MHT CET 2024 PCB Apr 22 Shift 2 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. The centre of mass of a system of particles does NOT depend on

(A) masses of the particles.
(B) internal forces on the particles.
(C) position of the particles.
(D) relative distance between the particles.

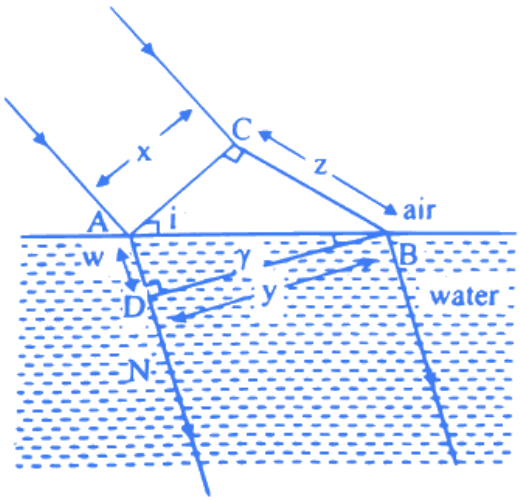
2. A blackbody at 1227°C emits radiation with maximum intensity at a wavelength of $5600\mathring{A}$. If the temperature of the body is increased by 1000°C, the maximum intensity will be at wavelength

(A) $3000\mathring{A}$
(B) $3360\mathring{A}$
(C) $5000\mathring{A}$
(D) $6600\mathring{A}$

3. A resistor of 400Ω, an inductance of 0.4 H are in series with an a.c. source of e.m.f. $E = 200\sqrt{2}\sin(1000t)$. The power factor of the circuit is

(A) 0.4
(B) 0.5
(C) $\frac{1}{\sqrt{2}}$
(D) $\frac{1}{\sqrt{3}}$

4. A plane wavefront of width ' x ' is incident on an air-water interface and the corresponding refracted wavefront has a width ' y ' as shown in figure. The refractive index of air with respect to water in terms of distances ' w ' and ' z ' is $(AD = w, CB = z)$



(A) $\frac{w}{z}$
(B) $\frac{z}{w}$
(C) $\sqrt{\frac{w}{z}}$
(D) $\sqrt{\frac{Z}{W}}$

5. The intermediate image formed by an objective lens of a compound microscope is

(A) virtual and magnified.
(B) virtual and diminished.
(C) real and diminished.
(D) real and magnified.

6. A solid sphere and a ring have equal mass and equal radius of gyration. If sphere is rotating about its diameter and ring about an axis passing through centre and perpendicular to its plane, then the ratio of radius of sphere to that of ring is $\sqrt{\frac{x}{2}}$ then the value of ' x ' is

(A) 2
(B) 3
(C) 5
(D) 7

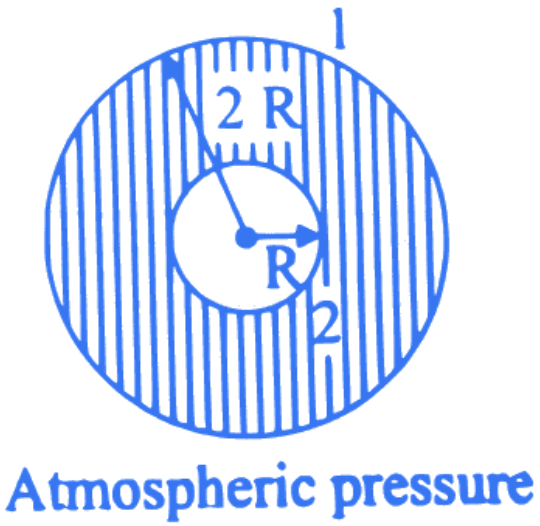
7. The third overtone of a closed pipe of length ' L_c ' has the same frequency as the third overtone of an open pipe of length ' L_0 '. The ratio ' L_c ': ' L_0 ' is equal to (Neglecting end correction)

(A) 5 : 3
(B) 3 : 2
(C) 8 : 7
(D) 7 : 8

8. To manufacture a solenoid of length ' l ' and inductance ' L ', the length of the thin wire required is (cross - sectional diameter of a solenoid is considerably less than length, μ_0 = permeability of free space)

(A) $[\frac{4\pi\ell_0 L}{\mu_0}]^{1/2}$
(B) $[\frac{2\pi\ell_0 L}{\mu_0}]^{1/2}$
(C) $[\frac{8\pi\ell_0 L^2}{\mu_0}]^{\frac{1}{2}}$
(D) $[\frac{\pi\ell_0^2 L}{\mu_0}]^{\frac{1}{2}}$

9. A soap bubble of radius R is surrounded by another soap bubble of radius $2R$ as shown in figure. The excess pressure inside the smaller soap bubble will be ($T =$ surface tension of soap solution)

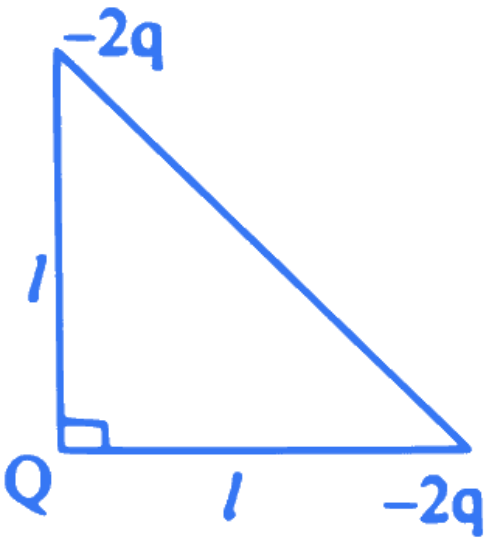


(A) $\frac{3T}{2R}$ (B) $\frac{3T}{R}$
(C) $\frac{4T}{R}$ (D) $\frac{6\,T}{R}$

10. For a transistor, the current amplification factor ' α ' is 0.8 . The transistor is then connected in common emitter configuration. The change in the collector current when the base current changes by 6 mA is

(A) 6 mA (B) 4.8 mA
(C) 24 mA (D) 8 mA

11. Three charges $Q, -2q$ and $-2q$ are placed at the vertices of an isosceles right-angled triangle as shown in figure. The net electrostatic potential energy is zero if Q is equal to



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

12. A spring has length ' L ' and force constant ' K '. It is cut into two springs of length ' L_1 ' and ' L_2 ' such that $L_1 = nL_2$ (n is an integer). The force constant of the spring of length ' L_2 ' is

(A) $K(1+n)$ (B) $\frac{(n+1)K}{n}$
(C) K (D) $K(n-1)$

13. The period of revolution of planet A around the sun is 8 times that of B. The distance of A from the sun is how many times greater than that of B from the sun?

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

14. In Young's double slit experiment, fringe width is 1.4 mm with light of wavelength $6000\mathring{A}$. If the light of wavelength $5400\mathring{A}$ is used, with no other change in the experimental set up. The change in fringe width is

(A) 1.26 mm (B) 0.12 mm
(C) 0.13 mm (D) 0.14 mm

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15. Radioactive materials A and B have decay constants ' 9λ ' and ' λ ' respectively. Initially they have same number of nuclei. The ratio of number of nuclei of material ' A ' to that of ' B ' will be $\left(\frac{1}{e}\right)$ after time ' t '. So ' t ' is equal to

(A) $\frac{1}{\lambda}$ (B) $\frac{1}{6\lambda}$

(C) $\frac{1}{8\lambda}$ (D) $\frac{1}{9\lambda}$

16. Two bodies A and B have their moments of inertia ' I ' and ' 2 I ' respectively about their axis of rotation. If their kinetic energy of rotation are equal then angular momentum of body A to that of body B will be in the ratio

(A) 1 : 2 (B) $\sqrt{2}:1$

(C) 2 : 1 (D) $1:\sqrt{2}$

17. The flux linked with the coil at any instant ' t ' is given by $\phi = 12t^2 - 60t + 275$. The magnitude of induced e.m.f. at t = 3 second is

