

MHT-CET 2021 Question Paper

25th September 2021

- If oxygen molecule has r.m.s velocity ' c ' ms^{-1} then r.m.s. velocity of hydrogen molecule will be (molecular masses of oxygen and hydrogen are $32 \times 10^{-3} \text{ kg}$ and $2 \times 10^{-3} \text{ kg}$ respectively, Boyle's law is obeyed)
(A) $8c$ (B) $\frac{1}{8}c$
(C) $\frac{1}{4}c$ (D) $4c$
- Two equal charges each of charge ' $2q$ ' are placed at a distance ' $2x$ ' apart and third charge $-4q$ is placed at the midpoint. The potential energy of the system is
(A) $\frac{-7q^2}{4\pi\epsilon_0 x}$ (B) $\frac{-14q^2}{4\pi\epsilon_0 x}$
(C) $\frac{-14q^2}{4\pi\epsilon_0 x^2}$ (D) $\frac{-7q^2}{4\pi\epsilon_0 x^2}$
- An electron with speed ' v ' and a photon with speed ' c ' have the same de Broglie wavelength. If the kinetic energy and momentum of the electron is E_e and P_e and that of the photon is E_{ph} and P_{ph} respectively, then the correct statement is
(A) $\frac{P_e}{P_{ph}} = \frac{v}{2c}$ (B) $\frac{P_e}{P_{ph}} = \frac{2c}{v}$
(C) $\frac{E_e}{E_{ph}} = \frac{v}{2c}$ (D) $\frac{E_e}{E_{ph}} = \frac{2c}{v}$
- The change in angular momentum of the electron when it jumps from 4th orbit to 1st orbit in hydrogen atom is (h = Planck's constant)
(A) $\frac{h}{\pi}$ (B) $\frac{(1.5)h}{\pi}$
(C) $\frac{3h}{\pi}$ (D) $\frac{h}{4\pi}$
- The resistances in the two gaps of a balanced meter bridge are 10Ω and 30Ω respectively. If the resistances are interchanged, the balance point shifts by
(A) 25 cm (B) 50 cm
(C) 30 cm (D) 66.67 cm
- The co-efficient of linear expansion of brass and steel are α_b and α_s respectively. Let I_b and I_s be the lengths of brass and steel rod respectively at 0°C . The difference in lengths of brass and steel rods (I_b and I_s) will remain the same at all temperatures if
(A) $\alpha_b I_s = \alpha_s I_b$ (B) $\alpha_b I_s = \alpha_s I_b^2$
(C) $\alpha_b^2 I_b = \alpha_s^2 I_s$ (D) $\alpha_b I_b = \alpha_s I_s$
- In double slit experiment, when a glass plate of refractive index 1.5 and of thickness ' t ' is introduced in the path of one of the interfering beams (wavelength λ), the intensity at the position where the central maximum occurred previously remains unchanged. The minimum thickness of the glass plate is
(A) 2λ (B) λ
(C) $\frac{\lambda}{3}$ (D) $\frac{\lambda}{2}$
- The difference between refractive index of glass with respect to air and liquid with respect to air is $\frac{1}{5}$. The velocity of light in liquid is [μ_g and μ_l are refractive indices of glass and liquid respectively. v_g and v_l are velocities of light in glass and liquid respectively]
(A) $10\mu_g(v_l - v_g)$ (B) $5\mu_g(v_l - v_g)$
(C) $2\mu_g(v_l - v_g)$ (D) $6\mu_g(v_l - v_g)$
- A bullet of mass ' m ' moving with velocity ' v ' is fired into a wooden block of mass ' M '. If the bullet remains embedded in the block, the final velocity of the system (block with bullet) is
(A) $\frac{mv}{M - m}$ (B) $\frac{M + m}{mv}$
(C) $\frac{mv}{M + m}$ (D) $\frac{M - m}{mv}$
- A metal rod of length ' ℓ ' rotates about one of its ends in a plane perpendicular to a magnetic field of induction ' B '. If the e.m.f. induced between the ends of the rod is ' e ', then the number of revolution made by the rod per second is
(A) $\frac{e}{B\pi\ell^2}$ (B) $\frac{\pi\ell^2}{eB}$
(C) $\frac{e}{B\pi^2\ell}$ (D) $\frac{B^2}{e\pi\ell}$

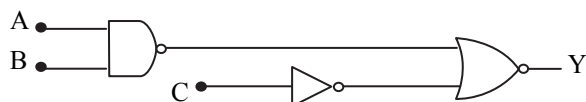
11. A circular coil carrying current has radius 'R'. At a point 'P' on the axis of the coil, the value of magnetic induction is $\left(\frac{1}{8}\right)^{\text{th}}$ of its value at the centre of the coil. The distance of point 'P' from the centre of the coil is

(A) $\frac{R}{2\sqrt{3}}$ (B) $\left(\frac{2}{\sqrt{3}}\right)R$
(C) $\frac{R}{\sqrt{3}}$ (D) $\sqrt{3}R$

12. A wire of length 8 m has resistance of 20Ω and it is connected in series with a battery of e.m.f. 6 V and external resistance 10Ω . The potential gradient along the wire in $\frac{V}{m}$ is

(A) 0.5 (B) 1.5 (C) 0.75 (D) 0.2

13. In the following combination of logic gates, which one of the sets of inputs (A, B and C respectively) will give output (Y) as '1'?



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

14. Soluble substance such as a detergent is mixed with water, surface tension of water

(A) remains constant.
(B) first increases and then decreases.
(C) decreases.
(D) increases.

15. The half life of a radioactive substance is 20 minutes. The approximate time interval $(t_2 - t_1)$ between the time t_2 when $\left(\frac{2}{3}\right)^{\text{rd}}$ of it is

decayed and time t_1 when $\left(\frac{1}{3}\right)^{\text{rd}}$ of it has decayed is (in minutes)

(A) 7 (B) 20 (C) 14 (D) 28

16. In Young's double slit experiment, 8^{th} maximum with wavelength ' λ_1 ' is at a distance ' d_1 ' from the central maximum and 6^{th} maximum with wavelength ' λ_2 ' is at a distance ' d_2 ' from the central maximum. Then $\frac{d_1}{d_2}$ is equal to

(A) $\frac{4\lambda_1}{3\lambda_2}$ (B) $\frac{4\lambda_2}{3\lambda_1}$
(C) $\frac{3\lambda_1}{4\lambda_2}$ (D) $\frac{3\lambda_2}{4\lambda_1}$

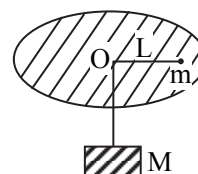
17. A capacitor of capacity 'C' has charge 'Q' and energy stored is 'E'. If the charge is increased to $3Q$, the energy stored is ' E_1 ', the relation between ' E_1 ' and 'E' is

