

MHT - CET MOCK

(Physics, Chemistry & Biology)



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MHT - CET MOCK TEST - 2025

QUESTION BOOKLET

Subjects : Physics, Chemistry & Biology

Test Booklet Code
A

Duration : 3 Hours

Roll No.						

Test Booklet No.			
1	2	3	4
(Write this number on your Answer Sheet)			

Total Marks: 200

Candidate's Signature

Invigilator's Signature

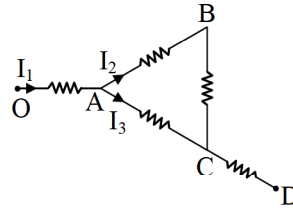
Instructions to Candidates

1. This Question Booklet contains 200 Objective Type Questions (Single Best Response Type) in the subjects of Physics (50), Chemistry (50) and Biology (100).
2. The Question Booklet and Answer Sheets are issued to examinees separately at the beginning of the examination session.
3. Choice and sequence for attempting questions will be as per the convenience of the candidate.
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. Special care should be taken to fill Question Booklet No. and Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. **The candidate must sign on the Answer Sheet and Question Booklet.**
5. Read each question carefully.
6. Determine the correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering the particular question, with Black/Blue ball point pen only, in the Answer Sheet.
8. Each answer with correct response shall be awarded **one (1) mark**. There is **no Negative Marking**.
9. Use of whitener or any other material to erase/hide the circle once filled is not permitted. Avoid overwriting and/or striking of answers once marked.
10. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Question Booklet/ Answer Sheet.
11. **Rough work should not be done on the Answer Sheet.**
12. Use of Electronic/Manual Calculator is prohibited.
13. No candidate is allowed to leave the examination hall till the examination session is over.

[Note: MHT-CET 2025 examination will be conducted Online (Computer Based Test) and the instructions may vary accordingly.]

1. The current in the arm CD of the circuit will be

- (A) $I_1 + I_2$
 (B) $I_2 + I_3$
 (C) $I_1 + I_3$
 (D) $I_1 - I_2 + I_3$



2. An object has a weight of 90 N on the Earth's surface. Approximately, what is the gravitational force acting on it when it is at an altitude equivalent to three-fourths of the Earth's radius?

- (A) 29 N (B) 36 N (C) 45 N (D) 20 N

3. What is the nuclear radius of Fe^{125} , if that of Al^{27} is 3.6 fermi?

- (A) 3.6 fermi (B) 4.8 fermi (C) 5.4 fermi (D) 6 fermi

4. When the current through a solenoid increases at a constant rate, the induced current

- (A) is constant and is in the direction of the inducing current.
 (B) is constant and is opposite to the direction of the inducing current.
 (C) increases with time and is in the direction of the inducing current.
 (D) increases with time and opposite to the direction of the inducing current.

5. A projectile is launched with an initial speed v_0 at an angle θ above the horizontal. At the instant when its velocity makes an angle of 30° with the horizontal, its speed is found to be half of its initial speed. The angle of projection θ is

- (A) $\cos^{-1}\left(\frac{1}{3}\right)$ (B) $\cos^{-1}\left(\frac{\sqrt{2}}{4}\right)$ (C) $\cos^{-1}\left(\frac{1}{\sqrt{6}}\right)$ (D) $\cos^{-1}\left(\frac{\sqrt{3}}{4}\right)$

6. Consider a system undergoes an adiabatic process. If $\gamma = 2.5$ and volume is equal to $\frac{1}{8}$ times to the initial volume then pressure P' is equal to (Initial pressure = P)

- (A) $P' = P$ (B) $P' = 2P$ (C) $P' = P \times (2)^{15/2}$ (D) $P' = 7P$

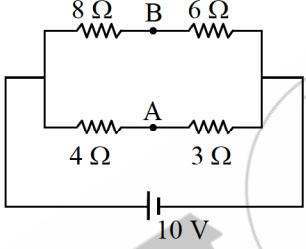
7. Two vibrating tuning forks produce progressive waves given by $y_1 = 4 \sin 480 \pi t$, $y_2 = 2 \sin 490 \pi t$ and are held near the ear of a person. Number of beats heard per minute is

- (A) 180 (B) 3 (C) 300 (D) 60

8. The electron in the hydrogen atom circles round the proton with a speed of $1.2 \times 10^6 \text{ ms}^{-1}$ in an orbit of radius $4 \times 10^{-11} \text{ m}$. What magnetic field does it produce at the proton?