(A) 200 V (B) 108 V

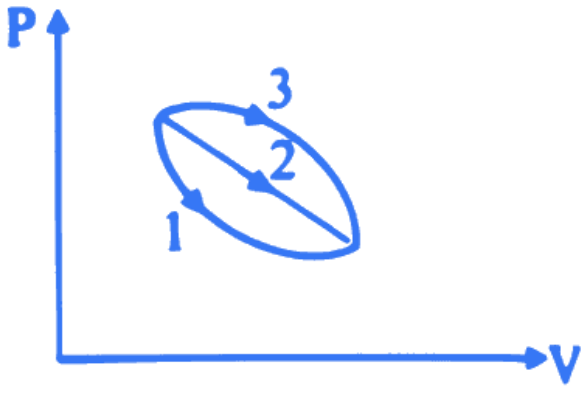
(C) 72 V (D) 12 V

18. Two sounding sources send waves at certain temperature in air of wavelength 60 cm and 60.6 cm respectively. The frequency of sources differ by 5 Hz . The velocity of sound in air at same temperature is

(A) 330 m/s (B) 313 m/s

(C) 303 m/s (D) 300 m/s

19. An ideal gas of mass ' M ' is in the state ' A ' goes to another state B via three different processes. If Q_1, Q_2 and Q_3 denote the heat absorbed by the gas along the paths 1,2 and 3 respectively, then



(A) $Q_1 < Q_2 < Q_3$ (B) $Q_1 < Q_2 = Q_3$

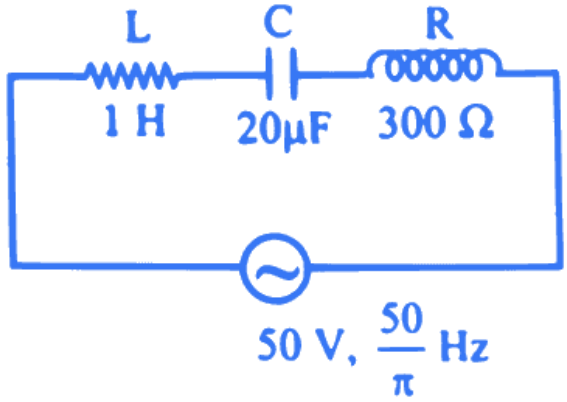
(C) $Q_1 = Q_2 > Q_3$ (D) $Q_1 > Q_2 > Q_3$

20. The magnitude of magnetic induction at a point on the axis at a large distance ' r ' from the centre of a circular coil of ' n ' turns and area ' A ' carrying current ' I ' is (μ_0 = permeabilty of free space)

(A) $B_{axis} = \frac{\mu_0}{4\pi}\frac{nA}{Ir^3}$ (B) $B_{axis} = \frac{\mu_0}{4\pi}\frac{2nIA}{r^3}$

(C) $B_{axis} = \frac{\mu_0}{4\pi}\frac{2nI}{Ar^3}$ (D) $B_{axis} = \frac{\mu_0}{4\pi}\frac{nA}{r^3}$

21. In the series LCR circuit shown in figure, the impedance is



(A) 300Ω (B) 500Ω

(C) 700Ω (D) 900Ω

22. An ideal gas is heated from 27°C to 627°C at constant pressure. If initial volume of gas is 4 m^3, then the final volume of the gas will be

(A) 2 m^3 (B) 4 m^3

(C) 6 m^3 (D) 12 m^3

23. A large insulated sphere of radius ' r ', charged with ' Q ' units of electricity, is placed in contact with a small insulated uncharged sphere of radius ' R ' and is then separated. The charge on the smaller sphere will now be

(A) Q(r + R) (B) Q(r − R)

(C) $\frac{Q}{r+R}$ (D) $\frac{QR}{R+r}$

24. A thin concavo-convex lens with convex face receiving incident rays has radii of curvatures 12 cm and 24 cm respectively. If refractive index of material of lens is 1.5 , then the focal length of the lens is

(A) 16 cm (B) 24 cm

(C) 32 cm (D) 48 cm

25. At two points on a horizontal tube of varying cross-section the radii are 1 cm and **0.4 cm**, velocities of fluid are V_1, V_2 and pressure difference ($P_1 - P_2$) between these points is 4.9 cm of water. The value of $\sqrt{V_2^2 - V_1^2}$ is (g = acceleration due to gravity g = 980 cm/s^2)

(A) 9.8 cm/s (B) 98 cm/s

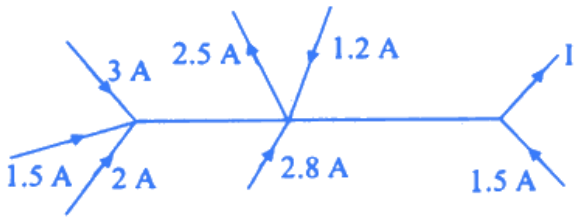
(C) 980 cm/s (D) 0.98 cm/s

26. A simple harmonic progressive wave is given by equation $y = a\sin 2\pi\left(nt - \frac{x}{\lambda}\right)$. If the wave velocity is equal to $\frac{1}{4}\times$ (maximum particle velocity), then the wavelength ' λ ' is (Given $\rightarrow$ a = amplitude, n = frequency, t = time, y = displacement, x = distance)

(A) $\frac{\pi a}{2}$ (B) πa

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

27.
In the following figure, the current I is equal to



(A) 4.5 A (B) 6.2 A

(C) 7.8 A (D) 9.5 A

28. The work function of a photosensitive metallic surface is hv_0. If photons of energy (2.5) hv_0 fall on this surface, the electrons come out with maximum velocity ' v '. When the photon energy is increased to $7\,hv_0$, the maximum velocity of photoelectrons will be

(A) $2v$ (B) 2.5 v

(C) 3.5 v (D) $4v$

29. A magnet having a magnetic dipole moment ' M is placed in two magnetic fields ' B_1 ' and ' B_2 ' respectively. If it is displaced slightly from the equilibrium position, it oscillates 60 times in 20 second in field ' B_1 ' and 60 times in 30 second in field ' B_2 '. The ratio of field ' B_1 ' to that of ' B_2' is

(A) 3 : 2 (B) 9 : 4

(C) 2 : 3 (D) 4 : 9

30. Two objects A and B are separated horizontally by distance ' a '. Object B moves in a direction perpendicular to distance ' a ' with velocity ' V_1 '. Simultaneously object A covers shortest distance with velocity ' V ' and meets object B in time ' t '. The time ' t ' is given by

(A) $\frac{a}{V+V_1}$ (B) $\sqrt{\frac{a^2}{V_1^2+V^2}}$

(C) $\frac{a}{\sqrt{V^2-V_1^2}}$ (D) $\frac{a}{V-V_1}$

31. Pressure of the gas remaining same, the temperature at which r. m. s. speed of the gas molecules is double its value at 27°C is

(A) 1200°C (B) 927°C

(C) 627°C (D) 300°C

32. In a single slit diffraction experiment, slit of width ' a ' and incident light of wavelength 5600 $\mathring{A}$, the first minimum is observed at angle 30°. The first secondary maximum is observed at angle ($\sin 30^\circ = 0.5$)

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

(C) $\sin^{-1}(\frac{\sqrt{3}}{2})$ (D) $\sin^{-1}(\frac{3}{4})$

33. If R_1 and R_2 are the radii of the atomic nuclei of mass numbers 27 and 125 respectively, then the ratio $R_2 : R_1$ is

(A) $\frac{125}{27}$ (B) $\sqrt{\frac{125}{27}}$

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

34. By increasing the temperature, the electrical conductivity of a conductor and a semiconductor,

(A) increases for both (B) decreases for both

(C) increases and decreases respectively (D) decreases and increases respectively

35. Water rises up to height ' x ' in a capillary tube immersed vertically in water. When the whole arrangement is taken to a depth 'd' in a mine, the water level rises height ' Y '. If ' R ' is the radius of earth then the ratio (Y/x) is

(A) $\frac{2R}{(R-d)}$ (B) $\frac{R^2}{(R-d)}$

(C) $\frac{R}{(R-d)}$ (D) $\frac{R}{(R+d)}$

36. Three tuning forks A, B and C have respective frequencies n_1, n_2 and n_3 related as $n_1 = 1.03n_2$ and $n_3 = 0.99n_2$. When A and C are sounded together 4 beats are heard per second. The frequencies of fork B and C are respectively

(A) 103 Hz and 100 Hz (B) 103 Hz and 99 Hz

(C) 99 Hz and 100 Hz (D) 100 Hz and 99 Hz

37. In the Davisson Germer experiment, the velocity of electrons emitted from the electron gun can be increased by

(A) increasing the potential difference between the anode and cathode. (B) decreasing the potential difference between anode and cathode.