(A) $E_1 = \frac{E}{6}$ (B) $E_1 = 3E$
(C) $E_1 = \frac{E}{3}$ (D) $E_1 = 9E$

18. A series combination of n_1 capacitors each of value C_1 is charged by a source of potential difference 4V. Another parallel combination of n_2 capacitors each of value C_2 is charged by a source of potential difference V. Total energy stored in both the combinations is same. The value of C_2 , in terms of C_1 is

(A) $\frac{2C_1n_2}{n_1}$ (B) $\frac{16C_1n_2}{n_1}$
(C) $\frac{2C_1}{n_1n_2}$ (D) $\frac{16C_1}{n_1n_2}$

19. The figure shows two masses 'm' and 'M' connected by a light string that passes through a small hole 'O' at the centre of the table. M is moved round in a horizontal circle with O as the centre. The frequency with which 'm' should be revolved so that 'M' remains stationary is



(A) $\frac{1}{\pi} \sqrt{\frac{ML}{mg}}$ (B) $\frac{1}{\pi} \sqrt{\frac{Mg}{mL}}$
(C) $\frac{1}{2\pi} \sqrt{\frac{ML}{mg}}$ (D) $\frac{1}{2\pi} \sqrt{\frac{Mg}{mL}}$

20. Two bodies 'A' and 'B' have their moments of inertia 'I' and '2I' respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta (of body A to that of B) will be in the ratio

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

21. An electron is moving with a velocity 10^7 m/s, parallel to infinitely long straight wire, carrying a current of 10 A. If the electron is at a perpendicular distance of 4 cm from the wire, the force acting on the electron is ($\mu_0 = 4\pi \times 10^{-7}$ SI units, $e = 1.6 \times 10^{-19}$ C)

(A) 8×10^{-17} N (B) 6×10^{-16} N
(C) 5×10^{-17} N (D) 3×10^{-17} N

22. A flywheel of mass 50 kg and radius of gyration about its axis of rotation is 0.6 m. It is acted upon by a constant torque of 18 Nm. Its angular velocity at $t = 8$ second is (Initially flywheel is at rest)
- (A) 36 rad s^{-1} (B) 4 rad s^{-1}
(C) 8 rad s^{-1} (D) 18 rad s^{-1}
23. Let ' E_a ' be the magnitude of electric field due to electric dipole in its axial plane at a distance ' $2x$ ' from the centre of the dipole and ' E_q ' is the magnitude of electric field in the equatorial plane at a distance ' $4x$ ' from the centre of the dipole. Then the relation between E_a and E_q will be [Length of dipole is very short as compared to distance x]
- (A) $E_a = 8E_q$ (B) $E_a = \frac{E_q}{16}$
(C) $E_a = \frac{E_q}{16}$ (D) $E_a = 16E_q$
24. A semiconductor with band gap energy of $3.31 \times 10^{-19} \text{ J}$ is used to fabricate a p-n junction photo diode. It can detect the signal of wavelength
- [Planck's constant $= 6.62 \times 10^{-34} \text{ Js}$, velocity of light $c = 3 \times 10^8 \text{ ms}^{-1}$]
- (A) $6400 \text{ \AA}$ (B) $6800 \text{ \AA}$
(C) $7000 \text{ \AA}$ (D) $6000 \text{ \AA}$
25. Two identical pieces of metal wire are used to make a circular loop and a square loop. Same current is passed through both the loops. The ratio of magnetic dipole moment associated with the circular loop to that of the square loop is
- (A) $\frac{4}{\pi}$ (B) $\frac{2}{\pi}$
(C) $\frac{\pi}{2}$ (D) 4π
26. A circular coil carrying current of radius 5 cm has 500 turns of a wire. The approximate value of the coefficient of self induction of the coil will be ($\mu_0 = 4\pi \times 10^{-7} \text{ SI units}$)
- (A) $50 \times 10^{-3} \text{ millihenry}$.
(B) 25 millihenry .
(C) $25 \times 10^{-3} \text{ millihenry}$.
(D) 50 millihenry .
27. A gas at pressure ' P_0 ' is contained in vessel. If the masses of all the molecules are halved and their speeds are doubled, the resulting pressure ' P ' is equal to
- (A) $4 P_0$ (B) $\frac{P_0}{2}$
(C) P_0 (D) $2P_0$
28. Which one is the wrong statement from the following?
- (A) The resistance of an intrinsic semiconductor decreases with increase in temperature.
(B) A p-n junction diode is used in a rectifier.
(C) Electrons are the majority carriers in n-type semiconductor.
(D) To get p-type semiconductor, silicon should be doped with a pentavalent impurity.
29. A current of 2A is passed through winding of a long solenoid having 500 turns. If the magnetic flux linked with each turn is $4 \times 10^{-3} \text{ Wb}$, the self inductance of the solenoid is
- (A) 1.5 H (B) 2 H
(C) 0.5 H (D) 1 H
30. A sonometer wire is vibrating in the second overtone. The number of nodes and antinodes formed respectively are
- (A) 3, 4 (B) 4, 3
(C) 3, 2 (D) 2, 3
31. The period of an earth's satellite is 5 hour. If the distance between the earth and the satellite is increased to 4 times its original value, then the new period of the satellite will be
- (A) 30 hour (B) 40 hour
(C) 80 hour (D) 20 hour
32. The frequency of two tuning forks A and B are respectively 1.5% more and 2.5% less than that of the tuning fork C. When forks A and B are sounded together, 12 beats are produced in 1 second. The frequency of tuning fork C is
- (A) 300 Hz (B) 240 Hz
(C) 200 Hz (D) 360 Hz
33. A perfect gas has volume ' V ' and pressure ' P '. According to kinetic theory of gases, if the total translational kinetic energy of all the molecules of the gas is equal to $\frac{3}{2} PV$, the gas is
- (A) polyatomic only.
(B) diatomic only.
(C) monoatomic only.
(D) monoatomic, diatomic and polyatomic.
34. The weight of a body of mass 20 kg at a depth half way to centre of earth is ($g = 10 \text{ m/s}^2$) (Earth is a sphere of uniform mass density)
- (A) 75 N (B) 100 N
(C) 25 N (D) 50 N