- (A) 14 T (B) 13 T (C) 10 T (D) 12 T

9. Solar cell is based on the principle of
- (A) formation of electron-hole pairs with incident light.
 (B) formation of electron-hole pairs with heating.
 (C) formation of electron-hole pairs with potential.
 (D) all of these
10. A simple pendulum is taken to a place where acceleration due to gravity increases by 4%, then time period will
- (A) decrease by 4%. (B) increase by 2%. (C) decrease by 2%. (D) increase by 4%.
11. A wind blowing at a speed 30 m/s moves parallel to the roof of a house, which has an area of 500 m². Assuming that the pressure inside the house is atmospheric pressure, the force exerted by the wind on the roof and the direction of the force will be ($\rho_{\text{air}} = 1.2 \text{ kg/m}^3$)
- (A) $5.4 \times 10^5 \text{ N}$, downwards.
 (B) $5.4 \times 10^5 \text{ N}$, upwards.
 (C) $2.7 \times 10^5 \text{ N}$, upwards.
 (D) $2.7 \times 10^5 \text{ N}$, downwards.
12. A wave travels in a medium, and its displacement is given by, $y(x, t) = 0.03 \sin \pi(2t - 0.01x)$ where y and x are in metres and t in seconds. The phase difference at a given instant of time between two particles 50 m apart in the medium is determined. If the wave enters a new medium where its speed increases by 50% while keeping the frequency constant, how will the phase difference between these two points (still 50 m apart) change?
- (A) It remains the same (B) It increases by 50%
 (C) It decreases by 33.3% (D) It doubles
13. A massless spring with force constant k launches a ball of mass m . In order for the ball to reach a height h , by what displacement s should the spring be compressed?
- (A) $s = \sqrt{\frac{k}{m}}$ (B) $s = \sqrt{\frac{m}{2k}}$ (C) $s = \sqrt{\frac{k}{2m}}$ (D) $s = \sqrt{\frac{m}{k}}$
14. Two identical space probes are orbiting a planet at distances of $3R$ and $9R$ from the planet's center, where R is the radius of the planet, and the planet's mass is M . The correct statement is
- (A) The ratio of their orbital speeds will be 1:3
 (B) The ratio of their angular momenta will be 3:1
 (C) The ratio of their orbital periods will be 1:27
 (D) The ratio of their gravitational forces will be 9:1

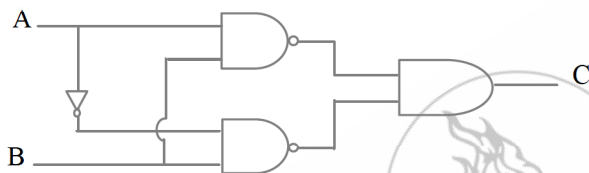
15. Two coils have a mutual inductance 0.005 H. The current changes in the first coil according to the equation $I = I_m \sin \omega t$ where $I_m = 10 \text{ A}$ and $\omega = 100 \pi \text{ rad s}^{-1}$. The maximum value of the emf induced in the second coil is
 (A) π (B) 2π (C) 4π (D) 5π
16. If a diamagnetic liquid is filled in a U-tube and one arm of U-tube is placed in an external magnetic field with the meniscus in a line with the field, then the level of liquid in that arm will
 (A) rise. (B) fall. (C) remain as it is. (D) oscillate slowly.
17. A glass tube of internal diameter 3.5 cm and thickness 0.5 cm is held vertically with its lower end immersed in water. The downward pull on the tube due to surface tension (S.T. of water = 0.074 N/m) is
 (A) $1.86 \times 10^{-2} \text{ N}$ (B) $1.86 \times 10^{-3} \text{ N}$ (C) $1.86 \times 10^{-1} \text{ N}$ (D) 1.86 N
18. The potential difference between point A and B in the following circuit is
 (A) $\frac{20}{7} \text{ V}$
 (B) $\frac{40}{7} \text{ V}$
 (C) $\frac{10}{7} \text{ V}$
 (D) 0
- 
19. A rectangular coil of 20 turns and area of cross-section 25 sq. cm has a resistance of 100 Ω . If a magnetic field which is perpendicular to the plane of coil changes at a rate of 1000 tesla per second, the current in the coil is
 (A) 1 A (B) 50 A (C) 0.5 A (D) 5 A
20. Energy stored in a condenser of capacity 10 μF , charged to 6 kV is used to lift a mass of 10 gm. The height to which the body can be raised is (Take $g = 10 \text{ m/s}^2$)
 (A) 180 m (B) 18 m (C) 1.8 m (D) 1800 m
21. In moving coil galvanometer, strong horse shoe magnet of concave shaped pole pieces is used to
 (A) increase space for rotation of coil
 (B) produce magnetic field which is parallel to plane of coil at any position
 (C) reduce weight of galvanometer
 (D) make magnetic induction weak at the centre
22. If a gas has n degrees of freedom, ratio of specific heats of gas is
 (A) $\frac{1+n}{2}$ (B) $1+\frac{1}{n}$ (C) $1+\frac{n}{2}$ (D) $1+\frac{2}{n}$