(C) increasing the filament current. (D) decreasing the filament current.

38. A circular coil carrying current ' I ' has radius ' R ' and magnetic field at the centre is ' B '. At what distance from the centre along the axis of the same coil, the magnetic field will be $\frac{B}{8}$?

(A) $R\sqrt{2}$ (B) $R\sqrt{3}$

(C) $2R$ (D) $3R$

39. A satellite of mass ' m ' is orbiting the earth of radius ' R ' at height ' h ' from the surface of earth. The total energy of the satellite is (g = acceleration due to gravity at the earth's surface)

(A) $-\frac{mgR^2}{2(R+h)}$ (B) $+\frac{mgR^2}{2(R+h)}$

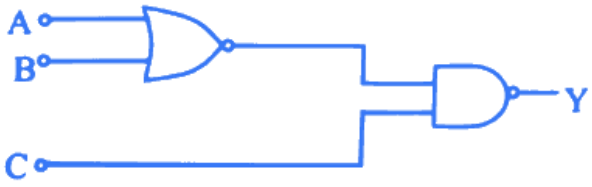
(C) $\frac{2mgR^2}{(R+h)}$ (D) $-\frac{2mgR^2}{(R+h)}$

40. Rods ' A ', ' B ' and ' C ' are made of a paramagnetic, a ferromagnetic and a diamagnetic substance respectively. A magnet is brought close to them, it will

(A) repel all three substances. (B) attract ' A ' strongly, ' B ' weakly and repel 'C' weakly.

(C) attract ' A ' strongly but repel both ' B ' and 'C' weakly. (D) attract ' A ' weakly, ' B ' strongly and repel 'C' weakly.

41. To get an output Y = 1 in the given logic circuit, the correct choice for the input is



(A) A = 1, B = 1, C = 1

(B) A = 1, B = 1, C = 0

(C) A = 1, B = 0, C = 1

(D) $A = 0, B = 1, C = 1$

42. Which one of the following statements is false for a particle moving in a circle with constant angular speed?

(A) linear velocity vector is along the tangent to the circle. (B) linear acceleration vector is along the tangent to the circle.

(C) linear acceleration vector points to the centre of the circle. (D) the velocity and acceleration vectors are perpendicular to each other.

43. An alternating current is given by $I = 100\sin(50\pi t)$. How many times will the current become zero in one second?

(A) 25 times (B) 40 times

(C) 50 times (D) 100 times

44. A particle starts from mean position and performs S.H.M. with period 6 second. At what time its kinetic energy is 50% of total energy?

$$\left(\cos 45^\circ = \frac{1}{\sqrt{2}}\right)$$

(A) 0.25 s (B) 0.50 s

(C) 0.75 s (D) 1 s

45. Rate of flow of heat through a cylindrical rod is H_1. The temperature of the ends of the rod are ' T_1 ' and ' T_2 '. If all the dimensions of the rod become double and the temperature difference remains the same, the rate of flow of heat becomes ' H_2 '. Then H_2 =

(A) $\frac{H_1}{2}$ (B) $2H_1$

(C) $\frac{H_1}{4}$ (D) $4H_1$

46. A coil of area 12 cm^2 has 250 turns. Magnetic field of 0.2 Wb/m^2 is perpendicular to the plane of the coil. The field is reduced to 0.1 Wb/m^2 in 0.1 second. The magnitude of induced e.m.f. in the coil is

(A) 0.2 V (B) 0.3 V
(C) 3 V (D) 6 V

47. For which of the following combinations of working temperatures, the efficiency of Carnot's engine is maximum?

(A) 40 K and 20 K (B) 50 K and 30 K
(C) 70 K and 50 K (D) 90 K and 60 K

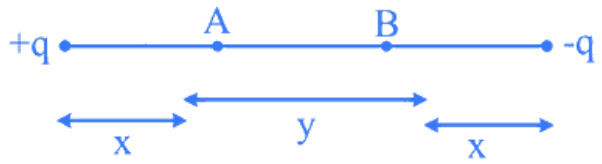
48. A galvanometer of resistance ' G ' is converted into an ammeter of resistance $\frac{G}{40}$, by connecting a shunt ' S ' to it. The part of main current passing through the galvanometer is

(A) 25% (B) 10%
(C) 2.5% (D) 0.4%

49. The wrong statement out of the following statements is

(A) A negative test charge experiences a force opposite to the direction of the field.
(B) A tangent drawn to a line of force represents the direction of the electric field.
(C) Field lines never intersect.
(D) The electric field lines form closed loop.

50. The potentials at points A and B are V_A and V_B respectively for the charges $+q$ and $-q$ placed at distances ' x ' each from points A and B as shown in figure. The distance between points A and B is ' y '. The net potential $(V_A - V_B)$ is proportional to



(A) $\frac{2qy}{x(x+y)}$ (B) $\frac{-2qy}{x(x+y)}$
(C) $\frac{qy}{x(x+y)}$ (D) Zero

51. Identify the element having highest value of first ionization enthalpy.

(A) Se (B) Br

(C) Xe (D) Ar

52. One mole of a perfect gas expands isothermally and reversibly from $10dm^3$ to $20dm^3$ at 300 K . Find $\Delta U, q$ and work done respectively in the process. $\left(R = 8.3 \times 10^{-3}\ kJ\ K^{-1}\ mol^{-1}\right)$

(A) $0.0\ kJ, 1.726\ kJ, -1.726\ kJ$

(B) $0.0\ kJ, -17.48\ kJ, -17.48\ kJ$

(C) $-1.726\ kJ, 0\ kJ, 1.726k$

(D) $0.0\ kJ, 21.84\ kJ, -21.84\ kJ$

53. Identify anionic complex from following.

(A) Sodium hexafluoroaluminate(III)

(B) Tetraamminecopper(II) ion

(C) Triamminetrinitrocobalt(III)

