of carboxylic acids using lithium aluminum hydride?

(A) Primary alcohol
(B) Secondary alcohol
(C) Aldehyde
(D) Ketone

87. An organic compound 'A' on oxidation with pyridinium chlorochromate forms an aldehyde having the molecular formula C_2H_4O. What is compound 'A'?

(A) Methanol
(B) Ethanol
(C) Ethanal
(D) Ethanoic acid

88. Identify the product when propan-2-ol heated with Cu at 573 K.

(A) propanol
(B) Propene
(C) Propanone
(D) propanoic acid

89. Which of following reagents convert propene to 1-propanol?

(A) $KOH, KMnO_4$
(B) H_2O, H_2SO_4
(C) $MgSO_4, NaBH_4, H_2O$
(D) B_2H_6, H_2O_2, OH^-

90. An organic compound A on reaction with thionyl chloride, gives compound B. Compound B, reacts with sodium in dry ether as solvent, gives 2,3-dimethyl butane. Identify compound A.

(A) Isopropyl alcohol
(B) Isobutyl alcohol
(C) Ethane
(D) Isobutane

91. Butan-2-ol is heated with red phosphorous and bromine. Find the number of optical isomers of the product formed.

(A) Zero
(B) One
(C) Two
(D) Three

92. Which of the following compounds is found in Indian gooseberry?

(A) Gallic acid
(B) Curcumin
(C) Eugenol
(D) Methyl salicylate

93. Benzaldehyde is converted to benzyl alcohol by

(A) Wurtz reaction
(B) Fittig reaction
(C) Wurtz Fittig reaction
(D) Cannizzaro's reaction

94. Which one of the following compounds, on reaction with hydrogen cyanide (HCN), gives an optically active cyanohydrin?

(A) CH_3-$COCH_3$
(B) H-CHO
(C) CH_3-CHO
(D) C_6H_5-CO-C_6H_5

95. Which of the following methods is the most convenient method to prepare an amine containing one carbon atom less than the parent compound?

(A) Reduction of Isonitriles
(B) Hofmann bromamide reaction
(C) Gabriel phthalimide synthesis
(D) Reductive amination of aldehydes.

96. Why does fructose reduce Fehling's solution?

(A) Due to the presence of hydroxy group.
(B) Due to the presence of aldehydic group
(C) Due to the presence of ketonic group.
(D) Due to the presence of alpha-hydroxy ketonic group

97. What type of following peptides, the glycylalanine is?

(A) Dipeptide
(B) Tripeptide
(C) Tetrapeptide
(D) Polypeptide

98. Which from following statements regarding biological importance of elements is NOT true?

(A) Ca^{2+} ions are required for contraction and stretching of muscles.
(B) Mg^{2+} ions are important for breaking of glucose and fats in protein synthesis.
(C) K^+ ions are most abundant in extra cellular fluid.
(D) Na^+ ions regulate water flow across the membrane.

99. What are the monomers used for preparation of PHBV?

(A) Cellulose xanthate and NaOH.
(B) 1,3-Butadiene and styrene
(C) β-Hydroxy butyric acid and β-Hydroxy valeric acid
(D) Ethylene glycol and phthalic acid

100. Which of the following is a polyamide polymer?

(A) Nylon-6,6 (B) Teflon

(C) Bakelite (D) Polythene

101. The process by which the diploid oocyst of *Plasmodium* forms large number of haploid sporozoites through meiosis in the gut wall of female anopheles is called ---------.

