MHT CET 2024 PCB Apr 22 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 2024**, 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. Water is flowing through a horizontal pipe in a streamline flow. At the narrowest part of the pipe

(A) velocity is maximum and pressure is minimum.
(B) pressure is maximum and velocity is minimum.
(C) both the pressure and velocity are minimum.
(D) both the pressure and velocity are maximum.

2. Two different coils have self - inductance $L_1 = 9mH$ and $L_2 = 3mH$. The current in first coil is increased at a constant rate. The current in the second coil is also increased at the same constant rate. At certain instant of time, the power given to the two coils is same. At that time, there was current and induced voltage in the two coils. At the same instant, the ratio of the energy stored in the first coil to that in second coil is

(A) $1:3$
(B) $3:1$
(C) $1:9$
(D) $9:1$

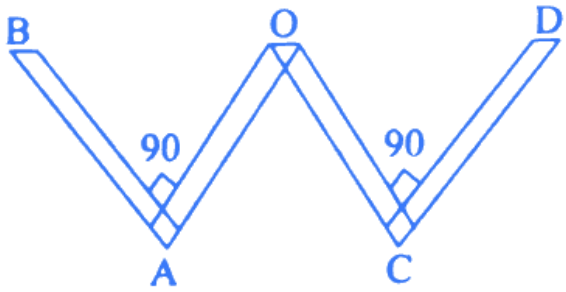
3. Four masses of $1\,kg, 2\,kg, 3\,kg$ and $4\,kg$ are kept at co-ordinates $(0,0)m, (0,1)m$ and $(1,0)m$ respectively. Using the co-ordinates of centre of mass its position vector is

(A) $0.5\hat{i} + 0.7\hat{j}$
(B) $0.7\hat{i} + 0.5\hat{j}$
(C) $0.4\hat{i} + 0.6\hat{j}$
(D) $\hat{i} + \hat{j}$

4. In between the plates of parallel plate capacitor of plate separation 'd' a dielectric plate of thickness ' t ' is inserted. The capacitance becomes one-third of the original capacity without dielectric. The dielectric constant of the plate is

(A) $\frac{t}{2\,d-t}$
(B) $\frac{t}{2d+t}$
(C) $\frac{3t}{d-t}$
(D) $\frac{3t}{d+t}$

5. A thin rod of length ' 4 L ' and mass ' 4 m ' is bent at the points as shown in the figure. The moment of inertia of the rod about an axis passing through point ' O ' and perpendicular to plane of the paper is



(A) $\frac{mL^2}{3}$
(B) $\frac{10\,mL^2}{3}$
(C) $\frac{mL^2}{12}$
(D) $\frac{mL^2}{24}$

6. The resistance of a coil for d.c. is 5Ω. In a.c., the resistance will

(A) remain same.
(B) increase.
(C) decrease.
(D) be zero.

7. When a ray of light is refracted from one medium to another, then the wavelength changes from $6000\,\mathring{A}$ to $4000\,\mathring{A}$. The critical angle for the interface will be

(A) $\cos^{-1}(\frac{3}{2})$
(B) $\sin^{-1}(\frac{2}{\sqrt{3}})$
(C) $\sin^{-1}(\frac{2}{3})$
(D) $\cos^{-1}(\frac{2}{\sqrt{3}})$

8. A pipe closed at one end vibrating in fifth overtone is in unison with open pipe vibrating in its fifth overtone. The ratio of $l_c : l_o$ is [l_c = vibrating length of closed pipe, l_0 = vibrating length of open pipe]

(A) $12:11$
(B) $1:1$
(C) $11:12$
(D) $5:1$

9. Two stars 'A' and 'B' radiate maximum energy at $5200\,\mathring{A}$ and $6500\,\mathring{A}$ respectively. Then the ratio of absolute temperatures of stars ' A ' and ' B ' is

(A) $25:16$
(B) $5:4$
(C) $4:5$
(D) $16:25$

10. A hollow charged metal sphere has a radius ' r '. If the potential difference between its surface and a point at a distance ' 3 r ' from the centre is ' v ', then the electric field intensity at a distance ' $3r$ ' is

(A) $\frac{V}{2r}$ (B) $\frac{v}{3r}$

(C) $\frac{v}{6r}$ (D) $\frac{v}{4r}$

11. For a given medium, the speed of light and the polarising angle are ' v ' and ' i_p ' respectively, then (c = speed of light in vaccum)

(A) $v\sin(i_p) = c\cos(i_p)$ (B) $c = v\cot(i_p)$

(C) $v\cos(i_p) = c\sin(i_p)$ (D) $v = c\cos(i_p)$

12. A particle of mass ' m ' is executing S.H.M. about the origin on x-axis with frequency $\sqrt{\frac{ka}{\pi m}}$, where ' k ' is a constant and ' a ' is the amplitude of S.H.M. If ' x ' is a displacement of a particle, at time ' t ', potential energy of the particle will be

(A) $\frac{1}{2}kax^2$ (B) πkax^2

(C) $2\pi kax^2$ (D) $2kax^2$

13. A satellite is revolving round the earth with orbital speed ' V_0 '. If it stops suddenly, the speed with which it will strike the surface of the earth would be (V_e = escape velocity of a particle on earth's surface)

(A) $\frac{V_e^2}{V_0}$ (B) $2\ V_0$

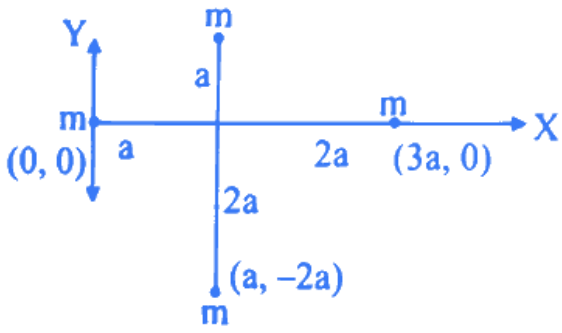
(C) $\sqrt{V_e^2 - V_0^2}$ (D) $\sqrt{V_e^2 - 2\ V_0^2}$

14. The angular momentum of electron in hydrogen atom in first orbit is ' L '. The change in angular momentum if electron is in second orbit of hydrogen atom is

(A) 2 L (B) L

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

15. Four point masses, each of mass ' m ' are arranged in $X - Y$ plane as shown in the figure. The moment of inertia of this system about X-axis is



(A) $3ma^2$ (B) $5ma^2$

(C) $4ma^2$ (D) $6ma^2$

16. In biprism experiment the maximum intensity is ' I_0 '. If the path difference between the two interfering waves is ' $\lambda/4$ ' then intensity at the point on the screen is

$$\left[\sin 45^\circ = \cos 45^\circ = \frac{1}{\sqrt{2}}\right]$$

(A) $\frac{I_0}{4}$ (B) $\frac{I_0}{3}$

(C) $\frac{I_0}{2}$ (D) I_0

17. Work done to get ' n ' spherical drops of equal size from a single spherical drop of water, is proportional to

(A) $(\frac{1}{n^{2/3}} - 1)$ (B) $(\frac{1}{n^{1/3}} - 1)$

(C) $n^{1/3} - 1$ (D) $n^{4/3} - 1$

18. Diode and resistance are connected as shown in figure. Out of the following statements which one is TRUE?



Fig. (1)



Fig. (2)

(A) Diode D_1 and diode D_2 both are forward biased.

(B) Diode D_1. and diode D_2 both are reverse biased.

(C) Diode D_1 is forward biased and diode D_2 is reverse biased.

(D) Diode D_1 is reverse biased and diode D_2 is forward biased.