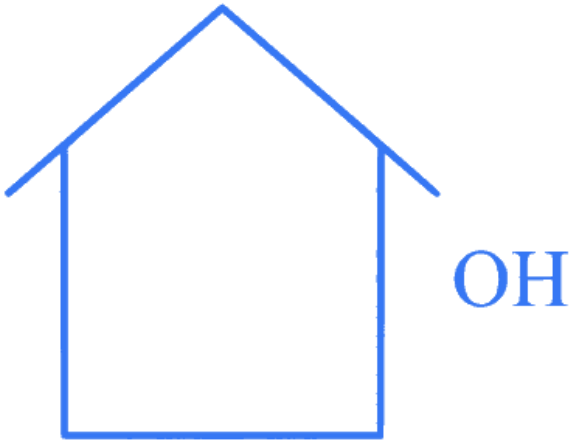
(D) Pentacarbonyliron

54. Identify a ligand having two donor atoms and uses pairs of electrons on both donor atoms.

(A) Nitro (B) Isothiocyanato

(C) Ethylenediamine (D) Carbonyl

55.
What is IUPAC name of following compound?



(A) 3-Hydroxy-1-methylcyclopentane

(B) 3-Methylcyclopentanol

(C) 1-Methylcyclopentan-3-ol

(D) 3-Methylpentan-1-ol

56. Which from the following buffers is used for precipitation of cations of IIIA group in qualitative analysis?

(A) NH_4OH and NH_4Cl

(B) CH_3COOH and CH_3COONa

(C) C_6H_5COOH and C_6H_5COONa

(D) HCOOH and HCOONa

57. Which of the following has the highest basic strength?

(A) Trimethyl amine (B) Dimethyl amine

(C) Methylamine (D) Ammonia

58. The molar conductivity of 0.02 M HCl is $408.4\Omega^{-1}\ cm^2\ mol^{-1}$ at $25°C$. Calculate it's conductivity.

(A) $16.180 \times 10^{-3}\Omega^{-1}\ cm^{-1}$

(B) $8.168 \times 10^{-3}\Omega^{-1}\ cm^{-1}$

(C) $6.108 \times 10^{-3}\Omega^{-1}\ cm^{-1}$

(D) $4.042 \times 10^{-3}\Omega^{-1}\ cm^{-1}$

59. What is the percentage by mass of oxygen in water, if percentage by mass of hydrogen is 11.1% ?

(A) 18% (B) 80%

(C) 26% (D) 88.9%

60. Identify a pair of compounds that exhibits functional group isomerism from following.

(A) Methoxymethane and Ethanol (B) But-2-ene and But-1-ene

(C) Methoxyethane and Methoxypropane (D) n-Pentane and 2,2-dimethylpropane

61. What is the order of a reaction having unit of the rate constant $moldm^{-3}\ s^{-1}$?

(A) 0 (B) 3

(C) 1 (D) 2

62. Alkyl chlorides on heating with metal fluorides form alkyl fluorides. This reaction is known as

(A) Finkelstein reaction (B) Sandmeyer's reaction

(C) Swartz reaction (D) Saytzeff reaction

63. Which of the following is NOT an example of diamagnetic substance?

(A) N_2 (B) F_2

(C) NaCl (D) Co

64. Identify the product formed in the following reaction.

$$CH_3 - CH = CH - CH_2 - CHO \xrightarrow[\text{ii) } H_3O^+]{\text{i) } LiAlH_4} \text{product}$$

(A) $CH_3 - (CH_2)_3 - CH_2OH$

(B) $CH_3 - CH_2 - CH = CH - CH_2 - OH$

(C) $CH_3 - CH = CH - CH_2 - CH_2 - OH$

(D) $CH_3 - CH = CH - CH_2 - OH$

65. Identify the major product formed when 2-chlorobutane is boiled with concentrated alcoholic KOH .

(A) Butan-2-ol (B) Butan-1-ol

(C) But-1-ene (D) But-2-ene

66. Which of the following substances is NOT required in the construction of $H_2 - O_2$ fuel cell?

(A) Carbon rod (B) KOH solution

(C) Platinum (D) Pure water

67. Which alkali metal is used for heat transfer in nuclear power station?

(A) Sodium (B) Potassium

(C) Rubidium (D) Caesium

68. Which of the following solvents is safe to use and considered as green solvent?

(A) H_2O (B) CCl_4

(C) $CHCl_3$ (D) CH_2Cl_2

69. What is rate constant of a first order reaction having half life 138.6 minute?

(A) 5.0 minute $^{-1}$ (B) 0.54 minute $^{-1}$

(C) 0.25 minute $^{-1}$ (D) 0.005 minute $^{-1}$

70. Which of the following compounds has highest boiling point?

(A) 1-Bromobutane (B) 1-Bromo-2-methylpropane

(C) 2-Bromobutane (D) 2-Bromo-2-methylpropane

71. Calculate the volume of bcc unit cell if the radius of an atom in it is 216.5 pm .

(A) 1.012×10^{-22} cm^3 (B) 1.25×10^{-22} cm^3

(C) 2.130×10^{-22} cm^3 (D) 2.541×10^{-22} cm^3

72. Which of the following statements is NOT true about lyophobic colloids?

(A) These are formed easily by direct mixing of dispersion medium and dispersed phase. (B) These are irreversible.

(C) These are unstable and hence require traces of stabilisers. (D) Viscosity of dispersed phase is nearly same as the dispersion medium.

73. Identify the correct increasing order of boiling point of following compounds.

(A) $CHBr_3 < CH_2Br_2 < CH_3Br < CH_3Cl$

(B) $CH_3Cl < CH_3Br < CH_2Br_2 < CHBr_3$

(C) $CH_3Br < CH_2Br_2 < CHBr_3 < CH_3Cl$

(D) $CH_2Br_2 < CHBr_3 < CH_3Br < CH_3Cl$

74. Identify the product ' B ' in the following sequence of reactions.

Ethanenitrile $\xrightarrow{SnCl_2,HCl}$ A $\xrightarrow{H_3O^+}$ B + NH_4Cl

(A) Ethylamine (B) Ethanamide

(C) Ethanol (D) Ethanal

75. Find increase in temperature for a gas when first its pressure and then volume both are doubled at 400 K .

(A) 400 K (B) 800 K

(C) 1200 K (D) 1600 K

76. Calculate heat of formation of SO_2 from following equations.

$$S + \frac{3}{2}O_2 \longrightarrow SO_3, \Delta H = -2xkJ$$

$$SO_2 + \frac{1}{2}O_2 \longrightarrow SO_3, \Delta H = -ykJ$$

(A) $y - 2x$ (B) $2x - y$

(C) $2x + y$ (D) $\frac{2x}{y}$

77. If four different elements A, B, C and D having outer electronic configuration as,

$A = 3s^2 3p^4,\ B = 3s^2 3p^5, C = 4s^2 4p^4, D = 4s^2 4p^5$

identify the element with lowest ionization enthalpy ($\Delta_1 H_1$)

(A) A (B) B

(C) C (D) D

78. Which from the following statements about nylon 2-nylon 6 is NOT correct?

(A) It is a polyester fibre (B) It is a copolymer

(C) It is obtained from amino acids (D) It is biodegradable

79. Which carbon atoms of glucose in open chain structure numbered from C – 1 to C – 6 are NOT chiral?

(A) C – 3 and C – 4 (B) C – 1 and C – 6

(C) C-2 and C-4 (D) C – 4 and C – 5

80. The dissociation constant of weak monoacidic base is 1.8×10^{-5}. Calculate the degree of dissociation in 0.02 M solution.

(A) 0.03 (B) 0.04

(C) 0.02 (D) 0.01

81. What is the expected value of ΔT_f for 0.2 m aqueous $CaCl_2$ solution if ΔT_f for 0.2 m sucrose solution is x K ?

(A) x (B) $2x$

(C) $3x$ (D) $\frac{x}{2}$

82. How many isomers of $C_4H_{11}N$ are tertiary amines?

(A) One (B) Two

(C) Three (D) Four

83. Calculate the number of moles of electrons required to convert 1.1 mol $Cr_2O_7^{2-}$ to Cr^{3+} in acidic medium.

(A) 7.1 mole (B) 0.183 mole

(C) 6.6 mole (D) 3.3 mole

84. Which from following metal ions in their respective oxidation states forms colourless compounds?

(A) Ti^{4+} (B) V^{3+}

(C) Cu^{2+} (D) Mn^{2+}

85. Which of the following symbols represents heat of reaction at constant pressure?

(A) ΔH (B) ΔS

(C) ΔU (D) ΔG

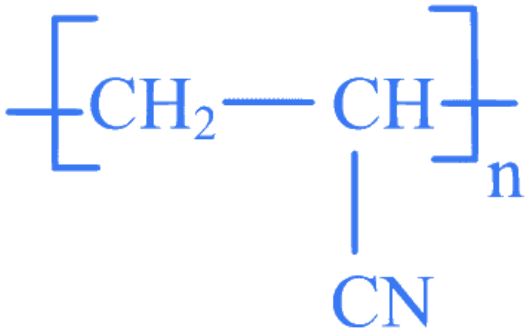
86. Which from following amino acids contains sulfur in it's side chain?

(A) Tyrosine (B) Threonine

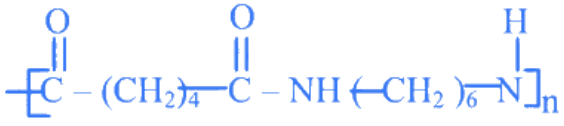
(C) Cysteine (D) Lysine

87. Which from following polymers is obtained by addition polymerisation method?

(A)



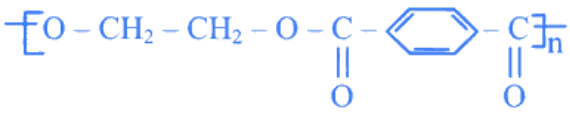
(B)



(C)



(D)



88. Calculate the pH of buffer solution containing 0.12 M weak acid and 0.48 M of its salt with strong base if pK_a is 3.82 .