(A) schizogony
(B) gamogony
(C) sporogony
(D) syngamy

102. Which of the following animal phyla show closed blood vascular system apart from vertebrates?

(A) Arthropods and higher Molluscs
(B) Arthropods and Annelids
(C) Annelids and higher Molluscs
(D) Arthropods and Echinoderms

103. In Annelids like earthworm and nereis, majority of gaseous exchange takes place through----------.

(A) book lungs
(B) tracheal tubes
(C) moist skin
(D) book gills

104. Which animal belongs to group Hylobatidae?

(A) Gorilla
(B) Gibbons
(C) Chimpanzee
(D) Orangutan

105. Lenticels are absent in

(A) bark of old stem
(B) pericarp of woody fruits
(C) leaves
(D) roots of dicot flowering plants

106. Match **List I** with **List II**

List I (Type of chromosome)	**List II (Shape of chromosome)**
(A). Acrocentric	(I). i shaped
(B). Metacentric	(II). L shaped
(C). Telocentric	(III). j shaped
(D). Submetacentric	(IV). V shaped

Choose the **correct** answer from the options given below:

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

107. The scientists who earned Nobel Prize in chemistry in 1989 for the discovery of Ribozymes are ---------.

(A) Oparin and Haldane
(B) Altman and Cech
(C) Crick and Orgel
(D) Urey and Miller

108. Which enzyme in the midgut of insect is instrumental in the release of core toxic fragments from bacterial spores ingested by it?

(A) Pectinase
(B) Acid phosphatase
(C) Penicillinase
(D) Proteinase

109. Which amino acids are synthesized from intermediates of Krebs cycle like alpha-ketoglutarate and oxaloacetate?

(A) Lysine and aspartic acid
(B) Glutamic acid and mevalonic acid
(C) Aspartic acid and mevalonic acid
(D) Glutamic acid and aspartic acid

110. Match **List I** with **List II**

List I (Enzyme)	**List II (Reaction catalyzed)**
(A). Alcohol dehydrogenase	(I). Transfer of certain groups between two molecules
(B). Sucrase	(II). Oxidation and reduction reactions
(C). Glucokinase	(III). Structural rearrangements within a molecule
(D). Racemases	(IV). Hydrolytic reactions

Choose the **correct** answer from the options given below:

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

111. The organic compounds that are tightly attached to the protein part of an enzyme to make them catalytically active are called ----------.

(A) prosthetic groups
(B) co-enzymes
(C) co-factors
(D) metal ions

112. All of the following are conjugated proteins EXCEPT

(A) Heparin
(B) Histones
(C) Haemoglobin
(D) Mucin

113. Which of following group includes reducing sugars?

(A) Glucose, Sucrose, Maltose
(B) Fructose, Ribulose, Sucrose
(C) Glucose, Lactose, Maltose
(D) Fructose, Sucrose, Galactose

114. Match **List I** with **List II**

List I (Types of translocation)	**List II (Path of translocation)**
(A). Radial translocation	(I). From leaves to growing point of stem
(B). Tangential translocation	(II). From phloem to pith
(C). Upward translocation	(III). From leaves to roots
(D). Downward translocation	(IV). From phloem to cortex

Choose the **correct** answer from the options given below:

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

115. Which is the driving force for the process of passive absorption of water in roots?

(A) Root pressure
(B) Capillarity in root xylem cells.
(C) Transpiration pull in leaves
(D) More supply of oxygen

116. Select the correct statement from the following.

(A) In a fully turgid cell, TP = OP.
(B) In a fully turgid cell, TP > OP.
(C) In a fully turgid cell, DPD = OP.
(D) Turgor pressure decreases when the cell is placed in hypotonic solution.

117. If any solute is added in pure water, what will be the effect on the value of water potential?

(A) Value of water potential is increased.
(B) Value of water potential is decreased.
(C) There is no change in its value.
(D) Value of water potential becomes more than D.P.D.

118. How many electrons and ATP are required for the biological fixation of a molecule of nitrogen to form ammonia?

(A) 4 and 8 respectively
(B) 2 and 4 respectively
(C) 8 and 16 respectively
(D) 16 and 32 respectively

119. Which of the following groups has all three micro-elements?

(A) Magnesium, Potassium, Zinc
(B) Zinc, Copper, Silicon
(C) Potassium, Sulphur, Calcium
(D) Sulphur, Calcium, Chlorine

120. During aerobic respiration, the total number of ATP formed from one glucose molecule through substrate level phosphorylation is ----------.