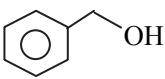
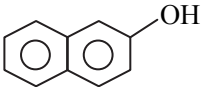
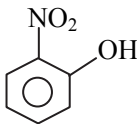
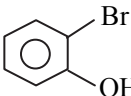
35. Photoelectrons are emitted from two similar metal plates when wavelengths ' λ_1 ' and ' λ_2 ' are incident on them. ($\lambda_1 = 1.5\lambda_2$) if maximum kinetic energy of emitted photoelectrons is ' E_1 ' and ' E_2 ' respectively then
- (A) $E_1 < \frac{2E_2}{3}$ (B) $E_1 = \frac{E_2}{4}$
 (C) $E_1 < \frac{E_2}{3}$ (D) $E_1 = \frac{2E_2}{3}$
36. An object of mass 40 gram moves uniformly along a circular path with linear speed of 20 ms^{-1} . If the angular speed of object is 4 rad s^{-1} , the centripetal force acting on it will be
 (A) 1.6 N (B) 12.8 N
 (C) 6.4 N (D) 3.2 N
37. A police car travels towards a stationary observer at a speed of 20 ms^{-1} . The siren on the car emits a sound of frequency 320 Hz. If the speed of sound is 340 ms^{-1} then frequency recorded by the observer will be
 (A) 170 Hz (B) 320 Hz
 (C) 340 Hz (D) 640 Hz
38. When open pipe is closed from one end then 3rd overtone of closed pipe is higher in frequency by 150 Hz than second overtone of open pipe. The fundamental frequency of open end pipe will be (Neglect end correction)
 (A) 300 Hz (B) 150 Hz
 (C) 75 Hz (D) 225 Hz
39. A gas is suddenly expanded such that its final volume becomes four times its initial volume. If the specific heat at constant volume $C_v = 2R$, then the ratio of initial pressure to final pressure will be
 (A) 3 : 4 (B) 8 : 1
 (C) 4 : 3 (D) 8 : 3
40. The bob of a simple pendulum performs S.H.M. in air with period ' T ' and in water with period ' T_1 '. Relation between ' T ' and ' T_1 ' is (Neglect friction due to water, density of the bob is $\frac{9}{8} \times 10^3 \text{ kg/m}^3$, density of water = 1000 kg/m^3)
 (A) $T_1 = T$ (B) $T_1 = 3T$
 (C) $T_1 = 4T$ (D) $T_1 = 2T$
41. A mass ' m_1 ' performs S.H.M. with amplitude ' A ' which is connected to horizontal spring. While mass ' m_1 ' is passing through mean position another mass ' m_2 ' ($m_2 < m_1$) is placed on it so that both masses move together with amplitude ' A_1 '. The ratio of $\left(\frac{A_1}{A}\right)$ is
 (A) $\left[\frac{m_1}{m_1 + m_2}\right]^{\frac{1}{2}}$ (B) $\left[\frac{m_1}{m_1 + m_2}\right]$
 (C) $\left[\frac{m_2}{m_1 + m_2}\right]^{\frac{1}{2}}$ (D) $\left[\frac{m_2}{m_1 + m_2}\right]$
42. Water rises in a capillary tube upto height ' h ' so that the upward force due to surface tension is balanced by the force due to the weight of the water column. If this force is 90 dyne and surface tension of water is $6 \times 10^{-2} \frac{\text{N}}{\text{m}}$ then the inner circumference of the capillary is
 (A) $15 \times 10^{-2} \text{ m}$ (B) $1.5 \times 10^{-2} \text{ m}$
 (C) $0.75 \times 10^{-2} \text{ m}$ (D) $0.5 \times 10^{-2} \text{ m}$
43. Light takes time t_1 to travel a distance ' X ' in vacuum and time t_2 to travel a distance $10X$ in a medium. What is the critical angle of the medium?
 (A) $\sin^{-1}\left(\frac{5t_1}{6t_2}\right)$ (B) $\sin^{-1}\left(\frac{t_1}{10t_2}\right)$
 (C) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$ (D) $\sin^{-1}\left(\frac{10t_2}{t_1}\right)$
44. In series LCR circuit, $C = 2 \mu\text{F}$, $L = 1 \text{ mH}$ and $R = 10 \Omega$. What is the ratio of energies stored in the inductor and the capacitor when the maximum current flows in the circuit?
 (A) $\frac{5}{1}$ (B) $\frac{3}{1}$
 (C) $\frac{2}{1}$ (D) $\frac{4}{1}$
45. The e.m.f.s. are given as $e_1 = E_0 \sin(100\pi t)$ and $e_2 = E_0 \sin\left(100\pi t + \frac{\pi}{3}\right)$. We conclude that
 (A) e_1 leads e_2 by 90° .
 (B) e_2 lags behind e_1 by 45° .
 (C) e_1 achieves its maximum value $\frac{1}{300}$ second before e_2 .
 (D) e_2 achieves its maximum value $\frac{1}{300}$ second before e_1 .

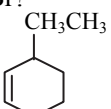
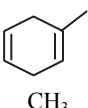
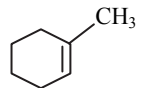
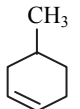
46. The distance of a point on the screen from two slits in Young's double slit experiment is 1.8×10^{-5} m and 1.23×10^{-5} m. If λ (wavelength used) = $6000 \text{ \AA}$, the fringe number formed at that point is
 (A) 8th dark. (B) 9th dark.
 (C) 10th dark. (D) 11th dark.
47. A mass attached to a spring performs S.H.M. whose displacement is $x = 3 \times 10^{-3} \cos(2\pi t)$ m. The time taken to obtain maximum speed for the first time is
 (A) 0.40 s (B) 0.25 s
 (C) 0.8 s (D) 0.50 s
48. An ideal gas is compressed isothermally until its pressure becomes four times the initial and then allowed to expand adiabatically to regain its original volume. The ratio of final pressure to initial pressure is $[\gamma = \frac{C_p}{C_v} = 1.5]$
 (A) 3 : 2 (B) 2 : 3
 (C) 2 : 1 (D) 1 : 2
49. Same current is passing in two a.c. circuits. First circuit contains only inductance and the other contains only a capacitor. What is the effect on the values of the current in the two circuits, if the frequency of the alternating e.m.f. is increased?
 (A) Decreases in both the circuits.
 (B) Increases in both the circuits.
 (C) Increases in the 1st circuit and decreases in the other.
 (D) Decreases in the 1st circuit and increases in the other.
50. Water rises upto 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 upto height 'y'. If 'R' is the radius of the earth then ratio x : y is
 (A) $\left(1 - \frac{d}{R}\right)$ (B) $\left(1 - \frac{d}{4R}\right)$
 (C) $\left(1 - \frac{2d}{R}\right)$ (D) $\left(1 - \frac{d}{2R}\right)$