(A) 5.31 (B) 2.67

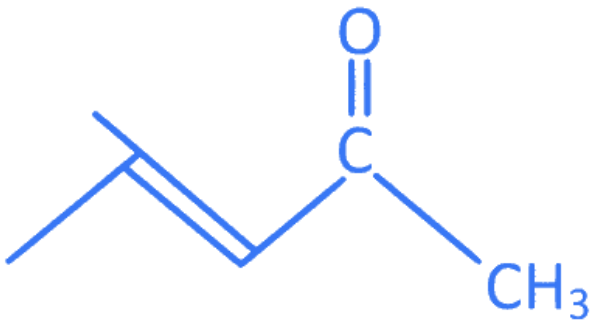
(C) 3.72 (D) 4.42

89. Calculate ΔT_b of 0.02 m solution if molal elevation constant for solvent is 0.52 K kg mol^{-1}.

(A) 0.0104 K (B) 0.0202 K

(C) 0.0304 K (D) 0.0416 K

90. Identify IUPAC name of the following compound.



(A) 4-Methylpent-3-en-2-one
(B) 2-Methylpent-2-en-4-one
(C) 4-Ethyl-but-3-en-2-one
(D) 4-Methyl-but-2-en-3-one

91. What is the representation of element (X) having mass number 40 containing 22 neutrons.

(A) $^{40}_{20}X$
(B) $^{40}_{18}X$
(C) $^{40}_{18}X$
(D) $^{40}_{22}X$

92. Identify oxidant in following reaction.
$3H_3AsO_{3(aq)} + BrO^-_{3(aq)} \longrightarrow Br^-_{(aq)} + 3H_3AsO_{4(aq)}$

(A) Br^-
(B) H_3AsO_3
(C) H_3AsO_4
(D) BrO^-_3

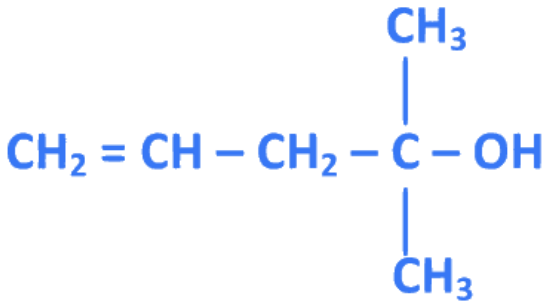
93. Identify false statement about zinc.

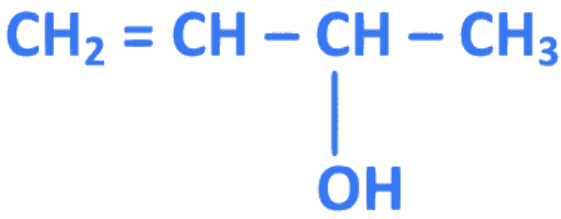
(A) It has no unpaired electron either in observed or in expected electronic configuration.
(B) It has lowest density amongst all 3d elements.
(C) It has highest ionization enthalpy amongst 3d elements.
(D) Magnetic moment of $Zn^{++}$is zero.

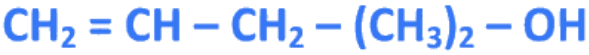
94. For the reaction,
$3I^-_{(aq)} + S_2O^{2-}_{8(aq)} \longrightarrow 2SO^{2-}_{4(aq)} + I^-_{3(aq)}$
rate of formation of $SO^{2-}_{4(\,aq\,)}$ is 0.044 moldm^{-3} s^{-1}. What is the rate of consumption of $S_2O^{2-}_{8(aq)}$?

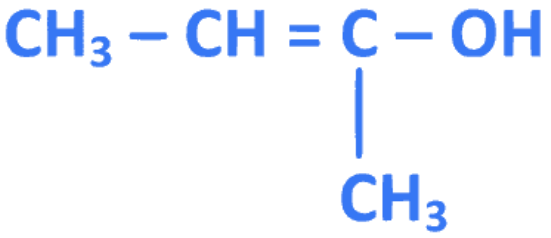
(A) 0.022 moldm^{-3} s^{-1}
(B) 0.044 moldm^{-3} s^{-1}
(C) 0.066 moldm^{-3} s^{-1}
(D) 0.088 moldm^{-3} s^{-1}

95. Which of the following is a tertiary allylic alcohol?

(A) 

(B) 

(C) 

(D) 

96. Calculate the number of atoms in 0.4 gram of metal if it forms fcc structure.
$\left[\rho \times a^3 = 1.2 \times 10^{-22}\ g\right]$

(A) 2.516×10^{22}
(B) 1.333×10^{22}
(C) 3.721×10^{22}
(D) 4.905×10^{22}

97. Identify a molecule having octahedral geometry as per VSEPR theory.

(A) PCl_5
(B) CH_4
(C) $BeCl_2$
(D) SF_6

98. Calculate the mass of solute dissolved in 1dm^3 water has osmotic pressure 3.0 atm at 300 K [Molar mass of solute $= 41$ g mol^{-1}, R $= 0.082$dm^3 atm K K^{-1} mol^{-1}]

(A) 4.00 g
(B) 5.00 g
(C) 6.20 g
(D) 7.25 g

99. Identify functional group from following that forms pink colour when schiffs reagent is added in it.

(A) $-CH_2-OH$ (B) -COOH

(C) -CHO (D) $-CO-$

100. What is the radius of first orbit of monopositive helium ion?

(A) 13.23 pm (B) 26.45 pm

(C) 39.68 pm (D) 19.84 pm

101. Which one of the following is the main objective of proposing Biological diversity Act 2002?

(A) To study rampant loss of natural resources.
(B) To set norms to reduce pollution.
(C) For recording conservation status of plant and animal species.
(D) For regulation of access to Indian biological resources.

102. Match the types of endosperms given in Column I with examples given in Column II

Column I		Column II	
i.	Cellular	a.	Coconut
ii.	Nuclear	b.	Asphodelus
iii.	Helobial	c.	Petunia

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

103. Select the correct set of evolutionary characters of man.

(A) Prognathus face, bony eyebrow ridge, presence of chin.
(B) Erect posture, opposable thumb, shorter forelimbs.
(C) Broad pelvic girdle, long forelimbs, presence of chin.
(D) Long forelimbs, presence of lumbar curvature, prognathus face.

104. Match the Column I with Column II

Column I (Animals)		Column II (Respiratory organs)	
i.	Sponges	a.	External gills
ii.	Insects	b.	Plasma membrane
iii.	Limulus	c.	Tracheae
iv.	Amphibian tadpoles	d.	Book gills

Select the correct option

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

105. Which one of the following statements is INCORRECT?

(A) Cnidaria is the first animal group showing true simple nervous system.
(B) Diffused type of nervous system is the first landmark in the development of nervous system.
(C) In plants, control and co-ordination mechanism is brought about by sending chemical signals for chemotactic, phototropic and thigmotactic movements.
(D) Ladder type of nervous system is found in sponges and Hydra.