23. In LCR, A.C. series circuit, $L = 9 \text{ H}$, $R = 10 \Omega$ and $C = 100 \mu\text{F}$. Hence Q-factor of the circuit is _____.
- (A) 30 (B) 35 (C) 45 (D) 25
24. The first minimum of a single slit diffraction pattern is observed at angle 2° with a light of wavelength 698 nm. The width of this slit is
- (A) 2 mm (B) 0.2 mm (C) 0.02 mm (D) 0.002 mm
25. A pendulum is hung from the roof of a sufficiently high building and is moving freely to and fro like a simple harmonic oscillator. The acceleration of the bob of the pendulum is 20 m/s^2 at a distance of 5 m from the mean position. The time period of oscillation is
- (A) $2\pi \text{ s}$ (B) $\pi \text{ s}$ (C) 2 s (D) 1 s
26. Two perfect blackbodies A_1 and A_2 made out of same material have diameters 2 cm and 16 cm respectively. λ'_{max} and λ''_{max} are the wavelengths corresponding to their maximum radiation of energy at a common temperature λ'_{max} and λ''_{max} are related as
- (A) $\lambda'_{\text{max}} = 8\lambda''_{\text{max}}$ (B) $16\lambda'_{\text{max}} = 5\lambda''_{\text{max}}$ (C) $\lambda'_{\text{max}} = \lambda''_{\text{max}}$ (D) $8\lambda'_{\text{max}} = \lambda''_{\text{max}}$
27. The work done in breaking a big drop of radius R in n droplets of equal radii is ($T = \text{surface tension}$)
- (A) $4\pi R^2 T n^{2/3}$ (B) $4\pi R^2 T (n^{2/3} - 1)$
(C) $4\pi R^2 T (n^{1/3} - 1)$ (D) $4\pi R^2 T (n - n^{2/3})$
28. Three charges each $(-q)$ are placed at the corners of an isosceles triangle ABC of sides AB and AC each equal to $2d$. The mid-points of sides AB and AC are D and E respectively. The work done in taking a charge 'Q' from D to E is
- (A) $\frac{-qQ}{8\pi\epsilon_0 d}$ (B) $\frac{-3qQ}{4\pi\epsilon_0 d}$ (C) $\frac{-3qQ}{8\pi\epsilon_0 d}$ (D) zero
29. Three identical photocathodes receive light of frequencies ' f_1 ', ' f_2 ' and ' f_3 '. If the velocities of photoelectrons coming out are ' v_1 ', ' v_2 ' and ' v_3 ' respectively then (m - mass of photoelectron)
- (A) $v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2) \right]^{1/2}$, $v_1 - v_3 = \left[\frac{2h}{m}(f_1 - f_3) \right]^{1/2}$
(B) $v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2) \right]^{1/2}$, $v_1 + v_3 = \left[\frac{2h}{m}(f_1 + f_3) \right]^{1/2}$
(C) $v_1^2 + v_2^2 = \frac{2h}{m}(f_1 + f_2)$, $v_1^2 + v_3^2 = \frac{2h}{m}(f_1 + f_3)$
(D) $v_1^2 - v_2^2 = \frac{2h}{m}(f_1 - f_2)$, $v_1^2 - v_3^2 = \frac{2h}{m}(f_1 - f_3)$

30. In case of stationary waves, which of the following statements is CORRECT?
- (A) The distance between consecutive antinodes is equal to the wavelength.
 (B) In a pipe closed at one end, when an air column is vibrated, all harmonics are present.
 (C) In pipe open at both ends, when an air column is vibrated, only even harmonics are present.
 (D) In case of a stretched string, when vibrated, frequency of first overtone is same as second harmonic.