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- Which from the following is NOT a primary amine?
(A) Diphenyl amine (B) Benzyl amine
(C) p - Toluidine (D) Allyl amine
- Which among the following has the lowest boiling point?
(A) $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_3$
(B) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$
(C) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$
(D) $\text{CH}_3 - \text{COOH}$
- Which of the following equations represents relation between $t_{\frac{1}{2}}$ and rate constant for a first order reactions?
(A) $k = \frac{2.303}{t_{\frac{1}{2}}}$ (B) $t_{\frac{1}{2}} = \frac{0.693}{k}$
(C) $t_{\frac{1}{2}} = \frac{k}{0.693}$ (D) $t_{\frac{1}{2}} = 2.303 k$
- Which polymer is formed from hexamethylene diammonium adipate monomer?
(A) Buna - S
(B) Nylon 6,6
(C) Nylon 6
(D) Polyacrylonitrile
- Calculate molar mass of solute if 5 g of it in 100 g of solvent has the depression in freezing point 2.15 K . (K_f for solvent = $14.7 \text{ K kg mol}^{-1}$).
(A) 180 g mol^{-1} (B) 78 g mol^{-1}
(C) 60 g mol^{-1} (D) 342 g mol^{-1}
- Which among the following has the highest boiling point?
(A) Propan-1-ol (B) Ethanoic acid
(C) Propanone (D) Propanal
- Which of the following formulae is used to calculate angular momentum of an electron in given stationary orbit?
(A) $mvr = n \left(\frac{h}{2\pi} \right)$ (B) $mvr = n \left(\frac{2\pi}{h} \right)$
(C) $\frac{mv}{n} = r \left(\frac{h}{2\pi} \right)$ (D) $mvr = \frac{n\pi}{h}$
- Identify the catalyst used in following reaction.
 $\text{Vegetable oil} + \text{H}_2 \xrightarrow{\text{Catalyst}} \text{vegetable ghee}$
(A) $\text{Ni}_{(s)}$ (B) $\text{Mo}_{(s)}$
(C) $\text{Pb}_{(s)}$ (D) $\text{Fe}_{(s)}$
- What is the contribution of each particle at corner in unit cell of cubic system?
(A) $\frac{1}{2}$ (B) $\frac{1}{8}$
(C) $\frac{1}{4}$ (D) $\frac{1}{6}$
- The enthalpy of formation of ammonia gas is -46 kJ mol^{-1} . Find the enthalpy of following reaction.
 $2\text{N}_{2(g)} + 6\text{H}_{2(g)} \longrightarrow 4\text{NH}_{3(g)}$
(A) -184 kJ (B) -130 kJ
(C) -38 kJ (D) -92 kJ
- What is the value of dextrorotation of glucose and sucrose respectively?
(A) $+66.5^\circ$ and $+52.7^\circ$
(B) $+52.7^\circ$ and $+92.4^\circ$
(C) $+52.7^\circ$ and $+66.5^\circ$
(D) $+92.4^\circ$ and $+57.7^\circ$
- One mole maltose on hydrolysis forms _____.
(A) one mole glucose and one mole galactose
(B) two moles glucose
(C) one mole glucose and one mole fructose
(D) two moles galactose
- If 'a' is edge length of a simple cubic unit cell then atomic radius is given as _____.
(A) $0.1 a$ (B) $0.5 a$
(C) a (D) $1.5 a$
- Identify optically inactive compound from the following.
(A) 2-Bromopentane
(B) 2-Bromo-3-methylbutane
(C) 3-Bromohexane
(D) 2-Bromo-2-methylbutane
- Fraction of the total number of moles of an electrolyte dissociated when equilibrium is attained is known as _____.
(A) van't Hoff factor
(B) degree of dissociation
(C) degree of hydrolysis
(D) percentage dissociation

16. Which among the following compounds is NOT a phenol?
- (A)  (B) 
- (C)  (D) 
17. If Q is charge of one mole of electron equal to 96500 coulombs, then the number of moles of electrons actually passed during electrolysis is given as _____.
- (A) $\frac{96500}{Q}$ (B) $\frac{96500}{2Q}$
(C) $96500 \times Q$ (D) $\frac{Q}{96500}$
18. Identify neutral complex from the following.
- (A) $[\text{Fe}(\text{CN})_6]^{4-}$ (B) $[\text{Fe}(\text{CO})_5]$
(C) $[\text{Cu}(\text{NH}_3)_4]^{2+}$ (D) $[\text{Ni}(\text{CN})_4]^{2-}$
19. Which of the following polymer is used in the manufacture of drinking straws?
- (A) Polypropylene (B) PET
(C) LDPE (D) Polystyrene
20. Aromatization reaction involves _____.
- (A) dehydration and oxidation
(B) dehydrogenation and cyclization
(C) dehydrogenation and oxidation
(D) hydrogenation and cyclization
21. Which of the following oxoacids of sulphur is called as pyrosulphuric acid?
- (A) $\text{H}_2\text{S}_2\text{O}_3$ (B) H_2SO_5
(C) $\text{H}_2\text{S}_2\text{O}_7$ (D) $\text{H}_2\text{S}_2\text{O}_8$
22. Find out the difference between ΔH and ΔU at 300 K for the following reaction.
- $$\text{C}_{(\text{graphite})} + \text{CO}_{2(\text{g})} \longrightarrow 2\text{CO}_{(\text{g})}$$
- (A) 2.5 kJ (B) 5.0 kJ
(C) 3.6 kJ (D) 7.5 kJ
23. What is the relation between solubility and solubility product for lead iodide?
- (A) $K_{\text{sp}} = 8S^3$ (B) $K_{\text{sp}} = 4S^3$
(C) $K_{\text{sp}} = S^2$ (D) $K_{\text{sp}} = 27S^4$
24. Which among the following reactions is used to prepare oleum?
- (A) $\text{SO}_3 + \text{H}_2\text{SO}_4 \longrightarrow$
(B) $2\text{NaOH} + \text{SO}_2 \longrightarrow$
(C) $\text{I}_2 + \text{SO}_2 + 2\text{H}_2\text{O} \longrightarrow$
(D) $\text{Na}_2\text{SO}_3 + \text{H}_2\text{O} + \text{SO}_2 \longrightarrow$
25. $\text{R-Cl} + \text{AgF} \longrightarrow \text{R-F} + \text{AgCl} \downarrow$
This reaction is an example of _____.
(A) Sandmeyer's reaction
(B) Swartz reaction
(C) Finkelstein reaction
(D) Wurtz-Fitting reaction
26. Identify the pair of compounds from the following that exhibits chain isomerism.
- (A) Ethanol and methoxymethane
(B) n-Butane and 2-methylpropane
(C) Ethoxyethane and n-butyl alcohol
(D) Keto form and enol form of carbonyl compounds
27. What is the value of Henry's law constant for CH_3Br if its solubility is 0.08 mol L^{-1} at 0.5 bar?
- (A) $0.50 \text{ mol L}^{-1} \text{ bar}^{-1}$
(B) $0.40 \text{ mol L}^{-1} \text{ bar}^{-1}$
(C) $0.16 \text{ mol L}^{-1} \text{ bar}^{-1}$
(D) $0.08 \text{ mol L}^{-1} \text{ bar}^{-1}$
28. Identify the magnetic behavior and structure of $[\text{Ni}(\text{CN})_4]^{2-}$ complex from the following.
- (A) Paramagnetic and pyramidal
(B) Diamagnetic and tetrahedral
(C) Diamagnetic and square planar
(D) Paramagnetic and square planar
29. Calculate number of moles of nitrogen gas filled in a container of volume 3.05 dm^3 at 32°C and at 4.7 atm pressure. ($R = 0.0821 \text{ dm}^3 \text{ atm K}^{-1} \text{ mol}^{-1}$)
- (A) 2.30 (B) 1.65
(C) 1.14 (D) 0.57
30. Which of the following compounds on reactions with Grignard's reagent followed by hydrolysis forms tertiary alcohol?
- (A) Propanone (B) Ethanal
(C) Methanal (D) Propanal
31. Which among the following has the lowest pKa value?
- (A) Monochloroacetic acid
(B) Acetic acid
(C) Trichloroacetic acid
(D) Dichloroacetic acid
32. The reaction in which $-\text{C}\equiv\text{N}$ group is converted into $-\text{CH}_2\text{NH}_2$ group is called _____.
(A) Hofmann alkylation
(B) Hofmann degradation
(C) Mendius reaction
(D) Hofmann elimination
33. What is the value of density of an element having bcc structure with edge length $5 \text{ \AA}$?
(Atomic mass = 70 g mol^{-1})
(A) 4.35 g cm^{-3} (B) 3.72 g cm^{-3}
(C) 5.35 g cm^{-3} (D) 1.86 g cm^{-3}