106. Match the Column I containing restriction enzymes with Column II containing recognition sequences.

	Column I		Column II
i.	AluI	a.	5' A – G ↓ C – T 3' 3' T – C ↑ G – A 5'
ii.	BamHI	b.	5' G – T – C ↓ G – A – C 3' 3' C – A – G ↑ C – T – G 5'
iii.	EcoRI	c.	5' G ↓ A – A – T – T – C 3' 3' C – T – T – A – A ↑ G 5'
iv.	HindII	d.	G ↓ G – A – T – C – C C – C – T – A – G ↑ G

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

107. Which of the following pair of organs do NOT produce digestive enzymes?

(A) Large intestine and Liver
(B) Liver and pancreas
(C) Duodenum and jejunum
(D) Salivary glands and stomach

108. Most important fuel of living cells is _____ .

(A) glucose
(B) fructose
(C) galactose
(D) xylose

109. Given below are two statements about asexual reproduction.
Statement I - In asexual reproduction, the ploidy of progeny is identical to the parent.
Statement II - The progeny is also referred to as clone.
In the light of above statements, choose the correct option given below:

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

110. The final electron acceptor in ETS of cellular respiration is

(A) Hydrogen
(B) water
(C) molecular oxygen
(D) Cyt. a. a3

111. Which one of the following occurs maximum during exponential growth phase in plants?

(A) Cell formation
(B) Cell elongation
(C) Cell differentiation
(D) Cell dedifferentiation

112. Which of the following is caused by neither bacteria nor viruses?

(A) Laryngitis
(B) Sinusitis
(C) Chronic bronchitis
(D) Pneumonia

113. Given below are two statements.
Statement I - GMO crops could potentially have negative effects on human health and natural biodiversity.
Statement II - Insertion of a gene from Brazil nut to increase the production of methionine in soyabean has caused allergic reaction to those who have nut allergies.
In the light of above statements, choose the correct option given below:

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

114. All of the raw materials that are extracted from an ecosystem are called _____ services.

(A) provisioning
(B) regulating
(C) supporting
(D) cultural

115. Action of salivary amylase stops when it mixes with gastric juice in stomach because _____ .

(A) digestion of starch completes in mouth
(B) amylase becomes inactive in pH 1.8
(C) amylase becomes inactive in alkaline medium
(D) maltose is digested by pepsin

116. Basic proteins consist of more basic amino acids and these amino acids exist as a cation at the physiological pH of 7.4.
Which among the following are basic amino acids?

(A) Lysine and Methionine
(B) Methionine and arginine
(C) Lysine and Valine
(D) Arginine and Lysine

117. Most energy saving mode of excretion is_____.

(A) ammonotelism
(B) ureotelism
(C) uricotelism
(D) guanotelism

118. Choose the correct sequence of events in pollenpistil interaction from the options given below:
i. Entry of pollen tube into synergid.
ii. Development of pollen tube.
iii. Deposition of pollen grains on the stigma.
iv. Release of contents from pollen tube.

(A) iii → iv → i → ii (B) iii → i → iv → ii
(C) iii → ii → i → iv (D) iii → ii → iv → i

119. Select the INCORRECT statement.

(A) UTRs are untranslated additional sequences on mRNA.
(B) UTRs are present only at $5'$ end on mRNA.
(C) UTRs are present at both $5'$ and $3'$:end on mRNA.
(D) UTRs are required for efficient translation.

120. Complete the following analogy about human sperm.
Nebenkern : mitochondria :: Acrosome : _____

(A) endoplasmic reticulum
(B) Golgi complex
(C) centriole
(D) spherosome

121. Water is the best medium for the transport of dissolved minerals and food molecules because it has _____ .

(A) high surface tension
(B) high adhesive force
(C) high adhesive force
(D) neutral pH

122. In a polarised state of nerve membrane, sodiumpotassium exchange pump actively restores the ions on their appropriate side because _____ against concentration electrochemical gradient.

(A) $Na^+$is forced out and $K^+$is forced inside the membrane
(B) both $Na^+$and $K^+$are forced out equally
(C) both $Na^+$and K^+ ions are forced inside
(D) $K^+$is forced out and $Na^+$is forced inside the membrane

123. Female Aedes mosquito acts as a vector in the transmission of _____

(A) malaria .
(B) dermatophytosis
(C) dengue
(D) pneumonia

124. Match types of niche in Column I with its explanation in Column II.

Column I (Type of niche)		**Column II (Explanation)**	
i.	Habitat	a.	absence of all competitors
ii.	Hypervolume	b.	physical space occupied by the organism
iii.	Fundamental	c.	presence of competition for resources
iv.	Realized	d.	considers biotic and abiotic environmental factors

Select the correct option

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

125. Which one of the following is considered as molecular scissors in modern biotechnology?

(A) Reverse transcriptase
(B) Taq polymerases
(C) Alkaline phosphatases
(D) Restriction endonucleases

126. Which of the following Cyanobacteria is found associated with both the lichens and the plants like Cycas and Azolla?

(A) Oscillatoria
(B) Tolypothrix
(C) Plectonema
(D) Anabaena

127. The partial pressure of carbon dioxide ($ppCO_2$) of blood entering the pulmonary capillaries is_____.

(A) 45 mm of Hg
(B) 65 mm of Hg
(C) 85 mm of Hg
(D) 104 mm of Hg

128. Which of the following pair of organisms are euryhaline in nature?

(A) Catla and clams
(B) Barnacles and Labeo
(C) Mrigala and barnacles
(D) barnacles

129. Which of the following reaction occurs during conversion of α-ketoglutarate → Succinyl Co-A?

(A) Decarboxylation
(B) Oxidative decarboxylation
(C) Phosphorylation
(D) Oxidative phosphorylation

130. In human female, the number of primordial follicles in the ovary at the time of birth is more than _____ million.

(A) 0.25 (B) 0.50
(C) 1.0 (D) 2.0

131. Match the process in Column I with the action in Column II.

Column I		Column II	
i.	Tailing	a.	Removal of introns
ii.	Capping	b.	Polyadenylation
iii.	Translocation	c.	Addition of mG_{ppp} at 5′ end of hnRNA
iv.	Splicing	d.	Movement of ribosome on mRNA.

Choose the correct match from the options given below.

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

132. Given below are two statements.
Statement I - Gibberellins promote flowering in long day plants.
Statement II - ABA inhibits flowering in long day plants but stimulates flowering in short day plants. In the light of above statements, choose the correct option given below:

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

133. Cranial nerve i is also called pneumogastric, ii is also called vestibulocochlear, and iii is also called Dentist's Nerve.

(A) i - Spinal accessory, ii - Olfactory, iii - Vagus. (B) i - Vagus, ii - Auditory, iii - Trigeminal.
(C) i - Facial, ii - Abducens, iii - Glossopharyngeal. (D) i - Pathetic, ii - Hypoglossal, iii - Vagus.

134. The water hyacinth (Eichhornia crassipes) is a native of _____

(A) Amazon basin (B) central Europe
(C) central Africa (D) bay of Bengal

135. During PCR cycle, the temperature range in the step of annealing is_____

(A) $40 - 60°C$. (B) $90 - 98°C$
(C) $70 - 75°C$ (D) $65 - 85°C$

136. Match the parts of human eye in Column I with their respective characteristics in Column II.

Column I		Column II	
i.	Fovea Centralis	a.	Thick, Muscular ring like structure at junction of choroid and iris.
ii.	Conjunctiva	b.	Area of retina from which the optic nerve and blood vessels leave the eyeball.
iii.	Blind spot	c.	Exposed, transparent part of sclera and cornea.
iv.	Ciliary body	d.	Place of formation of sharpest vision.

Choose the correct option from below.

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

137. In which one of the following conditions tobacco plants do NOT flower?

(A) Long uninterrupted dark period. (B) Long uninterrupted light period.
(C) Short light period with long uninterrupted dark period. (D) Long dark period is interrupted by a flash of red light (660 nm) and immediately followed by far red light (730 nm).

138. The erythropoietic organs of a foetus are _____and _____.

(A) spleen ; kidneys (B) liver ; spleen
(C) kidneys; yellow bone marrow (D) lymph nodes; kidneys

139. Which one of the following occurs due to changes in the environment and genetic variations of the species?

(A) Hybrid sterility (B) Geographical isolation
(C) Genetic drift (D) Chromosomal aberrations

140. Which of the following is the role of SSBP's during DNA replication?

(A) Formation of phosphodiester bond near point ' T '.
(B) Formation of phosphodiester bond near point ' O '.
(C) Prevention of recoiling of separated DNA strands.
(D) Joining the separated strand and restoring the double stranded nature of DNA.

141. To achieve pollination, attractions and reward are required in

(A) anemophily
(B) epihydrophily
(C) hypohydrophily
(D) chiropterophily

142. Kidneys are NOT associated with secretion of

(A) erythropoietin
(B) antidiuretic hormone
(C) renin
(D) calcitriol

143. How many CO_2 molecules are released after oxidation of one acetyl CoA in Krebs cycle?

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

144. Which bonds hold together the two complementary polynucleotide chains of DNA?

(A) Peptide
(B) Phosphodiester
(C) Glycosidic
(D) Hydrogen

145. Structural and functional unit of liver is _____.

(A) lobules
(B) acini
(C) villi
(D) sarcomere

146. Test cross is used to confirm .

(A) phenotype of the organism with dominant expression.
(B) sex / gender of an organism.
(C) genotype of the organism with dominant expression.
(D) genotype ratio in F_2 generation.