19. Two uniform strings ' A ' and ' B ' made of steel are made to vibrate under same tension. If the first overtone of ' A ' is equal to second overtone of ' B ' and radius of ' A ' is twice that of ' B '. Then the ratio of length of string ' A ' to that of ' B ' is

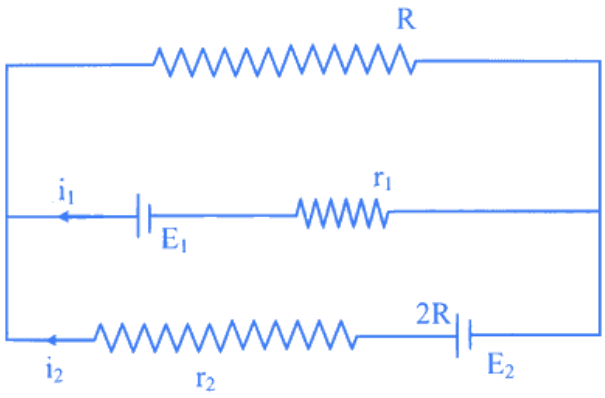
(A) 2 : 1

(B) 3 : 4

(C) 3 : 2

(D) 1 : 3

20. Which one of the following is the correct equation for the electric circuit shown in the figure?



(A) $E_1 - (i_1 + i_2)R + i_1 r_1 = 0$

(B) $E_1 - (i_1 + i_2)R - i_1 r_1 = 0$

(C) $E_2 - i_2 r_2 - E_1 - i_1 r_1 = 0$

(D) $E_2 - (i_1 + i_2)R + i_2 r_2 = 0$

21. A pendulum is performing simple harmonic motion. The acceleration of the bob is 20 cm s^{-2} at a distance of 5 cm from mean position. The time period of oscillation is

(A) 2 s

(B) πs

(C) 2π s

(D) 1 s

22. A spherical body of radius ' r ' radiates power ' P ' at T kelvin. If the radius s halved and the temperature doubled the power radiated in the same time ' t ' will be

(A) $\frac{P}{2}$

(B) 2 P

(C) 4 P

(D) 8 P

23. For a common emitter transistor configuration the ratio of $\frac{I_C}{I_E} = 0.96$, then the current gain in this configuration is

(A) 6

(B) 12

(C) 24

(D) 48

24. A stone is thrown upward with a speed 'u' from the top of a tower reaches the ground with velocity ' $3u$ '. The height of the tower is (g = acceleration due to gravity)

(A) $\frac{3u^2}{g}$

(B) $\frac{4u^2}{g}$

(C) $\frac{6u^2}{g}$

(D) $\frac{9u^2}{g}$

25. A metal surface is illuminated by light of two different wavelengths 207 nm and 414 nm . The maximum speeds of photoelectrons corresponding to these wavelengths are u_1 and u_2 respectively with $u_1 : u_2 = 2 : 1$. The work function of the metal is (hc = 1242eVnm)

(A) 1.6 eV

(B) 2.0 eV

(C) 2.4 eV

(D) 3.0 eV

26. In thermodynamic process, which of the following statements is not true?

(A) In an adiabatic process, the system is insulated from the surroundings.

(B) In an isochoric process, the pressure remains constant.

(C) In an isothermal process, the temperature remains constant.

(D) In an adiabatic process, pv^{γ} = constant.

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27. A charged particle is subjected to acceleration in a cyclotron which consists of two dees ' D_1 ' and ' D_2 '. The charged particle undergoes increase in its speed.

(A) inside D_1, D_2 and the gap between dees.
(B) only inside D_1.
(C) only in the gap between D_1 and D_2.
(D) only inside D_2.

28. In case of well of death which is a vertical cylindrical wall of radius ' r ' inside which vehicle is driven in horizontal circles. If ' m ' is mass of vehicle, ' V ' is the velocity and ' μ_s ' is the coefficient of static friction between the wheels of vehicle and walls then correct relation is [g = acceleration due to gravity]

(A) $V^2 \leq \frac{rg}{\mu_s}$
(B) $V \leq \frac{rg}{\mu_s}$
(C) $V^2 \geq \frac{rg}{\mu_s}$
(D) $V \geq \frac{rg}{\mu_s}$

29. In an oscillating LC circuit, the maximum charge on the capacitor is ' Q '. When the energy is stored equally between the electric and magnetic fields, the instantaneous charge on the capacitor ' q ' is

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

30. Two particles execute S.H.M. of same amplitude and frequency along the same straight line path. They pass each other when going in opposite directions, each time their displacement is half the amplitude. The phase difference between them is $(\sin 30^\circ = 0 \cdot 5)$

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

31. The pitch of whistle of an engine appears to drop by 30% of the original value when it passes a stationary observer. If speed of sound in air is 350 m/s, then the speed of engine in m/s is

(A) 87.5
(B) 105
(C) 150
(D) 175

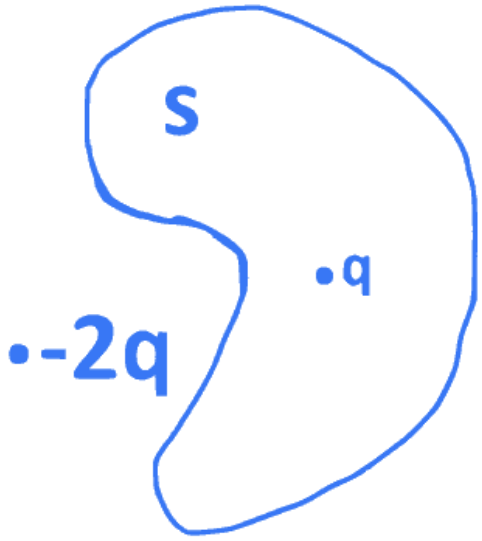
32. A solenoid is connected to a battery so that a steady current flows through it, If an iron core is inserted into the solenoid, then the current in the coil

(A) will not change.
(B) will increase.
(C) will decrease.
(D) may increase or decrease depending upon the direction of the current.

33. A monoatomic ideal gas, initially at temperature ' T_1 " is enclosed in a cylinder fitted with a frictionless piston. The gas is allowed to expand adiabatically to a temperature ' T_2 ' by releasing the piston suddenly. L_1 and L_2 are the lengths of the gas columns before and after the expansion respectively. Then $\frac{T_1}{T_2}$ is

(A) $\sqrt{\frac{L_1}{L_2}}$
(B) $\sqrt{\frac{L_2}{L_1}}$
(C) $(\frac{L_1}{L_2})^{2/3}$
(D) $(\frac{L_2}{L_1})^{2/3}$

34. In the diagram, the total electric flux through the closed surface ' S ' is
[Given q = charge
ε_0 = permittivity of free space]



(A) $\frac{q}{\epsilon_0}$
(B) $\frac{-2q}{\epsilon_0}$
(C) $\frac{-q}{\epsilon_0}$
(D) $\frac{3q}{\epsilon_0}$

35. If an electron in hydrogen atom jumps from 3^{rd} orbit to 2^{nd} orbit it emits a photon of wavelength ' λ '. When it emits a photon from 4^{th} orbit to 3^{rd} orbit then the corresponding wavelength of emitted photon will be

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

(C) $\frac{20}{7}\lambda$ (D) $\frac{20}{13}\lambda$

36. A solenoid having 400 turns/metre has a core of a material with relative permeability 300 . If a current of 0.5 A is passed through it, then the magnetisation of the core material is nearly

(A) 6×10^2 A/m (B) 6×10^3 A/m

(C) 6×10^4 A/m (D) 6×10^5 A/m

37. The volume of a block of metal at 30°C changes by 0.12% when its temperature is increased to 70°C. The coefficient of linear expansion of the metal is

(A) 2×10^{-5}°C (B) 3×10^{-5}°C

(C) 4×10^{-5}°C (D) 1×10^{-5}°C

38. A galvanometer of resistance ' G ' can be converted into a voltmeter of range ($0-\mathrm{V}$) volt by connecting a resistance ' R ' in series with it. The resistance ' R required to change its range from $\left(0-\frac{\mathrm{V}}{4}\right)$ volt will be