34. Which of the following factors does NOT affect heat of reaction?
 (A) The path by which final products are formed
 (B) Temperature
 (C) Physical states of reactants
 (D) Physical states of products
35. Which of the following molecules has the highest bond order?
 (A) Cl_2 (B) O_2
 (C) H_2 (D) N_2
36. A weak monobasic acid is 0.1 % dissociated in 0.04 M solution. Calculate dissociation constant of acid.
 (A) 4.5×10^{-6} (B) 2.8×10^{-6}
 (C) 4.0×10^{-8} (D) 2.5×10^{-8}
37. In carbinol system, sec-butyl alcohol is named as _____.
 (A) sec-butyl carbinol
 (B) ethyl methyl carbinol
 (C) diethyl carbinol
 (D) isopropyl carbinol
38. Which of the following metals when heated with hydrogen does NOT form hydride?
 (A) Mg (B) Ca
 (C) Si (D) Be
39. What is the molar conductivity of 0.20 M KCl solution if its conductivity is 0.0242 S cm^{-1} at 298 K?
 (A) $148.4 \text{ S cm}^2 \text{ mol}^{-1}$
 (B) $82.6 \text{ S cm}^2 \text{ mol}^{-1}$
 (C) $121.0 \text{ S cm}^2 \text{ mol}^{-1}$
 (D) $484.0 \text{ S cm}^2 \text{ mol}^{-1}$
40. Which of the following compounds forms 1-Bromo-1-methylcyclohexane when treated with HBr?
 (A)  (B) 
 (C)  (D) 
41. Which among the following statements about common properties of d-block elements is NOT true?
 (A) These are bad conductors of heat and electricity.
 (B) These have high tensile strength.
 (C) These are electropositive metals.
 (D) These are lustrous and shining.
42. A first order reaction takes 40 min for 50% decomposition; calculate its half life time.
 (A) 20 min (B) 4 min
 (C) 2 min (D) 40 min
43. Which among the following groups causes +I effect?
 (A) Cyano (B) Carboxy
 (C) Ethyl (D) Ester
44. How many coulombs of electricity is required to deposit 0.5 g of calcium metal (Molar mass = 40.0 g mol^{-1}) from calcium ions?
 (A) 2412.5 C (B) 3612.5 C
 (C) 2214.0 C (D) 3302.0 C
45. Which polymer from the following is used to manufacture toys?
 (A) Rayon (B) HDP
 (C) LDP (D) Glyptal
46. "A given compound always contains exactly the same proportion of elements by weight" is a statement of _____.
 (A) Law of combining volumes of gases
 (B) Law of conservation of mass
 (C) Law of multiple proportion
 (D) Law of definite proportion
47. What is the relation between boiling point elevation and molality of solution?
 (A) $K_b = \frac{1}{\Delta T_b \times m}$ (B) $K_b = \frac{m}{\Delta T_b}$
 (C) $K_b = \frac{\Delta T_b}{m}$ (D) $K_b = \Delta T_b \times m$
48. Which among the following lanthanoid hydroxides is the strongest base?
 (A) $\text{La}(\text{OH})_3$ (B) $\text{Lu}(\text{OH})_3$
 (C) $\text{Sm}(\text{OH})_3$ (D) $\text{Ho}(\text{OH})_3$
49. Identify the number of electrons lost by H_2O_2 when it is oxidised to O_2 according to following reaction.

$$\text{H}_2\text{O}_{2(aq)} + \text{ClO}_4^- \longrightarrow \text{ClO}_{2(aq)} + \text{O}_{2(g)}$$

 (A) 2 electrons
 (B) 1 electron
 (C) No loss of electron
 (D) 4 electrons
50. For the reaction $2\text{NO} + \text{Cl}_2 \longrightarrow 2\text{NOCl}$, what is the relation between $\frac{d[\text{Cl}_2]}{dt}$ and $\frac{d[\text{NOCl}]}{dt}$?
 (A) $\frac{1}{2} \frac{d[\text{NOCl}]}{dt} = -2 \frac{d[\text{Cl}_2]}{dt}$
 (B) $\frac{d[\text{NOCl}]}{dt} = -\frac{d[\text{Cl}_2]}{dt}$
 (C) $\frac{d[\text{NOCl}]}{dt} = -\frac{1}{2} \frac{d[\text{Cl}_2]}{dt}$
 (D) $\frac{d[\text{NOCl}]}{dt} = -2 \frac{d[\text{Cl}_2]}{dt}$

MHT-CET 2021 Question Paper

25th September 2021

1. Sometimes a pregnant woman is injected with _____ hormone to hasten parturition.
(A) FSH (B) thyroxine
(C) oxytocin (D) glucagon
2. In brood parasitism _____.
(A) the eggs after being laid in hosts nest are incubated by parent bird.
(B) the eggs of host bird are destroyed.
(C) the parasites egg hatch after the hosts egg.
(D) the eggs of one bird are laid in another birds nest who incubates them.
3. The patent titled "Control of plant gene expression" is based on a gene producing toxic protein that _____.
(A) causes allergic reactions.
(B) does not allow seeds to germinate.
(C) has adverse effect on Monarch butterfly population.
(D) develops resistance to herbicide.
4. Which one of the following is the substrate for the activity of restriction endonuclease enzyme?
(A) Double stranded DNA at VNTR's only.
(B) RNA primers used in PCR for gene amplification.
(C) Single stranded DNA separated by denaturation.
(D) Specific recognition sites of double stranded DNA.
5. The remnant of the embryonic aperture on the inter-auricular septum is called _____.
(A) foramen ovalis
(B) foramen of Monroe
(C) foramen of Luschka
(D) foramen of Magendie
6. Absciscic acid causes efflux of _____ ions from guard cells and brings about closure of stomata.
(A) Na^+ (B) K^+
(C) Mg^{++} (D) H^+
7. A large increase in blood volume and pressure stimulates atrial wall to produce _____.
(A) ANP (B) ACTH
(C) RAAS (D) ADH
8. All living beings have equal right to survive irrespective of their known or prospective economic use. "This is _____ reason for conservation of biodiversity."
(A) constitutional (B) broad utilitarian
(C) narrowly utilitarian (D) ethical
9. If a person has blood group 'A', then antigen A will be present, _____.
(A) in stroma of RBC
(B) on plasma membrane of RBC
(C) on plasma membrane of WBC
(D) in plasma of blood
10. Which plant hormone increases rate of respiration?
(A) Auxins (B) Ethylene
(C) Gibberellins (D) Cytokinins
11. In angiosperms, the embryo sac is _____.
(A) uninucleate (B) binucleate
(C) multinucleate (D) enucleate
12. Which one of the following sets contain enzymes coded by structural gene of lac operon of *E.coli*?
(A) β - galactosidase, phosphoglucose isomerase and transacetylase
(B) β - galactosidase, β - galactoside permease and glycogen synthetase.
(C) β - galactosidase, β - galactoside permease and transacetylase
(D) β - galactosidase, β - galactoside permease and helicase.
13. During biogas formation which one of the following process is NOT involved in anaerobic digestion of slurry?
(A) Methanogenesis (B) Acidogenesis
(C) Photolysis (D) Hydrolysis
14. The specific site where the DNA is cut by REN's is called _____ site.
(A) recognition (B) initiation
(C) 'ori' (D) termination
15. Which one of the following is an arboreal ape?
(A) Gorilla (B) Gibbon
(C) Orangutan (D) Chimpanzee
16. Which one of the following cranial nerves does NOT innervate eye muscles?
(A) Pathetic (B) Abducens
(C) Hypoglossal (D) Oculomotor