(A) 4
(B) 6
(C) 34
(D) 38

121. Which cytochrome acts as a mobile electron carrier, transferring electrons between complex III and IV during ETS?

(A) Cytochrome a
(B) Cytochrome bc_1
(C) Cytochrome c
(D) Cytochrome a_3

122. How many glucose molecules are utilized if the cell produces 68 pyruvic acid molecules during glycolysis?

(A) 17
(B) 34
(C) 51
(D) 68

123. Which enzyme is responsible for phosphorylation of glucose with ATP?

(A) Hexokinase
(B) Phosphofructokinase
(C) Aldolase
(D) Phosphohexose isomerase

124. If the dark period is interrupted even by a flash of light, plants like tobacco and soybean _____

(A) will not flower.
(B) will flower immediately.
(C) will give more flowers.
(D) cannot be made to flower again.

125. Identify the INCORRECT statement about gibberellins.

(A) It promotes bolting in beet and cabbage.
(B) It causes epinasty of leaves and flowers.
(C) It promotes seed germination in cereals.
(D) It breaks dormancy of seed and hastens germination.

126. In which phase of plant growth, the rate of growth slows down and comes to a steady state?

(A) Phase of cell division.
(B) Phase of cell enlargement.
(C) Phase of cell maturation.
(D) Phase of cell elongation.

127. Given below are two statements:
Statement (I): Pancreatic juice contains inactive proteolytic enzymes like trypsinogen and chymotrypsinogen.
Statement (II): The enzyme enterokinase in intestinal juice helps in the conversion of inactive chymotrypsinogen into its active form, chymotrypsin.
In 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.

128. Loss of appetite, acidity, heart burn, dyspepsia and stomach pain are the symptoms of ----------

(A) Constipation
(B) Jaundice
(C) Kwashiorkor
(D) Indigestion

129. All of the following are constituents of saliva EXCEPT

(A) lysozyme
(B) salivary amylase
(C) rennin
(D) bicarbonates

130. Which of the following is INCORRECT about the pancreas?

(A) Pancreas is a heterocrine gland having both exocrine and endocrine part.
(B) Exocrine part of the pancreas secretes acidic pancreatic juice.
(C) Opening of hepato-pancreatic duct is guarded by sphincter of Oddi.
(D) Endocrine part of pancreas is called islets of Langerhans, which secrete various hormones.

131. The opening of the oropharynx to the oesophagus is called----------.

(A) glottis
(B) epiglottis
(C) gullet
(D) pharynx

132. Given below are two statements about the oxygen dissociation curve.
Statement (I): The relationship between HbO_2 saturation and oxygen tension (ppO_2) is called oxygen dissociation curve.
Statement (II): Oxygen dissociation curve shifts towards the right due to decrease in H^+ concentration and decrease in temperature.
In 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.

133. The volume of air remaining in the lungs and the dead space even after maximum expiration is ----------ml.

(A) 500
(B) 1000-1100
(C) 1100-1200
(D) 2000-3000

134. Select the INCORRECT statement with respect to the respiratory system.

(A) The oropharynx is a common passage for food and air.
(B) Larynx contains vocal cords for producing sound.
(C) The trachea is supported by 'C' shaped rings of cartilage.
(D) The trachea is internally lined by simple squamous epithelium.

135. Choose the INCORRECT statement related to human heart valves.

(A) The right atrioventricular aperture is guarded by tricuspid valve.

(B) The opening of the postcaval into the right atrium is guarded by a Thebesian valve.

(C) Openings of pulmonary veins into the left atrium lack valves.

(D) The openings of the pulmonary artery and the aorta are guarded by three semilunar valves.