(A) $\frac{R-G}{2}$ (B) $\frac{\mathrm{R}-2\mathrm{G}}{3}$

(C) $\frac{R-3G}{4}$ (D) $\frac{4R-3G}{5}$

39. A light metal disc of radius ' r ' floats on water surface and bends the surface downwards along the perimeter making an angle ' θ ' with the vertical edge of the disc. If the weight of water displaced by the disc is ' W ', the weight of the metal disc is [T = surface tension of water]

(A) $\mathrm{W}-2\pi\mathrm{rTcos}\theta$ (B) $2\pi r\ \mathrm{T}+\mathrm{W}$

(C) $2\pi\mathrm{rTcos}\theta+\mathrm{W}$ (D) $2\pi\mathrm{rTcos}\theta-\mathrm{W}$

40. The magnetic field at the centre of a current carrying circular coil of area ' A ' is ' B '. The magnetic moment of the coil is (μ_0 =. permeability of free space)

(A) $\frac{2B}{\mu_0}\sqrt{\frac{A^3}{\pi}}$ (B) $\frac{\mathrm{BA}^2}{4\mu_0\pi}$

(C) $\frac{2\pi}{\mu_0}\sqrt{A^3}$ (D) $\frac{\mu_0}{2B}\sqrt{\frac{A^3}{\pi}}$

41. A parallel combination of two capacitors of capacities ' C ' and ' $\frac{\mathrm{C}}{3}$, respectively is connected across a battery of 12 volt. When both capacitors are fully charged, the charge and energy stored in them is Q_1, Q_2 and E_1, E_2 respectively. Then the ratio of (E_1-E_2) to (Q_1-Q_2) is

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

(C) 8 : 1 (D) 6 : 1

42. A transparent sphere of refractive index ' μ ' and radius of curvature ' R ' is kept in air. A point object is placed at a distance ' d ' from the surface of the sphere so that the real image is formed at the same distance ' d ' from exactly opposite side of the sphere. The distance ' d ' is

(A) $\frac{\mu}{R}$ (B) $\mathrm{R}(\mu-1)$

(C) $\frac{\mathrm{R}}{(\mu-1)}$ (D) $\frac{\mathrm{R}}{(\mu+1)}$

43. The instantaneous value of current in an a.c. circuit is $I=2\sin\left[100\pi t+\frac{\pi}{3}\right]$ A. The current will be maximum for the first time at $(\sin 90^\circ=1)$

(A) $\frac{1}{100}$ s (B) $\frac{1}{200}$ s

(C) $\frac{1}{400}$ s (D) $\frac{1}{600}$ s

44. A fixed mass of gas at constant pressure occupies a volume ' V '. The gas undergoes a rise in temperature so that the r.m.s. velocity of the molecule is doubled. The new volume will be

(A) $\frac{\mathrm{V}}{2}$ (B) $\frac{\mathrm{V}}{\sqrt{2}}$

(C) 2 V (D) 4 V

45. The Boolean expression for $\mathrm{X}-\mathrm{OR}$ gate $C=(A\oplus B)$ is equivalent to

(A) $(\bar{\mathrm{A}}\cdot\mathrm{B})+(\mathrm{A}\cdot\bar{\mathrm{B}})$ (B) $\mathrm{A}+(\bar{\mathrm{A}}\cdot\bar{\mathrm{B}})$

(C) $(\mathrm{A}\cdot\mathrm{B})+\bar{\mathrm{B}}$ (D) $(\mathrm{A}\cdot\mathrm{B})+(\bar{\mathrm{A}}\cdot\bar{\mathrm{B}})$

46. The equation of simple harmonic progressive wave is given by $y=A\sin(100\pi t-4x)$. The distance between two particles having a phase difference of $\left(\frac{\pi}{4}\right)^c$ is

(A) $\frac{\pi}{18}$ m (B) $\frac{\pi}{16}$ m

(C) $\frac{\pi}{9}$ m (D) $\frac{\pi}{3}$ m

47. A photon and an electron have an equal energy ' E '. The ratio of wavelength ' λ_{p} ' of photon to that of electron ' λ_{e} ' is proportional to

(A) $\sqrt{\mathrm{E}}$ (B) $\frac{1}{\sqrt{\mathrm{E}}}$

(C) $\frac{1}{E}$ (D) E

48. The height at which the acceleration due to gravity becomes $\frac{g}{4}$ in terms of R is [$R =$ the radius of the earth]

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

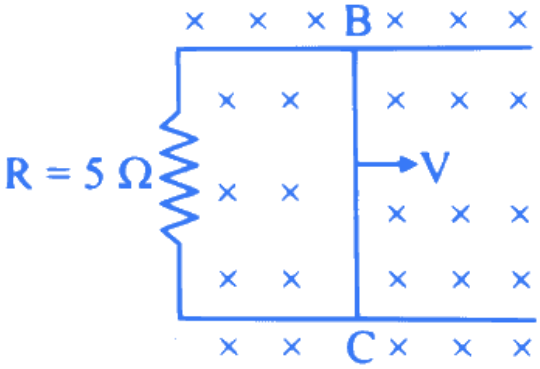
(C) $\sqrt{2}R$ (D) $2R$

49. In a biprism experiment, fifth dark fringe is obtained at a point. A thin transparent film of refractive index ' μ ' is placed in one of the interfering paths. Now 7^{th} bright fringe is obtained at the same point. If ' λ ' is the wavelength of light used, the thickness of film is equal to

(A) $1.5(\mu - 1)\lambda$ (B) $\frac{1.5\lambda}{(\mu-1)}$

(C) $2.5(\mu - 1)\lambda$ (D) $\frac{2.5\lambda}{(\mu-1)}$

50. Figure shows a rectangular frame situated in a constant magnetic field. A wire BC of length 1 m is moved out with velocity 4 m/s. Magnetic field strength is 0.15 T . Force acting on the wire BC is



(A) 18 N (B) 1.8 N

(C) 0.18 N (D) 0.018 N

51. Which element from following does NOT exhibit magnetic moment in +1 state?

(A) Zn (B) Co
(C) Cu (D) Mn

52. The entropy of vaporisation of benzene is 85 J K^{-1} mol^{-1}. When 117 g of benzene vaporises at its boiling point, what is entropy change of surrounding if process is at equilibrium?

(A) -85 J K^{-1} (B) -85×1.5 J K^{-1}
(C) 85×1.5 J K^{-1} (D) 42.5 J K^{-1}

53. Which from the following equations represents the relation between solubility ($molL^{-1}$) and solubility product for the salt B_2 A ?

(A) $S = (\frac{K_{sp}}{4})^{1/3}$ (B) $S = (4\ K_{sp})^{1/3}$
(C) $S = (\frac{K_{sp}}{3})^{1/3}$ (D) $S = (3\ K_{sp})^{1/3}$

54. What is the number of chiral carbon atoms and number of formyl groups respectively present in ribose?

(A) 2 and 2 (B) 2 and 1
(C) 3 and 1 (D) 3 and 2

55. Calculate the Henry's law constant at 25°C if solubility of gas in liquid is 2.1×10^{-2} $moldm^{-3}$ at 0.18 bar.

(A) 0.1166 $moldm^{-3}bar^{-1}$
(B) 0.1445 $moldm^{-3}bar^{-1}$
(C) 0.1730 $moldm^{-3}bar^{-1}$
(D) 0.2014 $moldm^{-3}bar^{-1}$

56. What is the name of isopropyl alcohol according to carbinol system?

(A) Methyl carbinol (B) Dimethyl carbinol
(C) Ethyl carbinol (D) Propyl carbinol

57. What is the frequency of red light having wave length 750 nm ?

(A) 3.0×10^{14} Hz (B) 4.0×10^{14} Hz
(C) 7.5×10^{14} Hz (D) 9.0×10^{14} Hz

58. Identify the product ' C ' formed in the following series of reactions.



(A) Ethane (B) Bromoethane
(C) Ethyl magnesium bromide (D) Ethene

59. Which from following groups exhibits +I effect?

(A) -COOR (B) -COOH
(C) $-C_2H_5$ (D) $-NO_2$

60. Which of the following equation exhibits integrated rate law equation for first order reaction?

(A) $k = \frac{[A]_0 - [A]_1}{2}$ (B) $k = \frac{2.303}{t} \times \log\frac{a}{(a-x)}$
(C) $k = \frac{1}{t}\ln\frac{(a-x)}{a}$ (D) $k = \frac{1}{t} \times \frac{x}{a(a-x)}$

61. Which from following statements is NOT true about physisorption?

(A) The forces operating are weak van der Waals forces. (B) It is not specific in nature.
(C) It is irreversible. (D) The heat of adsorption is low and lies in the range $20 - 40$ kJ mol^{-1}.