147. Which of the following hormones is secreted by theca interna covering the Graafian follicle?

(A) Relaxin
(B) Estrogen
(C) Progesterone
(D) GnRH

148. A type of chromosomal aberration, in which there is no loss or gain of gene complement of the chromosome is .

(A) deletion
(B) duplication
(C) inversion
(D) translocation

149. The QRS complex in a normal ECG represents _____.

(A) atrial depolarization
(B) ventricular depolarization
(C) atrial repolarization
(D) ventricular repolarization

150. Match the mineral deficiency disorders given in Column I with their symptoms given in Column II.

Column I		**Column II**	
i.	Chlorosis	a.	Localised death of tissues in leaves
ii.	Necrosis	b.	Premature fall of flowers, fruits and leaves
iii.	Motlling	c.	Yellowing of leaves due to absence of chlorophyll
iv.	Abscission	d.	Appearance of green and non-green patches on leaves

Choose the correct option from below.

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

151. Protozoans like Nosema locustae is used for controlling the target pests like _____

(A) grasshopper and crickets
(B) wasp, beetles and ants
(C) mealy bugs and mites
(D) caterpillars and cabbage worm

152. Which of the following in INCORRECT about conformers?

(A) They cannot maintain a constant internal environment.

(B) Their body temperature changes with ambient temperature.

(C) They perform physiological changes to ensure constant body temperature.

(D) When acquatic, they change osmotic concentration of body fluids as per ambient water osmotic concentration.

153. With reference to role of internal ear in equilibrium receptors for dynamic balance of body lie in i while the receptors for static or linear balance of body lie in ii

(A)

i	ii
organ of corti	tectorial membrane

(B)

i	ii
cristae of ampulla	maculae of utriculus and sacculus.

(C)

i	ii
scala vestibule	scala tympani

(D)

i	ii
Reissner's membrane	tectorial membrane

154. Identify the sacred groves found in India from the following list.
i. Khasi and Jaintia Hills in Meghalaya.
ii. Western Ghat regions of Maharashtra.
iii. Aravalli Hills of Rajasthan.
iv. Chanda and Sarguja areas of Madhya Pradesh.
v. Ladakh region of Himalayas.
Choose the correct option from given below

(A) i, ii and iii only

(B) i, ii and v only

(C) i, ii, iii and iv only

(D) i, ii, iii and v only

155. Which of the following microbes is used in the production of yoghurt?

(A) Penicillium roquefertii

(B) Streptococcus thermophilus

(C) Streptococcus aurifaciens

(D) Acetobacillus aceti

156. Given below are two statements.
Statement I - The heart sound 'Lub' is produced due to simultaneous closure of semilunar valves.
Statement II - The heart sound 'Dub' is produced due to simultaneous closure of cuspid valves.
In the light of above statements, choose the correct option given below:

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

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

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

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

157. Gene pool is _____ .

(A) any random change in gene frequency

(B) total number of genes of all individuals in a Mendelian population

(C) all genes located on non homologous region of chromosome

(D) all genes present on haploid number of chromosomes.

158. Which of the following is NOT a feature of capacitation process of sperm?

(A) Acrosomal membrane becomes thin

(B) Ca^{++}ions enter the sperm

(C) Male pronucleus begins to form

(D) The tail of sperm shows rapid whiplash movements

159. How many nuclei migrate from each pole to the centre of developing female gametophyte to form secondary nucleus?

(A) One

(B) Two

(C) Three

(D) Four

160. Match the following characteristics of tooth.

Column I		Column II	
i.	Enamel	a.	Made up of calcified connective tissue.
ii.	Dentine	b.	Contains blood vessels and nerves
iii.	Pulp cavity	c.	Covered by cementum
iv.	Root	d.	Hardest substance

Choose the correct option from below.

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

161. Given below are two statements.
Statement I - Skeletal muscles usually derive energy by anaerobic respiration.
Statement II - After vigorous exercise lactic acid accumulates in muscle fibres leading to muscle fatigue.
In the 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 but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

162. The number of nucleotides in tRNA is _____ .

(A) 40 – 50
(B) 50 – 60
(C) 70 – 80
(D) 90 – 100

163. The process in which an organism consumes and utilises food substances is _____ .

(A) emulsification
(B) biofortification
(C) respiration
(D) nutrition

164. Leaf cutting is successful in _____ .

(A) Blackberry
(B) Rose
(C) Sensevieria
(D) Bougainvillea

165. During allergic conditions which of the following increase in number?

(A) Cyanophils
(B) Acidophils
(C) Neutrophils
(D) Lymphocytes

166. Match the Column I containing mutant varieties with Column II containing respective crop plants.

Column I		Column II	
i.	Jagannath	a.	Cotton
ii.	NP- 836	b.	Cabbage
iii.	Indore - 2	c.	Rice
iv.	Regina - II	d.	Wheat

Choose the correct option from below.

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

167. Interferons are class of cytokines to stimulate other cells against _____ infections.

(A) bacterial
(B) helminth
(C) protozoan
(D) viral

168. Given below are two statements.
Statement I - Mode of action of catecholamines, peptide and polypeptide hormones is through cell membrane receptors.
Statement II - These hormones are non-steroid, water soluble and lipid insoluble hormones.
In the light of above statements, choose the correct option from 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.

169. Which one of the following is INCORRECT with respect to Verhulst - Pearl Logisitc Growth.

(A) It occurs when resources are limited
(B) It is a sigmoid curve
(C) It is more realistic
(D) It shows geometric growth in population

170. The manipulation of genetic material towards a desired end using "in vitro" process is called _____.

(A) traditional biotechnology
(B) genetics
(C) genetic engineering
(D) polvmerase chain reaction

171. The correct sequence of water absorption by root hair cell is _____

(A) Osmosis → imbibition → diffusion
(B) Diffusion → osmosis → imbibition
(C) Imbibition → diffusion → osmosis
(D) Imbibition → osmosis → diffusion

172. Non-disjunction of X-chromosomes during meiosis in the formation of ovum leads to _____ syndrome.

(A) Down's
(B) Turner's
(C) Klinefelter's
(D) Aquired Immuno Deficiency

173. Which contraceptive device attracts macrophages in the uterine cavity for phagocytosis of sperms?

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

174. How many phosphorylation reactions occur for formation of fructose 1,6 biphosphate during the preparatory phase of glycolysis?

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

175. Juxta glomerular apparatus in kidney releases Renin, when a person is _____

(A) dehydrated and has high BP
(B) hydrated and with high BP
(C) hydrated and with low BP
(D) dehydrated and with low BP

176. Given below are two statements.
Statement I-Budding is most common method of asexual reproduction in unicellular yeast.
Statement II - In yeast, budding occurs during unfavorable condition.
In the 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 but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

177. Choose the INCORRECT pair.

(A) Infection to kidney - increased leucocytes.
(B) Renal calculi - increased calcium oxalate.
(C) Nephritis - increased glucose in urine.
(D) Albuminuria - increased protein in urine.

178. Select the INCORRECT statement.

(A) DNA is negatively charged molecule.
(B) Histone proteins are rich in lysine and arginine residues.
(C) The chromatin packed to form solenoid structure looks like 'beads-on-string'
(D) Non-histone chromosomal proteins are required for packaging of chromatin at higher levels.

179. The additional apoplastic route of water that allows direct access to xylem and phloem is along the margins of _____ .

(A) primary root
(B) secondary root
(C) root hair
(D) casperian strips

180. Phosphorus cycle does not pass through _____ .

(A) lithosphere
(B) hydrosphere
(C) biosphere
(D) atmosphere

181. Match hormones given in Column I with their source gland in Column II.

Column I		**Column II**	
i.	Oxytocin	a.	Adrenal medulla
ii.	Melatonin	b.	Thyroid gland
iii.	Catecholamines	c.	Pineal gland
iv.	Calcitonin	d.	Hypothalamus

Choose the correct option from below.