136. Given below are two statements:
Statement (I): During ventricular systole, cuspid valves close both atrioventricular apertures, preventing blood flow into atria.
Statement (II): During ventricular diastole, semilunar valves are closed, preventing backflow of blood from pulmonary trunk and systemic aorta into ventricles.
In light of above statements, choose *most appropriate* answer from options given below.

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

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

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

(D) Statement (I) is incorrect; Statement (II) is correct.

137. Select the correct arrangement of types of WBCs with respect to their increasing percentage in blood.

(A) Eosinophils - Basophils - Lymphocytes - Neutrophils

(B) Basophils - Eosinophils - Lymphocytes - Neutrophils

(C) Lymphocytes - Eosinophils - Neutrophils - Monocyte

(D) Basophils - Neutrophils - Monocytes - Lymphocytes

138. Given below are two statements:
Statement (I): Peritoneal dialysis is as efficient as haemodialysis.
Statement (II): Secretion of erythropoietin, renin and calcitriol by kidneys is not possible using dialysis machine.
In 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.

139. Match **List I** with **List II**

List I (Hormone)	**List II (Role in regulating kidney function)**
(A). Renin	(I). Increases blood pressure by vasoconstriction in kidney
(B). Angiotensin II	(II). Stimulates reabsorption of water in DCT and CD
(C). ANP	(III). Stimulates formation of Angiotensin I
(D). ADH	(IV). Stimulates natriuresis and diuresis

Choose the **correct** answer from the options given below:

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

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

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

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

140. Which is the only mode of urine formation in marine bony fishes and desert amphibians?

(A) Ultrafiltration

(B) Glomerular filtration

(C) Augmentation

(D) Selective reabsorption

141. Which of the following part of nephron is NOT present in renal cortex?

(A) Malpighian bodies

(B) Loops of Henle

(C) Proximal convoluted tubules

(D) Distal convoluted tubules

142. Given below are two statements:
Statement (I): The organ of Corti is located on basilar membrane and helps in maintaining equilibrium.
Statement (II): The three semicircular canals maintain the balance and posture of the body.
In 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.

143. Fovea centralis of retina is the place of formation of sharpest vision where ----------

(A) only rods are present.
(B) only cones are present.
(C) both rods and cones are present.
(D) both rods and cones are absent.

144. Which of the following is the INCORRECT statement with respect to functional areas of cerebrum?

(A) Broca's area translates the thoughts into speech.
(B) Premotor area is the higher center for voluntary movements and the peripheral nervous system.
(C) Motor area controls the movements of muscles.
(D) Association area is for coordination between sensation and movements.

145. Select the group of cranial nerves which are only motor in function.

(A) Abducens, Facial, Spinal accessory
(B) Pathetic, Trigeminal, Abducens
(C) Hypoglossal, Pathetic, Abducens
(D) Abducens, Facial, Auditory

146. Resting potential of axonal membrane is restored mainly due to the ----------

(A) rapid diffusion of sodium ions to inside of the membrane.
(B) rapid diffusion of potassium ions to outside of the membrane.
(C) rapid diffusion of potassium ions to inside of the membrane.
(D) slow diffusion of potassium ions to inside of the membrane.

147. In a polarized state, the resting potential (average) of axon is ----------millivolts.

(A) -30
(B) -70
(C) $+30$
(D) $+60$

148. The most abundant glial cells of PNS which produce myelin sheath around medullated nerves are------.

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

149. Given below are two statements:
Statement (I): Calcitonin draws calcium from bones, increases calcium absorption in digestive tract, and reduces loss in urine.
Statement (II): Parathyroid hormone decreases calcium release from bones and accelerates uptake of phosphorus by bones.
In light of above statements, choose *most appropriate* answer from options given below.