62. Which from following is a semisynthetic polymer?

(A) Silk (B) Terylene
(C) Viscose rayon (D) Neoprene

63. Calculate the molar mass of an element having density 19.2 g cm^{-3} if it forms fcc structure $[a^3 \times N_A = 40\ cm^3\ mol^{-1}]$

(A) 192 g mol^{-1} (B) 186 g mol^{-1}
(C) 210 g mol^{-1} (D) 280 g mol^{-1}

64. Which among the following is the strongest acid?

(A) Acetic acid (B) Monochloroacetic acid
(C) Dichloroacetic acid (D) Trichloroacetic acid

65. What is the ratio of mass of nitrogen that combines with 16 parts by weight of oxygen in N_2O, NO, NO_2 ?

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

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

66. What is the quantity of electricity required to liberate 112 cm^3 of hydrogen gas at STP from acidified water?

(A) 482.5 C (B) 965 C

(C) 500 C (D) 96500 C

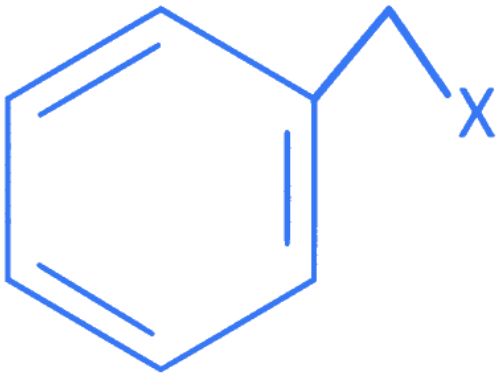
67. Which of the following is selected as cathode for a galvanic cell set up with nickel anode?

(A) Mg (B) Cu

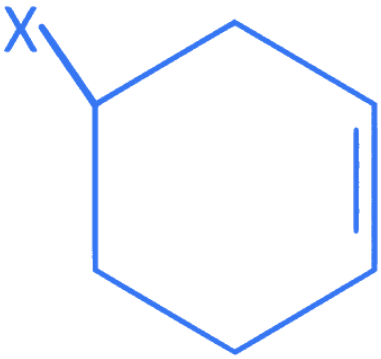
(C) Al . (D) Zn

68. Which among the following is haloarene?

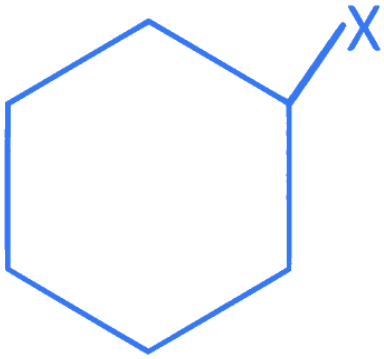
(A)



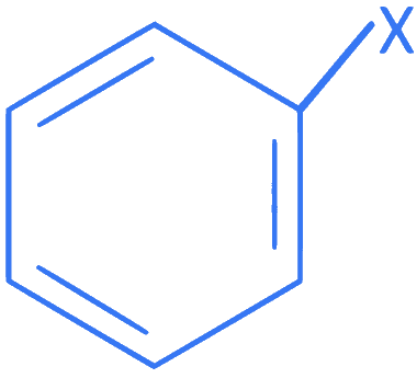
(B)



(C)



(D)



69. Which from following chemical activities does NOT exhibit good atom economy according to the principles of green chemistry?

(A) Formation of Grignard reagent.
(B) Action of HX on alkene to form alkylhalide.
(C) Action of thionyl chloride on ethanol to form ethyl chloride.
(D) Formation of cyclohexanol from phenol by catalytic hydrogenation.

70. Calculate activation energy for a reaction if it's rate doubles when temperature is raised from $20^{\circ}C$ to $35^{\circ}C$ $\left(R = 8.314\ J\ K^{-1}\ mol^{-1}\right)$

(A) 17.336 kJ
(B) 26.900 kJ
(C) 34.673 kJ
(D) 44.236 kJ

71. What is the formal charge present on oxygen atom (numbered 1) in Lewis structure of CO_2 ?



(A) 0
(B) -1
(C) $+1$
(D) -2

72. Which among the following is a monomer of natural rubber?

(A) 2-Methyl-1, 3-butadiene
(B) 1,1,2,2-Tetrafluoroethene
(C) 2-Chloro-1, 3 butadiene
(D) 1,3-butadiene

73. Identify the product obtained when alkyl alkanoate is hydrolysed with dilute HCl .

(A) Alkanol and Alkanoic acid
(B) Alkanal and Alkanone
(C) Alkanone and Alkanoic acid
(D) Alkanol and Alkanal

74. Which of the following changes exhibit that nitrogen undergoes oxidation?

(A) $NH_4^+ \rightarrow N_2$
(B) $NO_3^- \rightarrow NO$
(C) $NO_2 \rightarrow NO_2^-$
(D) $NO_3 \rightarrow NH_4^+$

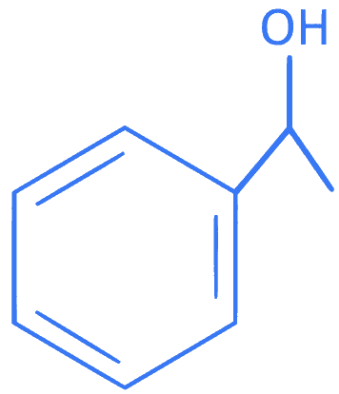
75. The molar conductivity of $0.02\ moldmdm^{-3}$ solution of sodium hydroxide is $230.5\Omega^{-1}\ cm^2\ mol^{-1}$. What is it's conductivity?

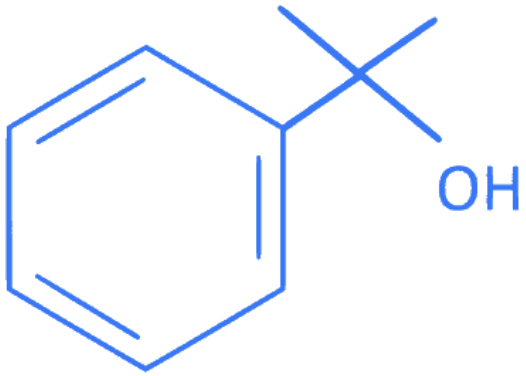
(A) $0.01155\Omega^{-1}\ cm^{-1}$
(B) $0.02308\Omega^{-1}\ cm^{-1}$
(C) $0.00461\Omega^{-1}\ cm^{-1}$
(D) $0.05613\Omega^{-1}\ cm^{-1}$

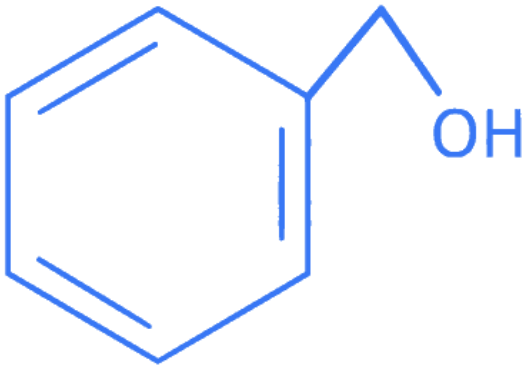
76. Calculate the volume occupied by particle in simple cubic unit cell if volume of unit cell is $5.5 \times 10^{-22}\ cm^3$.