17. Which one of the following is unlike other nuclei in the embryo sac of angiosperms regarding ploidy?
 (A) Male gamete nucleus
 (B) Egg nucleus
 (C) Secondary nucleus
 (D) Antipodal nucleus
18. Following are sex ratios obtained from a given area. Which one will show evolutionary stable strategy between males and females respectively?
 (A) 1000 : 1000 (B) 1015 : 1000
 (C) 1000 : 1015 (D) 1000 : 800
19. Number of NADH + H⁺ molecules formed during acetylation from end product of glycolysis in aerobic respiration is _____.
 (A) 2 (B) 3
 (C) 6 (D) 8
20. III ventricle of human brain is connected posteriorly to IV ventricle through _____.
 (A) foramen of Magendie
 (B) duct of Bellini
 (C) foramen of Monro
 (D) duct of Sylvius
21. The substance upon which an enzyme acts is termed as _____.
 (A) prosthetic group (B) exoenzyme
 (C) endoenzyme (D) substrate
22. Given below are two statements with respect to Menstrual cycle.
Statement I: Menstrual phase in menstrual cycle occurs when an ovulated egg does not fertilize and thus shed out along with the menstruum.
Statement II: Menstrual phase is called, 'funeral of unfertilized egg'.
 Choose the most appropriate answer from the options given below.
 (A) Both Statement-I and Statement-II are correct
 (B) Statement-I is correct but Statement-II is incorrect.
 (C) Both Statement-I and Statement-II are incorrect.
 (D) Statement-I is incorrect but Statement-II is correct.
23. The heterochromatin part of chromosome is _____ times more rich in DNA than euchromatin.
 (A) 2 – 3 (B) 9 – 12
 (C) 5 – 8 (D) 4 – 6
24. Which of the following does NOT contribute to the formation of thoracic cage?
 (A) Diaphragm (B) Sternum
 (C) Pleura (D) Ribs
25. Select the correct sequence of stage occurring in primary hydrarch succession.
 (A) Free floating plants → submerged plants → trees → reed swamp stage
 (B) Reed swamp stage → trees → submerged plants → free floating plants
 (C) Submerged plants → free floating plants → reed swamp stage → trees
 (D) Submerged plants → reed swamp stage → free floating plants → trees
26. Nucleic acid was first discovered from _____.
 (A) red blood cells
 (B) bacteriophages
 (C) white blood cells
 (D) *Streptococcus pneumoniae*
27. Rate of breathing in new born is about _____ times per minute.
 (A) 44 (B) 12
 (C) 16 (D) 20
28. Secondary succession takes place in / on _____.
 (A) newly formed volcanic island.
 (B) recently burnt or destroyed forest.
 (C) newly created pond.
 (D) bare rocky area
29. T-wave in normal ECG represents _____.
 (A) atrial depolarization.
 (B) ventricular depolarization.
 (C) atrial repolarization
 (D) ventricular repolarization
30. Choose the INCORRECT statement with respect to T.S. of Artery.
 (A) Arterial lumen is devoid of valves.
 (B) Angular margin around the lumen shows tessellations
 (C) The outermost tunic externa is thick and tough layer of collagen fibers.
 (D) Tunica media is thin and lumen is wide.
31. To provide energy for a metabolic process, ATP molecule undergoes _____.
 (A) phosphorylation (B) hydrolysis
 (C) oxidation (D) dehydrogenation
32. In which of the following plants male flower floats on the surface of water?
 (A) *Potamogeton* (B) *Zostera*
 (C) Water lily (D) *Vallisneria*
33. The cyanobacteria *Tolypothrix* is associated symbiotically with _____.
 (A) Lichen (B) *Azolla*
 (C) *Cycas* (D) Endomycorrhiza

34. Match the terms in Column-I with their explanation in Column-II.

	Column I		Column II
A.	Polycythemia	I.	Decrease in number of WBCs
B.	Erythrocytopenia	II.	Increase in number of RBCs
C.	Leukemia	III.	Decrease in number of RBCs
D.	Leucopenia	IV.	Uncontrolled increase in number of WBCs

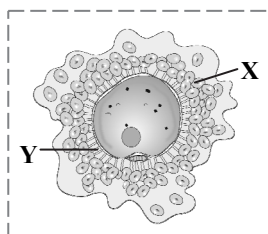
- (A) A – II B – III C-IV D – I
 (B) A – I B – II C – III D – IV
 (C) A – IV B - II C – I D – III
 (D) A - III B - IV C – II D – I

35. Match the following enzymes in Column-I with their source in Column-II.

	Column I		Column II
A.	Pectinase	I.	<i>Saccharomyces cerevisiae</i>
B.	Lipase	II.	<i>Aspergillus niger</i>
C.	Invertase	III.	<i>Trichoderma konigii</i>
D.	Cellulase	IV.	<i>Candida lipolytica</i>

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

36. Given below is a diagram of an unfertilized egg. Identify 'X' and 'Y' respectively.



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

37. Vasa recta refers to _____.
 (A) loop shaped capillary network around Henle's loop of juxtamedullary nephrons.
 (B) juxtaglomerular apparatus of nephrons.
 (C) neuronal circuit of hypothalamus,
 (D) vascular portion of pia mater of CNS.
38. Which one of the following is an example of milk sugar?
 (A) Lactose (B) Fructose
 (C) Sucrose (D) Maltose

39. Select the INCORRECT statement regarding transport of respiratory gases.

- (A) ppO_2 of capillary blood is 40 mm Hg before oxygenation.
 (B) Alveolar membrane is equally permeable to oxygen and carbon dioxide.
 (C) Dissociation of oxyhaemoglobin into haemoglobin and oxygen is favored by low $ppCO_2$.
 (D) $ppCO_2$ of alveolar air is 45 mm Hg.