31. A clear sheet of polaroid is placed on top of a similar sheet so that their axes make an angle of $\sin^{-1}\left(\frac{9}{15}\right)$ with each other. The ratio of intensity of the emergent light to that of unpolarised light is
- (A) 16 : 25 (B) 9 : 25 (C) 4 : 5 (D) 8 : 25

32. The truth table for the given logic circuit is:



(A)

A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

(B)

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

(C)

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

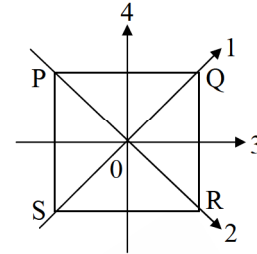
(D)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

33. In an isothermal process, the volume of an ideal gas is halved. One can say that
- (A) internal energy of the system decreases.
 (B) work done by the gas is positive.
 (C) work done by the gas is negative.
 (D) internal energy of the system increases.
34. The equal temperature value for Kelvin and Fahrenheit scales is
- (A) 574.58 °F (B) 574.25 °C (C) 100 °F (D) 273 K
35. A particle of charge q , mass m and energy E has de-Broglie wavelength λ . For a particle of charge $2q$, mass $2m$ and energy $2E$, the de-Broglie wavelength is
- (A) $\frac{\lambda}{4}$ (B) 2λ (C) 8λ (D) $\frac{\lambda}{2}$
36. Two planets revolve round the sun with frequencies n_1 and n_2 revolutions per year. If their average orbital radii be R_1 and R_2 respectively, then R_1/R_2 is equal to
- (A) $(n_1/n_2)^{3/2}$ (B) $(n_2/n_1)^{3/2}$ (C) $(n_1/n_2)^{2/3}$ (D) $(n_2/n_1)^{2/3}$

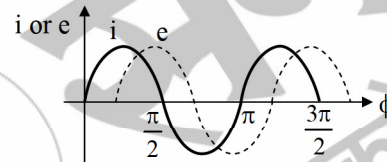
37. The moment of inertia of thin square plate PQRS of uniform thickness, about an axis passing through centre 'O' and perpendicular to the plane of the plate is (I_1, I_2, I_3, I_4) are respectively the moments of inertia about axis 1, 2, 3, 4 which are in the plane of the plate as shown in figure)

- (A) $I_1 + I_2 + I_3$
(B) $I_1 + I_3 + I_4$
(C) $I_1 + I_2 + I_3 + I_4$
(D) $I_1 + I_3$



38. When an A.C. source of e.m.f., $e = e_0 \sin(100t)$ is connected across a circuit, the phase difference between the e.m.f. e and the current i in the circuit is observed to be $\frac{\pi}{4}$, as shown in the diagram. If the circuit consists possibly only of RC or LC in series, find the relationship between the two elements.

- (A) $R = 1 \text{ k}\Omega, C = 10 \text{ }\mu\text{F}$
(B) $R = 1 \text{ k}\Omega, C = 1 \text{ }\mu\text{F}$
(C) $R = 1 \text{ k}\Omega, L = 10 \text{ H}$
(D) $R = 1 \text{ k}\Omega, L = 1 \text{ H}$

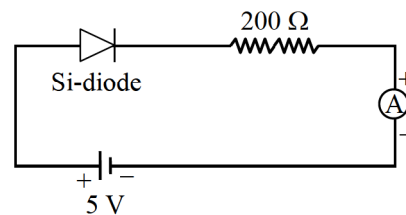


39. A sealed container holds an ideal gas with an initial volume V_0 , temperature T_0 , and pressure P_0 . The gas has a mass m , corresponding to n moles. The container is then modified such that the pressure is doubled to $2P_0$, the volume is increased to $4V_0$, and an additional mass $3m$ of the same gas is introduced. What is the new temperature of the gas?