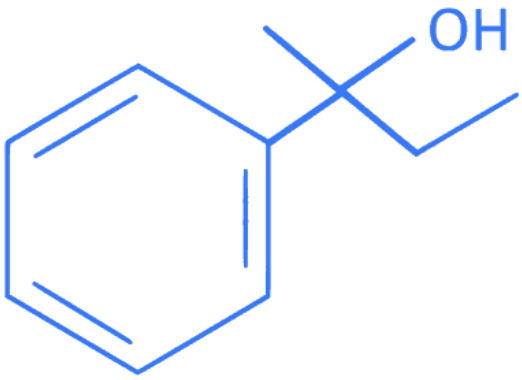
(A) $2.88 \times 10^{-22}\ cm^3$
(B) $1.87 \times 10^{-22}\ cm^3$
(C) $1.02 \times 10^{-22}\ cm^3$
(D) $3.44 \times 10^{-22}\ cm^3$

77. Which of the following is primary benzylic alcohol?

(A) 

(B) 

(C) 

(D) 

78. Which from following elements is a decay product of thorium?

(A) S (B) Se
(C) Po (D) Te

79. If half life of a first order reaction is 10 minutes, find the time required to decrease concentration of reactant from 0.08 M to 0.02 M .

(A) 10 minutes (B) 20 minutes
(C) 30 minutes (D) 40 minutes

80. Calculate the pOH of buffer solution formed from 0.3 M weak base and 0.45 M of its salt with strong acid $[pK_b = 4.7447]$

(A) 6.45 (B) 4.07
(C) 4.92 (D) 5.51

81. Which from following complexes is having ambidentate ligand in it?

(A) Sodium hexafluoroaluminate(III)
(B) Pentaaquaisothiocyanatoiron(III) ion
(C) Hexacyanoferrate(II) ion
(D) Trioxalatocobaltate(III) ion

82. What is the minimum number of spheres required to develop an octahedral void?

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

83. How many moles of iodomethane are consumed in the following conversion?

$$CH_3NH_2 \xrightarrow[\Delta]{CH_3I} (CH_3)_4 N^+I^-$$

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

84. Identify the use of calcium carbonate from following.

(A) For mercerising cotton fabrics. (B) As a source of hydride.
(C) As chlorinating agent. (D) In tooth paste.

85. Which of the following acid strength is used to get good yield of alkyl iodide from alcohol and sodium iodide in phosphoric acid?

(A) 15% (B) 35%
(C) 65% (D) 95%

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86. Identify false statement about transition elements.

(A) As per IUPAC convention, transition metal atom have incomplete d-subshell.

(B) 6d-series includes all elements from $Ac(Z = 89)$ to $Cn(Z = 112)$.

(C) These elements are placed in group 3 to 12 in modern periodic table.

(D) In these $(n - 1)$ d-orbital is filled successively.

87. Which from following terms is explained by first law of thermodynamics?

(A) Entropy

(B) Free energy

(C) Conservation of energy

(D) Enthalpy

88. Calculate degree of dissociation of a weak monobasic acid in 0.01 M solution if dissociation constant is 1.6×10^{-5}.

(A) 0.02

(B) 0.03

(C) 0.04

(D) 0.05

89. Which from following is an example of solution of solid as solute and liquid as solvent?

(A) Sea water

(B) Brass

(C) Gasoline

(D) Iodine in air

90. Identify the coordination number of aluminium in potassium trioxalatoaluminate(III).

(A) 2

(B) 4

(C) 6

(D) 12

91. Which of the following isomeric amines has the highest boiling point?

(A) tert-Butylamine

(B) Ethyldimethylamine

(C) Diethylamine

(D) n-Butylamine

92. If A, B, C, D are four different elements with outer electronic configuration as $A = 4s^2 4p^4$, $B = 4s^2 4p^5$, $C = 5s^2 5p^4$, $D = 5s^2 5p^5$. Find the element having highest ionization enthalpy $(\Delta_1 H_1)$

(A) A

(B) B

(C) C

(D) D

93. What is the change in internal energy for $2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$ at $25^\circ C$?
$(R = 8.314\ J\ K^{-1}\ mol^{-1}, \Delta H = -560\ kJ)$

(A) -557.5 kJ

(B) -530.0 kJ

(C) 510.0 kJ

(D) 656.9 kJ

94. Calculate the final pressure required to reduce the volume of a gas to one third, if initial pressure is $1.6 \times 10^5 Nm^{-2}$.

(A) $5.4 \times 10^5 Nm^{-2}$

(B) $1.6 \times 10^5 Nm^{-2}$

(C) $2.11 \times 10^5 Nm^{-2}$

(D) $4.8 \times 10^5 Nm^{-2}$

95. If osmotic pressure of 0.2 M aqueous glucose solution is 5 atm at 300 K . Calculate the concentration of glucose solution having osmotic pressure 2.5 atm at same temperature.

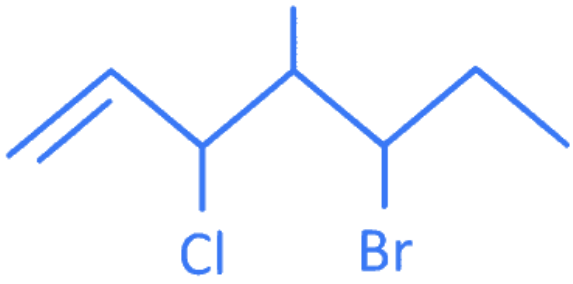
(A) 0.1 M

(B) 0.05 M

(C) 0.75 M

(D) 0.25 M

96. What is the IUPAC name of following compound?



(A) 3-Chloro-4-methyl-5-bromohept-1-ene

(B) 4-Methyl-3-bromo-5-chlorohept-6-ene

(C) 3-Bromo-4-methyl-5-chlorohept-6-ene

(D) 5-Bromo-3-chloro-4-methylhept-1-ene

97. Which amino acid from following contains highest number of N atoms in it?

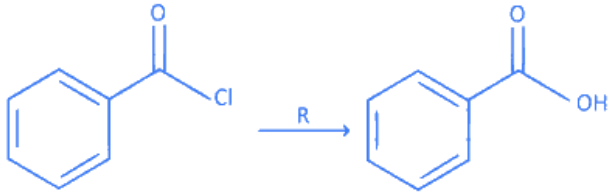
(A) Histidine

(B) Lysine

(C) Arginine

(D) Glutamine

98. Identify the reagent ' R ' necessary to bring the following conversion.



(A) H_2O

(B) CrO_3

(C) NaOH (dil.)

(D) $KMnO_4$

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99.

Identify ' A ' in the following reaction.