40. In angiosperms, the embryo is developed at _____ of the embryo sac.

- (A) antipodal side (B) micropylar end
 (C) chalazal end (D) centre

41. Which one of the following is the decarboxylated compound formed during TCA cycle?

- (A) Citrate (B) α -ketoglutarate
 (C) Isocitrate (D) Cis-aconitate

42. Which of the following is NOT a character of open circulation?

- (A) Blood flows with low pressure.
 (B) Respiratory pigment is usually absent.
 (C) Presence of blood capillaries.
 (D) Presence of haemocoel.

43. Match the following types of adaptations given in Column-I and their examples given in Column-II. Choose the correct answer from the options given below.

	Column-I		Column-II
A.	Morphological	I.	CAM plants
B.	Physiological	II.	Migration of birds
C.	Behavioural	III.	Leaves reduced to spines in opuntia

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

44. Identify the correct statement/s regarding unsaturated fatty acids.

- A. They have one or more double between the carbon atoms of hydrocarbon chains.
 B. Are generally solid at room temperature.
 C. Are generally liquid at room temperature.
 D. They do not have any double bonds between the carbon atoms of hydrocarbon chains.

- (A) Only A (B) Both A and C
 (C) Both A and B (D) A, B and C

45. The smallest WBC is _____.

- (A) basophil. (B) monocyte.
 (C) lymphocyte. (D) neutrophil.

46. Lac-operon is an example of which one of the following types of regulation of gene expression?
 (A) Transcriptional level
 (B) Translational level
 (C) Regulation of splicing/ processing level
 (D) Transport of mRNA from nucleus to cytoplasm
47. The Human Genome Project formally began in A and was completed in B.
 (A) A – 1993 B – 2000
 (B) A – 1995 B – 2005
 (C) A – 1990 B – 2003
 (D) A – 1980 B – 2001
48. During translation in protein synthesis, and codon bind by formation of _____ bond.
 (A) peptide (B) glycosidic
 (C) hydrogen (D) phosphodiester
49. Epstein-barr virus and Human papilloma virus cause _____.
 (A) dermatophytosis (B) nasopharyngitis
 (C) pneumonia (D) cancer
50. Species diversity is bountiful in the tropics near equator because of the following factors EXCEPT _____.
 (A) higher annual rainfall.
 (B) warmer temperature.
 (C) intense sunlight.
 (D) drastic seasonal climatic changes.
51. Symptoms such as intermittent pain below ribcage in the back and sideways, hazy, pinkish urine along with pain during micturition generally indicate _____.
 (A) uremia (B) kidney stones
 (C) diabetes mellitus (D) nephritis
52. How many copies of DNA will be produced in the thermal cyclor of PCR after 5 cycles?
 (A) 64 (B) 16
 (C) 128 (D) 32
53. Which one of the following is NOT a cause of diarrhea?
 (A) Colitis
 (B) Ulcer
 (C) Inflammation of intestine
 (D) Inadequate enzyme secretion
54. Given below are two statements regarding evolution.
Statement-I: Selection against harmful mutation leads to a mutation balance.
Statement-II: In mutation balance, the allele frequency of harmful recessives keep on changing generation after generation.
 In the light of above statements, choose the most appropriate answer from the options given below:
- (A) Statement-I is correct but Statement-II is incorrect
 (B) Both Statement-I and Statement-II are correct.
 (C) Both Statement-I and Statement-II are incorrect.
 (D) Statement-I is incorrect but Statement-II is correct.
55. Which one of the following is a hormone releasing IUD?
 (A) LNG – 20 (B) CuT
 (C) Cu7 (D) Multiload 375
56. With reference to the Mendelian experiments, which one of the following statements is INCORRECT?
 (A) A factor has only one allele.
 (B) Recessive allele is not expressed in the presence of an alternative allele.
 (C) The alleles accupy identical loci on homologous chromosomes.
 (D) Allele is an alternative form of a given gene.
57. Based on the statements regarding dialysis choose the correct answer from options given below.
Statement-I: Dialysis is regarded as a 'holding measure' until a renal transplant is performed.
Statement-II: Sometimes dialysis is not supportive measure in those for whom a transplant is inappropriate.
 (A) Statement-I is incorrect but Statement-II is correct.
 (B) Both Statement-I and Statement-II are correct.
 (C) Both Statement-I and Statement-II are incorrect.
 (D) Statement-I is correct but Statement-II is incorrect.
58. Select the mismatch pair with respect to hormones.
 (A) Milk ejecting hormone – Oxytocin
 (B) Sleep inducing hormone – Melatonin
 (C) Salt retaining hormone – Thyroxine
 (D) Emergency hormone – Adrenaline
59. During sewage treatment the activated sludge is present in _____.
 (A) settling tank.
 (B) aeration tank.
 (C) sedimentation tank.
 (D) grit chamber.
60. In Zea mays, color and shape of grain show _____ linkage.
 (A) complete (B) complete sex
 (C) incomplete (D) incomplete sex