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

150. Identify the mismatched pair with respect to hormones.

(A) Birth hormone - Oxytocin
(B) Salt retaining hormone - Aldosterone
(C) Hypercalcaemic hormone - Calcitonin
(D) Pregnancy hormone - Progesterone

151. Hormones produced by the placenta to maintain pregnancy are ----------.

(A) hCG, prolactin, relaxin
(B) progesterone, relaxin, oxytocin
(C) hCG, estrogen, progesterone
(D) hCG, estrogen, prolactin

152. Which of the following is NOT the function of sebum?

(A) It forms a lubricating layer on skin.
(B) It excretes substances like water, NaCl, lactic acid and urea.
(C) It protects skin from infection and injury.
(D) It makes the skin softer.

153. In which type of apomixis, a haploid embryo sac produces a haploid embryo from an egg or any other haploid cell of gametophyte?

(A) Recurrent apomixis
(B) Non-recurrent apomixis
(C) Diplospory
(D) Adventive polyembryony

154. Which is NOT a common example of adventive polyembryony?

(A) Pineapple
(B) Mango
(C) Orange
(D) Lemon

155. If the synergid of an ovule contains 24 chromosomes, then what will be the number of chromosomes in its endosperm?

(A) 24
(B) 48
(C) 72
(D) 96

156. Match **List I** with **List II**

List I (Outbreeding device)	**List II (example)**
(A). Unisexuality	(I). *Gloriosa*
(B). Protandry	(II). Mulberry
(C). Protogyny	(III). Apple
(D). Prepotency	(IV). Disc florets of sunflower

Choose the **correct** answer from the options given below:

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

157. All of the following aquatic plants are entomophilous EXCEPT

(A) Lotus
(B) *Vallisneria*
(C) Water hyacinth
(D) Waterlily

158. A female gametophyte of an angiospermic plant is developed from a megaspore mother cell by ----------.

(A) one meiotic and two mitotic divisions
(B) one meiotic and three mitotic divisions
(C) two meiotic and two mitotic divisions
(D) three meiotic and one mitotic divisions

159. Which of these developments occurs during the 1^{st} trimester of pregnancy?
(A). Arms, hands, fingers, feet, toes are formed.
(B). Baby's movements can be easily felt by the mother.
(C). Foetus can open and close mouth and fists.
(D). The CNS is developing, working of the excretory and circulatory systems begins.
Choose the **correct** answer from the options given below:

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

160. Given below are two statements with respect to gastrulation:
Statement (I): The cells of epiblast towards the blastocoel contribute in the formation of yolk sac.
Statement (II): The cells of epiblast take part in the formation of third germinal layer, the mesoderm.
In 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.

161. Fertilizin receptor proteins necessary for attraction of sperms to the egg in mammals are present on ---------.

(A) vitelline membrane
(B) corona radiata
(C) zona pellucida
(D) perivitelline space

162. How many eggs are released by a human female in the time period of about 32 years between menarche and menopause?

(A) 240
(B) 320
(C) 384
(D) 416

163. Identify the hormone releasing Intra Uterine Device from the following.

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

164. A normal woman whose father was colourblind is married to a normal man, (assuming equal distribution of female gametes), then _____.

(A) 50% of their sons will be colourblind.
(B) All the sons will be colourblind.
(C) All the sons will be normal.
(D) 75% of the sons will be colourblind.

165. Which one of the following is a symptom of Klinefelter's Syndrome?

(A) Webbed neck
(B) Gynaecomastia
(C) Broad shield-shaped chest
(D) Lower posterior hair line

166. A pea plant with genotype RrYy is crossed with another pea plant with genotype rryy. What will be the number of phenotypes obtained by this cross?

(A) 16
(B) 12
(C) 9
(D) 4

167. A sickle-cell carrier man marries a woman who is carrier for sickle-cell anaemia. What are the chances of having carrier children?

(A) All the children will be carriers.
(B) None of them will be carriers.
(C) 50% of them will be carriers.
(D) 25% of them will be carriers.

168. As in rDNA technology, in DNA fingerprinting, also, all the following techniques are used EXCEPT:

(A) Restriction enzymes.
(B) Cloning vector plasmids.
(C) Gel electrophoresis.
(D) Isolated DNA segments.