- (A) $T_0 / 2$ (B) T_0 (C) $2T_0$ (D) $4T_0$

40. In the following circuit, the reading in the ammeter is

- (A) 25.1 mA
(B) 22.5 mA
(C) 21.5 mA
(D) 21.25 mA

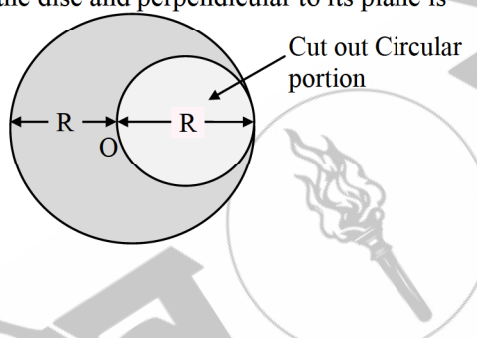
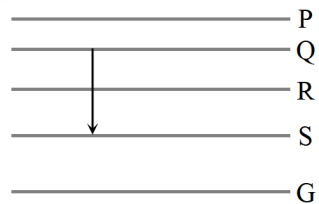


41. In Young's double-slit experiment, if the superimposing waves have amplitude a_0 and intensity I_0 , then the average intensity of the light in the fringe pattern formed on a screen will be

- (A) $6I_0$ (B) $4I_0$ (C) $2I_0$ (D) $I_0/2$

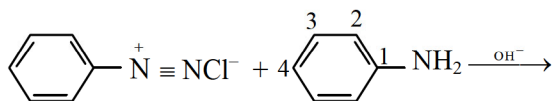
42. A transparent glass cube of length 24 cm has a small air bubble trapped inside. When seen normally through one surface from air outside, its apparent distance is 10 cm from the surface. When seen normally from opposite surface, its apparent distance is 6 cm. The distance of the air bubble from first surface is

- (A) 15 cm (B) 14 cm (C) 12 cm (D) 8 cm

43. An inductor 20 mH, a capacitor 50 μF and a resistor 40 Ω are connected in series across a source of emf $V = 10 \sin 340t$. The power loss in A.C. circuit is
 (A) 0.76 W (B) 0.89 W (C) 0.51 W (D) 0.67 W
44. When two or more lenses of magnification m_1, m_2, m_3, \dots are kept in contact, the total magnification (m) produced is given by
 (A) $m = m_1 + m_2 + m_3 + \dots$ (B) $m = m_1 + m_2 - m_3 - m_4 \dots$
 (C) $m = \frac{m_1 m_2}{m_3} + \frac{m_2 m_3}{m_4} + \dots$ (D) $m = m_1 \times m_2 \times m_3 \times \dots$
45. A circular portion of diameter R is cut out from a uniform circular disc of mass M and radius R as shown in the figure. The moment of inertia of the remaining (shaded) portion of the disc about an axis passing through the centre O of the disc and perpendicular to its plane is
 (A) $\frac{15}{32} MR^2$ (B) $\frac{7}{16} MR^2$ (C) $\frac{13}{32} MR^2$ (D) $\frac{3}{8} MR^2$
- 
46. Figure shows the energy levels P, Q, R, S and G of an atom where G is the ground state. A red line in the emission spectrum of the atom can be obtained by an energy level change from Q to S. A blue line can be obtained by following energy level change:
 (A) P to Q (B) Q to R (C) R to S (D) R to G
- 
47. Two identical capacitors have the same capacitance 'C'. One of them is charged to potential V_1 and other to V_2 . The negative ends of capacitors are connected together. When positive ends are also connected, the decrease in energy of the combined system is
 (A) $\frac{1}{4}C(V_1^2 + V_2^2)$ (B) $\frac{1}{4}C(V_1^2 - V_2^2)$ (C) $\frac{1}{4}C(V_1 + V_2)^2$ (D) $\frac{1}{4}C(V_1 - V_2)^2$
48. When a large bubble rises from bottom of a water lake to its surface, then its radius doubles. If the atmospheric pressure is equal to the pressure of height 'H' of a certain water column, then the depth of lake will be
 (A) H (B) 4H (C) 7H (D) 2H