61. Flame cell are also called A and they are found in animals like B .
 (A) A - Salt excreting glands, B - marine birds
 (B) A - Protonephridia, B - rotifers
 (C) A - metanephridia, B - Echinoderms
 (D) A - nephrons, B - Crustaceans
62. Polyembryony was first observed by Leeuwenhoek in the seeds of _____.
 (A) Citrus (B) Mango
 (C) Orchid (D) Papaya
63. Symptoms of malaria do NOT include _____.
 (A) sweating and shivering
 (B) arthralgia
 (C) conjunctivitis
 (D) fever with chills
64. India shares about _____% of total biodiversity wealth on earth.
 (A) 2.4 (B) 12 (C) 8.1 (D) 15
65. Given below are two statements with respect to counter current mechanism.
Statement-I: Tissue fluid around descending limb of Henle's loop becomes concentrated, during counter current mechanism.
Statement-II: Water moves out from descending limb of Henle's loop into tissue fluid by osmosis.
 In the light of above statements select the correct option from codes given below:
 (A) Both Statement-I and Statement-II are incorrect.
 (B) Both Statement-I and Statement-II are correct.
 (C) Statement-I is incorrect but Statement-II is correct.
 (D) Statement-I is correct but Statement-II is incorrect.
66. Generally the pigment bilirubin formed by breakdown of haemoglobin is excreted through _____.
 (A) faeces. (B) sebum.
 (C) sweat. (D) urine.
67. Following accessory ducts in human males are in pairs, EXCEPT _____.
 (A) epididymis (B) ejaculatory duct
 (C) vas deferens (D) urethra
68. How many of the following statements are true about angiosperms?
 A. The generative cell floats in the cytoplasm of vegetative cell.
 B. The stalk of ovule is called funiculus.
 C. Pollen grains are shed at two celled stage.
 D. Embryo sac is diploid.
 E. Megaspore mother cell towards chalazal end becomes functional.
- (A) A, B and C only (B) D and E only
 (C) A and B only (D) B and C only
69. Given below are two statements.
Statement-I: In root hair outer layer of cell wall is composed of pectin.
Statement-II: In root hair inner layer of cell wall is composed of cellulose.
 Choose the correct answer from the options given below with reference to structure of root hair.
 (A) Statement-I is correct but Statement-II is incorrect.
 (B) Statement-I is incorrect but Statement-II is correct
 (C) Both Statement-I and Statement-II are correct.
 (D) Both Statement-I and Statement-II are incorrect.
70. Which one of the following hormone is produced by β -cells of islets of Langerhans of pancreas?
 (A) Oxytocin (B) Insulin
 (C) Glucagon (D) Vasopressin
71. Anaerobic process after glycolysis, during lactic acid formation is called _____.
 (A) Fermentation (B) Citric acid cycle
 (C) HSK pathway (D) Calvin cycle
72. Given below are two statements.
Statement-I: Enzyme pyruvate dehydrogenase is present in mitochondria of eukaryotes.
Statement-II: Enzyme pyruvate dehydrogenase is present in cytoplasm of prokaryotes.
 In the light of the above statements choose the correct answer from the options given below.
 (A) Both Statement-I and Statement-II are incorrect.
 (B) Statement-I is incorrect but Statement-II is correct.
 (C) Both Statement-I and Statement-II are correct.
 (D) Statement-I is correct but Statement-II is incorrect.
73. Fishes have _____ for respiration
 (A) external gills (B) internal gills
 (C) book gills (D) book lungs
74. In neural system, chemical synapse shows synaptic gap of about _____.
 (A) 400 nm to 60 nm (B) 80 nm to 100 nm
 (C) 20 nm to 40 nm (D) 60 nm to 80 nm
75. Following are infection sites for syphilis, EXCEPT _____.
 (A) conjunctiva of eye.
 (B) oral mucous membrane.
 (C) mucous membrane in genital region.
 (D) mucous membrane in rectum.

76. Following are the functions of cerebrospinal fluid EXCEPT _____.
 (A) Acts as shock absorber.
 (B) Maintenance of constant pressure.
 (C) Helps in binding the neurotransmitter to receptor.
 (D) Exchange of nutrients and waste.
77. Formation of oogonia in human females is completed in _____.
 (A) embryonic stage.
 (B) puberty.
 (C) at the time of birth.
 (D) proliferative phase of menstruation

78. Match different cells of Islets of Langerhans in Column-I with their role in Column-II. Select the correct answer from the options given below.

	Column-I		Column-II
A.	Alpha cells	I.	Stimulates muscles for glycogenesis.
B.	Beta cells	II.	Decreases gastric secretions and absorption in digestive tract.
C.	Delta cells	III.	Inhibits the release of pancreatic juice.
D.	F cells	IV.	Stimulates liver for glucogenolysis.

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

79. How many phenotypes can be obtained if a pea plant (RrTt) is crossed with another pea plant with the same genotype?
 (A) 4 (B) 9 (C) 12 (D) 16
80. The _____ is regarded as an inborn metabolic disorder.
 (A) sickle cell anemia (B) Thalassemia
 (C) Window's peak (D) phenylketonuria
81. Which one of the following restriction enzyme has recognition sequence of 4 nucleotides and makes blunt end in the DNA?
 (A) Hind II (B) Bam H I
 (C) Alu I (D) Eco RI
82. Complete the following about the absence of clotting factors. Haemophilia A: _____ : : Haemophilia B: _____ .
 (A) x – IX y – VIII
 (B) x – X y – IX
 (C) x – VIII y – IX
 (D) x – IX y – X

83. Which one of the following gland is NOT present in human females?
 (A) Bartholin's glands
 (B) Endometrial glands
 (C) Bulbourethral glands
 (D) Mammary glands
84. Which one of the following statements is INCORRECT about angiospermic seed/fruit?
 (A) The micropyle of the ovule persists in the seed.
 (B) Coconut is a non-endospermic seed.
 (C) Coconut is a fleshy fruit.
 (D) Fruit development is triggered by hormones produced by developing seeds.
85. 'Bt' cotton contains the gene of a _____.
 (A) bacterium. (B) nematode.
 (C) protozoan. (D) virus.
86. Which one of the following is NOT a psychological disorder?
 (A) Anxiety disorder
 (B) Autism spectrum disorder
 (C) Bipolar disorder
 (D) Pulmonary disorder
87. Which one of the following is NOT correct regarding vaccines?
 (A) It is used to control diseases like measles, polio etc.
 (B) It is antigenic protection against particular pathogen.
 (C) It teaches immune system to recognize and eliminate the pathogenic organism.
 (D) It is introduction of antibodies into animal body.
88. Which one of the following is NOT a derivative of cholesterol?
 (A) Vitamin D (B) Progesterone
 (C) Testosterone (D) Diosgenin
89. Which one of the following is a chromosomal disorder?
 (A) Sickle cell anaemia
 (B) Phenylketonuria
 (C) Colorblindness
 (D) Turner's syndrome
90. Heterostyly is a contrivance for _____.
 (A) geitonogamy only
 (B) autogamy only
 (C) xenogamy only
 (D) geitonogamy and xenogamy
91. A heterozygous tall pea plant was crossed with a dwarf pea plant. The progeny of cross shows _____.
 (A) 1 Tall : 1 dwarf (B) 3 Tall : 1 dwarf
 (C) 1 Tall : 3 dwarf (D) 4 Tall : 2 dwarf

92. In the genome of mouse, the estimated number of genes is _____.
(A) 33,000 (B) 19,000
(C) 13,000 (D) 25,000
93. What is ubiquinol?
(A) Oxidized ubiquinone
(B) Co enzyme Q
(C) Ubiquinone
(D) Reduced ubiquinone
94. In which zone / region root hairs occur?
(A) Zone of elongation
(B) Zone of maturation
(C) Meristematic region
(D) Zone of absorption
95. In the ecological hierarchy the basic unit is _____.
(A) biome.
(B) community.
(C) individual organism.
(D) population.
96. The fossil of which one of the following has been found in Ethiopia as well as Tanzania?
(A) *Homo erectus*
(B) *Australopithecus*
(C) *Ramapithecus*
(D) *Drypithecus*
97. At the end of replication, the contribution of nucleotides from mother DNA is _____ percent.
(A) 75 (B) 25 (C) 100 (D) 50
98. With respect to derivatives of germinal layers in human beings, complete the analogy.
Ectoderm : Sweat glands :: Endoderm : _____.
(A) Mammary glands (B) Salivary glands
(C) Thyroid glands (D) Pineal glands
99. In Platyhelminthes and rotifers the excretory organs are _____.
(A) flame cells.
(B) green glands.
(C) nephridia.
(D) Malpighian tubules.
100. The spiral configuration of α -helix and β -helix of polypeptide chains are held together by _____ bonds to form secondary structure of protein.
(A) phosphodiester (B) hydrogen
(C) peptide (D) disulphide