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

182. Which one of the following is also called 'Terror of Bengal' ?

(A) Clarias gariepinus
(B) Eichhornia crassipes
(C) Parthenium
(D) Commelina benghalensis

183. The larvae of Wuchereria bancrofti undergo _____moultings before they become adults and settle in the lymphatic system of human.

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

184. Parenchymal circulation is found in _____

(A) earthworm (B) flatworms
(C) roundworm (D) ringworm

185. Which one of the following minerals is NOT mobilized in plants?

(A) Phosphorus (B) Sulphur
(C) Potassium (D) Calcium

186. Which of the following are true about sharks?
i. Their body fluids is isosmotic to external environment.
ii. They are osmoconformers.
iii. They control their internal environment independent of external environment.
iv. They are osmoregulators.

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

187. Chromosomal basis of inheritance suggested by Sutton and Boveri is based on _____

(A) segregation of genes. (B) Mendel's concept of stable factors.
(C) sex linkage (D) presence of sex chromosome.

188. Demineralization of bone resulting in softening, bending and fracture of bones, common in women who have reached menopause is called i and is caused due to ii.

(A)

i	ii
Myxoedema	hyposecretion of thyroxine hormone.

(B)

i	ii
Acromegaly	hyposecretion of Growth hormone.

(C)

i	ii
Osteoporosis	hypersecretion of parathormone.

(D)

i	ii
Grave's disease	hypersecretion of calcitonin.

189. The pyramid of biomass is inverted in-_____ ecosystem.

(A) pond (B) sea
(C) grassland (D) forest

190. The purposeful manipulation in the heredity of crops and the production of new superior varieties of existing crop plants is called _____

(A) genetics (B) traditional biotechnology
(C) horticulture (D) plant breeding

191. Consumption of which drug increases the concentration of dopamine in the brain?

(A) Heroin (B) Hashish
(C) Lysergic acid (D) Cocain

192. Match the hormones given in Column I with their respective source organs of secretion, given in Column II.

Column I (Hormone)		**Column II (Source of secretion)**	
i.	hCG	a.	Adenohypophysis of pituitary gland.
ii.	CCK	b.	Placenta.
iii.	ICSH	c.	Pars intermedia of hypophysis gland.
iv.	MSH	d.	Gastro - intestinal mucosa.

Choose the correct option from below.

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

193. According to proton transport theory of stomatal mechanism, protons are formed in the guard cells when _____ .

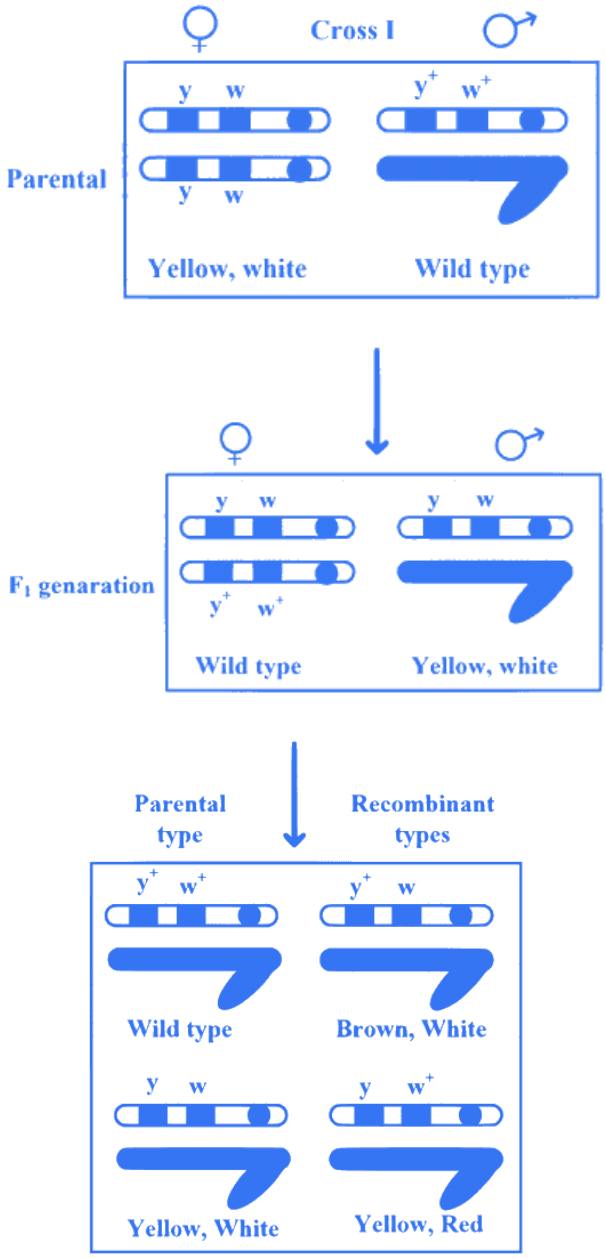
(A) starch is converted into cellulose during daytime. (B) sugar is converted into starch during night time.
(C) starch is converted into malic acid during day time which dissociates into malate. (D) potassium malate is formed during night time.

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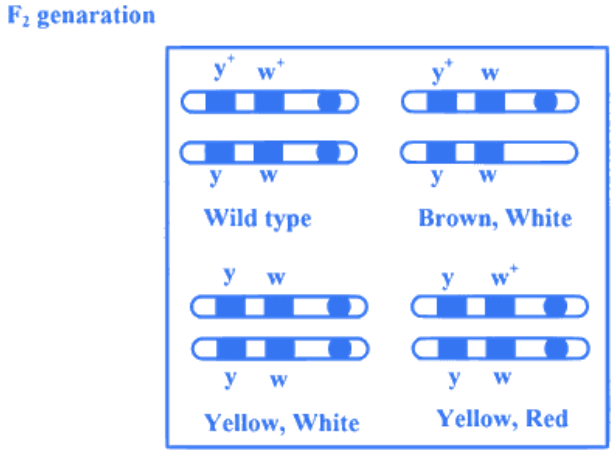
194. Which one of the following is the correct description of Streptococcus pneumoniae causing pneumonia?

(A) Virulent, Rough, non-capsulated
(B) Non-virulent, Rough, encapsulated
(C) Virulent, Smooth, encapsulated
(D) Non-virulent, Smooth, encapsulated

195. Observe the given figure of Morgan's experiment for yellow body and white eyed female Drosophila crossed with brown body and red eyed male Drosophila. What will be the percentage of parental type in F_2 generation?



195. (continued)



(A) 1.3%
(B) 62.8%
(C) 98.7%
(D) 37.2%

196. Given below are two statements regarding, competitive interaction.
Statement I - Competition is the type of interaction where totally unrelated species may compete for the same resource.
Statement II - Competition occurs only when resources are limited.
In the light of above statements, choose the correct option given below:

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

197. Nearly 80% of nitrogen found in human tissues originate from _____ nitrogen fixation.

(A) physical
(B) biological
(C) industrial
(D) symbiotic

198. Select the INCORRECT statement regarding RNA world hypothesis.

(A) RNA can self replicate via ribozymes.
(B) RNA catalyses protein synthesis.
(C) Varieties of RNA are formed due to mutation of RNA.
(D) RNA is the only stable genetic material, which is responsible for rich biodiversity on earth.

199. Choose the correct statement(s) with respect to Down's syndrome
i. Down's syndrome results from non-disjunction of 21^{st} chromosome during gamete formation.
ii. Down's syndrome is a sex chromosomal disorder observed in immature mothers who are below the age of 18 .
iii. These patients have mild mental retardation, poor skeletal development, flat hands, stubby fingers and palms are broader.
iv. The have 44 A with XO type of karyotype.
v. The risk of giving birth to a Down Syndrome child is more in mothers who are over 45 years of age.

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

200. What is the horizontal distribution of different species occupying levels on land or in water called?

(A) Stratification
(B) Niche
(C) Ecosystem
(D) Zonation

- End of Question Paper -