(A) Acrylic acid
(B) Oxalic acid
(C) Salicylic acid
(D) Phthalic acid

100. What are the possible values of magnetic quantum number for p orbital?

(A) 2
(B) 3
(C) 5
(D) 6

101. In eukaryotic organisms, replication of DNA occurs in _____

(A) anaphase
(B) G_1 phase
(C) G_2 phase
(D) S phase

102. Capillarity theory was proposed by _____

(A) Bohem
(B) J. Priestley
(C) Dixon and Joly
(D) Levitt

103. Given below are two statements.
Statement I - Oxaloacetate is useful as a precursor for synthesis of aspartic acid.
Statement II - α-ketoglutarate is useful for synthesis of glutamic acid.
In light of above statements, select the correct answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

104. Given below are two statements.
Statement I - Defecation is an involuntary process that takes place through anal opening guarded by sphincter muscles.
Statement II - Distension, of rectum stimulates pressure sensitive receptors that initiate a neural reflex for egestion.
In light of above statements, select the correct answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

105. Angina pectoris is severe pain and heaviness in chest that is mainly caused due to

(A) metabolic disorder of pancreas
(B) deficiency of iodine in diet
(C) reduction in blood supply to cardiac muscles due to atherosclerosis
(D) long term exposure to dust particles as in silicosis

106. The term 'Niche' denotes the _____ role played by an organism in its environment.

(A) chemical
(B) functional
(C) biological
(D) physical

107. When the phage DNA enters the host bacterium, the host cell protects itself from the viral DNA attacks with the help of _____ enzyme.

(A) exonuclease
(B) restriction endonuclease
(C) DNA ligase
(D) helicase

108. Given below are two statements.
Statement I - Nervous tissue is without lymphatic vessels.
Statement II - Nervous tissue is endodermal in origin.
In light of above statements, choose the most appropriate correct answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

109. With reference to adolescence, what is mhGAP?

(A) A programme by Maharashtra State Government to improve mental health.
(B) A programme by WHO to improve reproductive health.
(C) A programme by WHO for the treatment of mental disorder.
(D) A programme by Maharashtra State Government for the treatment of physical disorder.

110. Damage to biodiversity takes place due to natural reasons which includes the following EXCEPT

(A) Volcanic eruption
(B) Forest fires
(C) Reclamation
(D) Earthquakes Earthquakes

111. Match the disorder in column I with their nature in column II.

Column - I		**Column - II**	
i.	Thalassemia	a.	X monosomy
ii.	Turner's syndrome	b.	Extra X chromosomes in male
iii	Klinefelter's syndrome	c.	21^{st} Trisomy
iv.	Down's syndrome	d.	Mendelian disorder

(A) i-a ii - c iii - d iv - b
(B) i – b ii -a iii -c iv -d
(C) i-d ii - c iii - a iv - b
(D) i - d ii - a iii - b iv - c

112. Chemical digestion of which one of the following starts first in human alimentary canal?

(A) Proteins
(B) Starch
(C) Lipids and fats
(D) Cellulose

113. DDT resistant mosquitoes and different beak sizes of African seed cracker finches show _____ type of selection respectively.

(A) stabilizing and directional
(B) disruptive and balancing
(C) directional and disruptive
(D) balancing and directional

114. The number of ATP molecules generated in aerobic respiration after oxidation of two molecules of pyruvic acid is.

(A) 6
(B) 12
(C) 24
(D) 30

115. During oogenesis the meiotic division is arrested at_____ before fertilization.

(A) Anaphase I
(B) Metaphase I
(C) Anaphase II
(D) Metaphase II

116. Accessory cells of stomata are reservoirs of_____.

(A) Zn^{++}ions
(B) H^{+}ions
(C) K^{+}ions
(D) H^{+}ions and Cl^{-}ions

117. Mature erythrocytes are enucleated in following animals EXCEPT
i. Rat
ii. Monkey
iii. Llama
iv. Camel
v. Elephant
Choose the correct answer from options given below.

(A) i and ii only
(B) iii, iv and v only
(C) iii and iv only
(D) v only

118. Agarose gel electrophoresis is used to separate DNA fragments. The DNA fragments separate due to _____ .

(A) difference in their staining property
(B) difference in the base sequence in them
(C) positive charge on the fragments
(D) difference in the size of fragments

119. How many of the following are the symbiotic nitrogen fixing micro-organisms?
Rhizobium, Anabaena, Frankia, Azotobacter, Nostoc, Clostridium, Beijerinckia, Klebsiella

(A) 2
(B) 3
(C) 4
(D) 5

120. CSF is secreted by

(A) choroid plexus only.
(B) Pia mater and choroid plexus only.
(C) Pia mater, choroid plexus and ependymal cells lining the ventricles.
(D) White matter, Pia mater and grey matter.

121. Match the scientist in column I with their contribution in column II and choose the correct option.

Column - I		Column - II	
i.	Alexander Van Humboldt	a.	Estimated 7 million species round the globe
ii.	Rober ay	b.	Rivet popper hypothesis
iii	David TIllman	c.	Species Area Relationship
iv.	Paul Ehrlich	d.	Productivity stability hypothesis

(A) i – b ii - c iii - d iv - a
(B) i - c ii -a iii - d iv - b
(C) i-b ii-c iii-a iv-d
(D) i - a ii - b iii - d iv - c

122. Given below are two statements:
Statement I - During night, guard cells become flaccid.
Statement II - During day time, guard cells become turgid due to endosmosis.
In light of above statements, choose the most appropriate answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

123. Which one of the following is an EXCEPTION to the generalization made by Mendel on the basis of his experiments on garden pea plant?

(A) Single trait → single gene → Two alleles.
(B) Two alleles show interaction in which one is completely dominant.
(C) The genotypic and phenotypic ratios are identical in monohybrid crosses.
(D) Factors (genes) for different traits present on different chromosomes assort independently.

124. People who consume high protein diet can develop _____ stones.

(A) calcium
(B) uric acid
(C) struvite
(D) cystine

125. In an angiospermic embryo, upper swollen suspensor cell towards the micropyle, functions as_____.

(A) haustorium
(B) hypophysis
(C) epicotyl
(D) hypocotyl

126. In large proteins, peptide chains are much looped, twisted and folded back on themselves. The folded structure is due to the formation of_____bonds

(A) phosphodiester
(B) peptide
(C) disulphide
(D) glycosidic

127. Arrange the following in sequence during the transmission of nerve impulse at chemical synapse.
i. Neurotransmitter binds with receptors of post synaptic cell.
ii. Calcium channels open and the calcium diffuses inward from ECF.
iii. Impulse travels along the axon of presynaptic neuron.
iv. Release of neurotransmitter by exocytosis.
v. Synaptic vesicles fuse with cell membrane of axon terminal of presynaptic neuron.

(A) i, ii, v, iii, iv
(B) iii, v, ii, iv, i
(C) ii, v, i, iii, iv
(D) iii, ii, v, iv, i

128. The highest level of ecological hierarchy in ecological organization is

(A) biome
(B) community
(C) population
(D) organism

129. Primary productivity in an ecosystem refers to the rate of generation of _____ .

(A) oxygen
(B) carbon dioxide
(C) detritus
(D) biomass

130. Cells of malignant tumor spread from one organ to other via blood or lymph and cause new tumor. This property is called _____ .

(A) metastasis
(B) parthenogenesis
(C) interkinesis
(D) metamorphosis

131. Haemoglobin has maximum affinity for

(A) CO_2 (B) O_2

(C) CO (D) H^+

132. Given below are two statements:
Statement I - In prokaryotes, there is only replicon however in eukaryotes, these are several replicons in tandem.
Statement II - Two separated strands in a replicon of DNA are prevented from re-joining by helicase enzyme.
In light of above statements, choose the correct answer from the 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 and statement II is incorrect.

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

133. Which of the following characteristics are seen in a stable community?
i. It is strong enough to withstand environmental disturbance and recovers quickly.
ii. It is resistant to invasive species.
iii. It exhibits constant change in biomass production over a period of time.
iv. It has more species diversity.

(A) i, iii and iv only (B) i, ii and iv only

(C) i, ii and iii only (D) ii and iv only

134. Given below are two statements:
Statement I - Back cross is the crossing of F_1 hybrid with one of the two parents from which they were derived.
Statement II - Test cross involves the crossing of F_1 - hybrid with its homozygous recessive parent.
In light of above statements, choose the correct answer from the 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 and statement II is incorrect.