169. Select the INCORRECT statement from the following related to HGP.

(A) HGP is a multinational research project to determine the genomic structure of humans.
(B) The human genome project was initiated in 1990.
(C) HGP was co-ordinated by the US department of biotechnology and life sciences.
(D) HGP was completed in 2003.

170. Select the INCORRECT statement with respect to coding strand.

(A) It is also known as sense strand.
(B) The terminator is located at 3' end of coding strand.
(C) The nucleotide sequence of this strand is the same as in RNA, except that RNA contains uracil in place of thymine.
(D) The nucleotide sequence of this strand is the same as in the template strand with 3' $\rightarrow$ 5' polarity.

171. Meselson and Stahl proved the semi-conservative nature of DNA replication using the isotope ___.

(A) ^{32}P (B) ^{35}S

(C) ^{14}C (D) ^{15}N

172. In the chromosomes, DNA is associated with histone and non-histone proteins. This was reported in 1974 by ----------.

(A) F.H.C. Crick (B) F. Miescher

(C) F. Griffith (D) R. Kornberg

173. Given below are two statements related to sympatric speciation:
Statement (I): Formation of species within single population without geographical isolation is sympatric speciation.
Statement (II): Migration of individuals is helpful in sympatric speciation.
In 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.

174. The natural selection in which more number of individuals acquire peripheral character value at both ends of the distribution curve is called ---------- selection.

(A) stabilizing (B) balancing

(C) directional (D) disruptive

175. Populations with ---------- individuals have greater chances of genetic drift.

(A) 100-150 million. (B) 50-60 million.

(C) 5000-10000. (D) 80-90 million.

176. Which of the following does NOT favour speciation?

(A) Drastic seasonal variations

(B) Overall stability of tropical regions

(C) Availability of plenty of sunlight

(D) Less climatic changes throughout the year

177. Given below are two statements related to drugs abuse:
Statement (I): Excessive dosage of cocaine causes extreme happiness, irritability, paranoia etc.
Statement (II): A drug like heroin obtained from *Cannabis sativa* is used as depressant as it slows down the activity of body.
In 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.

178. Identify the CORRECT pair of vector borne diseases.

(A) Malaria and typhoid

(B) Dengue and amoebiasis

(C) Dengue and filariasis

(D) Ringworm and pneumonia

179. Match **List I** with **List II**

List I (Immune cells)	**List II (Functions)**
(A). Plasma cells	(I). Bind to infected cell and secrete perforins
(B). Helper T-cells	(II). Produce specialized glycoproteins, called antibodies
(C). Cytotoxic T-cells	(III). Engulf invading pathogens and process the antigens
(D). Antigen presenting cells	(IV). Stimulation of B-lymphocytes, macrophages

Choose the **correct** answer from the options given below:

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

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

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

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

180. Which of the following is INCORRECT regarding inbreeding?

(A) By inbreeding, pure lines of animals can be obtained.
(B) It involves breeding of animals of two related species having no common ancestors.
(C) It is useful in the elimination of harmful recessive genes.
(D) It is useful for accumulation of superior genes.

181. Which of the following species of honey bee are known as European bee and Indian bee respectively?

(A) *Apis mellifera* and *Apis indica*
(B) *Apis flora* and *Apis dorsata*
(C) *Apis mellifera* and *Apis dorsata*
(D) *Apis florea* and *Apis indica*

182. Match **List I** with **List II**

List I (Source of SCP)	**List II (Example)**
(A). Fungi	(I). *Chlorella pyrenoidosa*
(B). Yeast	(II). *Methylophilus methylotropus*
(C). Algae	(III). *Candida utilis*
(D). Bacteria	(IV). *Aspergillus niger*

Choose the **correct** answer from the options given below:

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

183. Disease resistant, high-yielding variety of rice developed by mutation breeding is ----------.

(A) NP 836
(B) Regina-II
(C) Jagannath
(D) Indore-2

184. Microbial source of antibiotic terramycin is ----------.

(A) *Streptomyces venezuelae*
(B) *Streptomyces griseus*
(C) *Streptomyces rimosus*
(D) *Streptomyces erythreus*

185. Which of the following characteristics, a good cloning vector must possess, to be efficiently used in rDNA technology?
(A). It should have the ability of independent replication.
(B). It should have marker genes for antibiotic resistance.
(C). It should be able to easily be introduced into host cells.
(D). It should have suitable control elements like promoter, operator, ribosome binding sites, etc.
Choose the **correct** answer from the options given below:

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

186. Which enzyme is used for inserting foreign DNA into the vector DNA in recombinant DNA technology?

(A) DNA polymerase
(B) DNA gyrase
(C) DNA ligase
(D) DNA helicase

187. To increase the production of Methionine in soya beans, researchers used a gene from the ----------.

(A) walnut
(B) cowpea
(C) Brazil nut
(D) maize

188. Insulin production by recombinant DNA technology is designed by ----------.

(A) Edward Sharpey Schafer
(B) Gilbert and Villa-Komaroff
(C) Itakura et al.
(D) Stanley Cohen et al

189. Given below are two statements related to natality and mortality:
Statement (I): Absolute natality will be always more than realized natality.
Statement (II): Absolute mortality will be always more than realized mortality.
In 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.

190. Which of the following population interaction is represented by the signs: +, 0

(A) Symbiosis
(B) Commensalism
(C) Amensalism
(D) Parasitism

191. Desert lizards bask in the sun and absorb heat, when their body temperature drops below the comfort zone, but move into shade, when the ambient temperature starts increasing. This is an example of ----------adaptations.

(A) morphological
(B) physiological
(C) biochemical
(D) behavioural

192. Select the INCORRECT statement from the following with respect to osmoregulation.

(A) Marine birds like Albatross have special salt glands near nostrils for osmoregulation.
(B) Marine organisms like sea turtles and marine iguanas have salt secreting glands to manage osmotic balance.
(C) Marine organisms are mostly osmoregulators because their body fluids and external environment are isoosmotic in nature.
(D) Fresh water forms and terrestrial organisms are osmoregulators.

193. Which are the pioneer species in hydrarch succession of plants?

(A) Crustose lichens
(B) Small phytoplanktons
(C) Bryophytes and mosses
(D) Zooplanktons

194. Given below are two statements related to the ecological pyramid.
Statement (I): Ecological pyramid assumes a simple food chain, something that never exists in nature.
Statement (II): Saprophytes are not given any place in ecological pyramids as they do not play any vital role in the ecosystem.
In 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.

195. The process of degradation of humus by soil microbes to release inorganic nutrients is called as ----------.

(A) fragmentation
(B) catabolism
(C) mineralisation
(D) humification

196. ---------- constitutes a large regional terrestrial unit delimited by a specific climatic zone having major vegetation zone and the associated fauna.

(A) Organism
(B) Community
(C) Biome
(D) Population

197. Pilot plantation programmes using Miyawaki pattern in various districts of Maharashtra are run by the State Forest Department and ----------.

(A) Local Biodiversity Committee
(B) Agricultural Universities
(C) Social Forestry Department
(D) Forest Rangers

198. Which group has more diversity of known species of organisms from the following?

(A) Protista
(B) Fungi
(C) Plants
(D) Animals

199. Eutrophication is due to overgrowth of ---------- at the instance of high phosphorus dissolved in water.

(A) fungi
(B) zooplanktons
(C) fishes
(D) algae

200. According to Central Pollution Control Board, which particulate matter size in diameter (in micrometers) are responsible for causing the greatest harm to human health?

(A) 2.5 or less (B) 2.5 to 5.0

(C) 5.0 to 7.5 (D) 7.5 to 10

- End of Question Paper -