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

135. Complete the analogy with respect to structure of sperm
Nebenkern : ' X ' : : Acrosome is formed from : ' Y '

(A)

'X'	'Y'
Mitochondria	centrioles

(B)

'X'	'Y'
Nucleus	Golgi body

(C)

'X'	'Y'
Mitochondria	Golgi body

(D)

'X'	'Y'
Nucleus	centrioles

136. Given below are two statements:
Statement I - The muscularis of intestine can be differentiated into longitudinal and oblique muscles only.
Statement II - The muscularis of stomach is made up of outer- longitudinal, middle oblique and inner circular muscles.
In light of above statements, choose the most appropriate answer from the 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 and statement II is incorrect.

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

137. An organ with sphincters at its origin is

(A) urinary bladder (B) urethra

(C) ureter (D) renal pelvic

138. The size of mRNA is generally related to

(A) the number of codons it has

(B) the size of the ribosome

(C) the size of entire DNA molecule

(D) the number of anticodons it has

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139. Given below are two statements:
Statement I - Reactions involved in Krebs cycle are anabolic and catabolic.
Statement II - During oxidation of acetyl Co-A, stepwise oxidation of acetyl part of acetyl Co-A occurs.
In light of above statements, choose the most appropriate answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

140. Match the valves of human heart in column I with the respective opening they guard in column II and select the correct option.

Column - I		**Column - II**	
i.	Eustachian valve	a.	Opening of pulmonary aorta
ii.	Thebesian valve	b.	Left atrioventricular aperture
iii	Mitral valve	c.	opening of inferior vena cava
iv.	Semilunar valve	d.	opening of coronary sinus

(A) i-c ii-d iii-b iv-a
(B) i-c ii-d iii-a iv-b
(C) i-d ii-c iii-b iv-a
(D) i-b ii-a iii-c iv-d

141. The _____ gene from Bacillus thuringiensis produces a protein that forms crystalline inclusions in bacterial spores.

(A) *cry*
(B) *myc*
(C) ras
(D) *nif*

142. Lateral sulcus separates _____ .

(A) frontal lobe from parietal lobe
(B) parietal lobe from occipital lobe
(C) temporal lobe from frontal and parietal lobes
(D) parietal lobe from occipital and frontal lobes

143. Which of the following is INCORRECT about Primary and Secondary ecological successions?

(A) Primary succession occurs where no living organisms were present before.
(B) Primary succession is slow.
(C) Secondary succession is quicker.
(D) Soil is already present where primary succession takes place.

144. Following are viral diseases in poultry, EXCEPT _____

(A) Ranikhet
(B) Avian influenza
(C) Pullorum
(D) Bronchitis

145. All the 64 codons in the dictionary of genetic code were deciphered by _____

(A) Watson and Crick
(B) Dr. Har Gobind Khorana
(C) Yanofski and Sarabhai
(D) Nirenberg, Matthaei and Ochoa

146. Median vertical depression of external genitalia in females, enclosing the urethral and vaginal opening is _____

(A) Mons pubis
(B) Vestibule
(C) Clitoris
(D) Hymen

147. Bird pollinated flowers are usually _____

(A) large, showy and brightly coloured
(B) small and brightly coloured
(C) large and colourless
(D) with strong fragrance

148. Complete the following analogy.
Parietal wall of Bowman's capsule : squamous epithelium : : PCT : _____ epithelium.

(A) ciliated
(B) cuboidal
(C) squamous
(D) transitional

149. Complete the following reaction by replacing (Y) with proper word.

$$\text{Emulsified fats} \xrightarrow{\text{Lipases}} \text{Fatty acids} + (Y)$$

(A) monoglycerides
(B) monosaccharides
(C) disaccharides
(D) triglycerides

150. Complete the following analogy with respect to classification of mammals.

Marsupials : (i) :: monotremes : (ii)

(A)

(i)	(ii)
pouched mammals	placental mammals

(B)

(i)	(ii)
pouched mammals	egg laying mammals

(C)

(i)	(ii)
placental mammals	egg laying mammals

(D)

(i)	(ii)
placental mammals	pouched mammals

151. While studying flowering behaviour in _____ and _____ plant, Garner and Allard discovered photoperiodism.

(A) rice, wheat
(B) tobacco, soyabean
(C) tomato, soyabean
(D) wheat, tobacco

152. Which of the following bacteria do not solubilize the insoluble rock phosphate?

(A) Bacillus polymyxa and Pseudomonas striata.
(B) Micrococcus and Aspergillus spp.
(C) Pseudomonas striata and Agrobacterium.
(D) Klebsiella and Beijerinckia.

153. Atherosclerosis can be treated with recombinant protein called _____

(A) platelet derived growth factor.
(B) interleukin -1 receptor.
(C) tissue plasminogen activator.
(D) macrophage activating factor.

154. Match elements given in Column I with their deficiency symptoms shown by plants given in Column II

Column - I		Column - II	
i.	Eustachian valve	a.	Brown heart disease
ii.	Boron	b.	Malformed leaves
iii	Zinc	c.	Poor growth of the plant
iv.	Copper	c.	Die-back of shoots

(A) i-c ii-a iii-d iv-b
(B) i-c ii-a iii-b iv-d
(C) i-c ii-b iii-d iv-a
(D) i-b ii-a iii-d iv-c

155. Given below are two statements.
Statement I - Biome constitute, a large regional terrestrial unit delimited by a specific climate zone having major vegetation zone and associated fauna.
Statement II - Biome is the fourth level of ecological hierarchy.
In light of above statements, select the correct answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

156. Identify the INCORRECT statement.

(A) Around 25% of the drugs sold in the global medicine market worldwide are plant derivatives.
(B) 25,000 plant species are put to use by tribals worldwide as traditional medicines.
(C) The relationship between diversity and well being of ecosystem is linear.
(D) Rich diversity leads to lesser variation in biomass production over a period of time.

157. Two different amino acids are never encoded by the same codon, this character of genetic code is called _____.

(A) commaless
(B) degeneracy
(C) non-ambiguous
(D) non-overlapping

158. Given below are two statements.
Statement I - Root hair is composed of two layers.
Statement II - Outer layer of root hair cell wall is composed of cellulose and inner layer is made up of pectin.
In light of above statements, choose the most appropriate answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

159. The fully developed foetus gives signals for uterine contractions by secreting _____ hormones.

(A) Oxytocin and ACTH
(B) Oxytocin and corticosteroids
(C) ACTH and prostaglandins
(D) ACTH and corticosteroids

160. Just before fertilization, the angiosperm's embryo sac contains_____ and _____nuclei.

(A) six haploid, one diploid
(B) five haploid, two diploid
(C) six diploid, one haploid
(D) seven haploid, one diploid

161. Just before fertilization, the angiosperm's embryo sac contains _____ and _____ nuclei.

(A) six haploid, one diploid
(B) five haploid, two diploid
(C) six diploid, one haploid
(D) seven haploid, one diploid

162. Given below are two statements.
Statement I - An ecosystem is a self regulatory and self sustaining structural and functional unit of nature.
Statement II - Entire biosphere can be considered as one global ecosystem.
In light of 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

163. The number of reduced coenzymes $NADH + H^+$ formed during complete oxidation of one molecule of glucose.

(A) 2
(B) 8
(C) 10
(D) 12

164. Monohybrid crosses are useful in demonstrating which of the following laws of inheritance suggested by Mendel?

(A) Law of dominance and law of independent assortment.
(B) Law of segregation and law of independent assortment.
(C) Law of purity of gamete and law of dominance.
(D) Law of independent assortment only.

165. Enzymes are needed only in small quantities to catalyse reactions because

(A) they act very fast.
(B) they remain unchanged at the end of the reaction.
(C) they are made up to proteins.
(D) they are temperature and pH sensitive.

166. The number of amino groups in the amino acids present in amides is _____

(A) one
(B) two
(C) three
(D) four

167. Which of the following are the initial and final steps during the process of ecological succession?

(A) Nudation and Aggregation
(B) Invasion and Competition
(C) Competition and co-action
(D) Nudation and Stabilization

168. Match column I with column II and select the correct option

Column - I		**Column - II**	
i.	Carrot and spinach	a.	High protein content
ii.	Bitter gourd	b.	More Vit A and minerals
iii	Maize	c.	More Vit C
iv.	Wheat Atlas-66	c.	Twice the amount of lysine and tryptophan

(A) i-d ii-a iii-b iv-c
(B) i-d ii-a iii-c iv-b
(C) i-b ii-c iii-d iv-a
(D) i-b ii-c iii-a iv-d

169. Hypersecretion of glucocorticoid leads to_____

(A) Cushing's disease
(B) Addison's disease
(C) Grave's disease
(D) Bleeders' disease

170. The restriction enzymes used as molecular scissors are type of _____

(A) ligases
(B) nucleases
(C) protease
(D) carboxylases

171. Given below are two statements.
Statement I - Calotropis growing in abandoned fields is never consumed by cattle and goats.
Statement II - Calotropis produces highly poisonous cardiac glycosides.
In light of above statements, select the most appropriate answer from the 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 and statement II is incorrect.
(D) Statement I is incorrect and statement II is correct.

172. Phenotypically tall plants can be obtained from genetically dwarf maize plants by application of_____

(A) Gibberellins
(B) Auxins
(C) Ethylene
(D) ABA

173. Islets of Langerhans are _____ .

(A) groups of endocrine cells of pancreas
(B) group of cells in the stroma of thyroid gland
(C) star shaped glial cells of CNS
(D) grey masses within the white matter of nervous system

174. Homo sapiens are most closely related to_____

(A) Lemurs
(B) Tarsiers
(C) Baboons
(D) Orangutan

175. Complete the analogy with respect to reproductive system.
Male : Penis : : Female : _____ .

(A) Vagina
(B) Vulva
(C) Clitoris
(D) Cervix

176. In a male gametophyte, ploidy of tube cell and a male gamete is _____

(A) both are haploid
(B) both are diploid
(C) tube cell is haploid and male gamete is diploid
(D) tube cell is diploid and male gamete is haploid

177. In which of the following, bilirubin is excreted in urine?

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

178. The only 5C intermediate formed during reactions of TCA cycle is _____

(A) Oxalosuccinic acid
(B) α-ketoglutarate
(C) Succinyl CoA
(D) Cis - Aconitate

179. Secondary metabolites like glucosinolates are produced by cabbage to

(A) protect it from many pests
(B) attracts insects for pollination
(C) kills weeds around it
(D) improve soil fertilization

180. Tubular fluid tends to become acidic in the_____ of nephron.

(A) PCT
(B) DCT
(C) neck
(D) Henle's loop

181. All are events of pollen-pistil interaction EXCEPT

(A) absorption of water and nutrients from the stigmatic surface.
(B) first division of pollen grain.
(C) deposition of pollen grain on stigma.
(D) germination of pollen grains to produce pollen tube.

182. Which one of the following cells secrete heparin, histamine and serotonin?

(A) Lymphocytes
(B) Basophils
(C) Eosinophils
(D) Thrombocytes

183. In an antibody, disulphide bonds are present_____
i. between two heavy chains
ii. between two light chains
iii. between the constant region of light chain and the constant region of a heavy chain
iv. between antigen binding sites of both the heavy and light chains
v. between the variable region of light chain and that of heavy chain
Select the correct answer from the options given below

(A) i and ii only
(B) i and iii only
(C) ii and v only
(D) ii and iv only

184. The water which percolates deep in the soil is _____

(A) Gravitational water (B) Capillary water
(C) Combined water (D) Hygroscopic water

185. Select INCORRECT statements with respects transport of CO_2 by RBCs and plasma.
i. 23% of CO_2 released from tissue cells diffuse into plasma first and then into RBCs.
ii. Within RBCs carbonic acid immediately dissociates into $H^+$and HCO_3^-.
iii. In RBCs CO_2 combines with H_2O to form carbonic acid.
iv. H^+ions move out of RBCs and combine with $Na^+$to form $NaHCO_3$.
v. 7% of CO_2 is transported in dissolved form as carbonic acid in plasma.
In the light of above statements choose the correct answer from option given below.

(A) i, ii and iii only (B) iii, iv and v only
(C) ii and v only (D) i and iv only

186. Dispersal of pollens is an example of

(A) gene mutation (B) genetic drifts
(C) genetic recombination (D) gene flow

187. Given below are two statements:
Statement I - Toddy is made by fermenting fleshy pedicels of cashews nuts.
Statement II - Fenny is made by fermenting the sugar sap extracted from palm plants and coconut palm.
In light of above statements, select the correct answer from the 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 and statement II is incorrect. (D) Statement I is incorrect and statement II is correct.

188. Which one of the following pair of hormones is NOT antagonistic?

(A) Calcitonin and Parathormone (B) Glucagon and Insulin
(C) Atrial Natriuretic hormone and Aldosterone (D) Oestrogen and Progesterone

189. In the processing of hnRNA in eukaryotic cell, the primary transcripts are processed in the following sequence.

(A) Splicing, Capping, Tailing (B) Tailing, Capping, Splicing
(C) Splicing, Tailing, Capping (D) Tailing, Splicing, Capping

190. Hormone causing vigorous contraction of myometrium to initiate parturition is _____ .

(A) hCG (B) ACTH
(C) corticosteroids (D) oxytocin

191. Which plant hormone is called antitranspirant?

(A) Gibberellins (B) Auxin
(C) Ethylene (D) ABA

192. Blood osmolarity decreases with the secretion of
i. ADH
ii. aldosterone
iii. angiotensin II
iv. ANP

(A) i and ii only (B) ii and iii only
(C) ii and iv only (D) i only

193. Blood plasma transports oxygen in dissolved state, percentage of which is _____ .

(A) 7% (B) 3%
(C) 23% (D) 10%

194. Which of the following statements are correct?
i. *X* chromosome has large amount of euchromatin.
ii. heterochromatin is genetically inert.
iii. Both X and Y chromosomes are homologous.
iv. Crossing over does not take place in sex chromosomes in female.
Choose the correct option.

(A) i and ii only (B) ii and iii only
(C) i, ii and iii only (D) iv and v only

195. Identify label ' X ' from the given diagram and name the cells, which regulate concentration of calcium and phosphorous in the blood and select the correct option given below.

(A) Thyroid gland - Parafollicular cells
(B) Thyroid gland - Sertoli cells
(C) Parathyroid gland - Acidophils
(D) Parathyroid gland - chromatophores

196. Which one of the following is the most primitive ancestor of Homo sapiens?

(A) Ramapithecus
(B) Australopithecus
(C) Dryopithecus
(D) Neanderthal man

197. Match column I with column II and select the correct option.

	Column I		Column II
i.	Frontal lobe	a.	Gustato receptors
ii.	Parietal lobe	b.	Olfactory receptors
iii.	Temporal lobe	c.	Sense of vision
iv.	Occipital lobe	d.	Broca's area

(A) i-c ii-b iii-a iv-d
(B) i-b ii-a iii-d iv-c
(C) i-a ii-c iii-b iv-d
(D) i-d ii-a iii-b iv-c

198. Which one of the following diseases is caused by a fungus?

(A) Filariasis
(B) Ringworm
(C) Typhoid
(D) Acute coryza

199. Respiratory centres that control the rate and depth of breathing are located in _____

(A) medulla oblongata only
(B) cerebrum only
(C) cerebellum and pons
(D) pons and medulla oblongata

200. In sea grass, pollens are long, ribbon like and without exine exhibiting _____ pollination.

(A) ornithophilous
(B) hypohydrophilous
(C) epihydrophilous
(D) anaemophilous

- End of Question Paper -