49. Two simple pendulums of length L_1 and L_2 have periodic time T_1 and T_2 respectively. ($T_1 > T_2$). The time period of the pendulum of length $(L_1 - L_2)$ is $[(L_1 \text{ and } L_2) > 60 \text{ cm}]$
- (A) $\sqrt{T_1 + T_2}$ (B) $\sqrt{T_1 - T_2}$ (C) $\sqrt{T_1^2 + T_2^2}$ (D) $\sqrt{T_1^2 - T_2^2}$
50. A tuning fork of known frequency 256 Hz makes 5 beats per second with the vibrating string of a piano. The beat frequency decreases to 2 beats per second when the tension in the piano string is slightly increased. The frequency of the piano string before increasing the tension was
- (A) 256 + 5 Hz (B) 256 + 2 Hz (C) 256 - 2 Hz (D) 256 - 5 Hz
51. Calculate the half-life of a zero order reaction, if its initial concentration is 0.74 M and rate constant is $3.7 \times 10^{-4} \text{ M s}^{-1}$.
- (A) 12.33 min (B) 16.67 min (C) 9.50 min (D) 27.78 min
52. Which of the following are electrophiles?
- (A) BF_3, Br^+ (B) $\text{ROH}, \text{AlCl}_3$ (C) NH_3, OH^- (D) $\text{H}_2\text{O}, \text{Cl}^-$
53. The freezing point of pure benzene is 278.4 K. When 5.0 g of a solute having molecular weight 50 g mol^{-1} is added to 250 g of benzene, the freezing point of the solution will be _____.
- (K_f of benzene = $5.12 \text{ K kg mol}^{-1}$)
- (A) 276.352 K (B) 278.400 K (C) 279.424 K (D) 277.376 K
54. Which of the following when added to NH_4OH solution can suppress the ionization of NH_4OH ?
- (A) HCl (B) NH_4Cl (C) KCl (D) CH_3COOH
55. The IUPAC name of the complex $[\text{Pt}(\text{en})_2(\text{SCN})_2]^{2+}$ is _____.
- (A) Dithiocyanatobis(ethylenediamine)platinum(IV)
(B) Bis(ethylenediamine)dithiocyanatoplatinate(IV)
(C) Bis(ethylenediamine)dithiocyanatoplatinum(IV)
(D) Bis(ethylenediamine)diisothiocyanatoplatinum(IV)
56. What is the IUPAC name of α -methyl butyraldehyde?
- (A) Pentanal (B) 3-Methylbutanal
(C) 2-Methylbutanal (D) Methylbutanal
57. Salicylic acid + Acetyl chloride $\xrightarrow{\text{pyridine}}$ X + HCl
- The % atom economy for the preparation of 'X' will be _____.
- (A) $\frac{216.5}{180} \times 100$ (B) $\frac{138}{180} \times 100$ (C) $\frac{180}{216.5} \times 100$ (D) $\frac{180}{138} \times 100$

58. Azo coupling reaction with respect to aniline takes place at position number _____.



- (A) 1 (B) 2 (C) 3 (D) 4

59. Which of the following statements is true about the hydrides of group 16 elements?

- (A) Acidic character decreases down the group
(B) Thermal stability increases down the group
(C) Boiling point decreases down the group
(D) Reducing power increases down the group

60. The CORRECT decreasing order of bond angle is _____.

- (A) $\text{BF}_3 > \text{NH}_3 > \text{H}_2\text{O}$ (B) $\text{H}_2\text{O} > \text{BF}_3 > \text{NH}_3$
(C) $\text{BF}_3 > \text{H}_2\text{O} > \text{NH}_3$ (D) $\text{H}_2\text{O} > \text{NH}_3 > \text{BF}_3$

61. ZnO shows metal excess defect, with the excess Zn^{2+} ions occupying the _____ and the electrons occupying the neighbouring _____.

- (A) interstitial sites, lattice sites (B) lattice sites, interstitial sites
(C) interstitial sites, interstitial sites (D) lattice sites, lattice sites

62. The criterion for a non-spontaneous process is _____.

- (A) $\Delta S_{\text{total}} > 0, \Delta G > 0$ (B) $\Delta S_{\text{total}} < 0, \Delta G < 0$
(C) $\Delta S_{\text{total}} = 0, \Delta G = 0$ (D) $\Delta S_{\text{total}} < 0, \Delta G > 0$

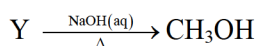
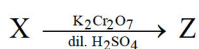
63. The rate of a first order reaction at 500 K is 10^5 times the rate of the same reaction at 300 K. Calculate the energy of activation (in kJ mol^{-1}) for the reaction if the ratio of rates is equal to the ratio of rate constants.

- (A) $8636 \times 8.314 \text{ J mol}^{-1}$ (B) $3750 \times 8.314 \text{ J mol}^{-1}$
(C) $1535 \times 8.314 \text{ J mol}^{-1}$ (D) $17272 \times 8.314 \text{ J mol}^{-1}$

64. Which of the following sets CORRECTLY represents the increase in the paramagnetic property of the ions?

- (A) $\text{Cu}^{2+} < \text{V}^{2+} < \text{Cr}^{2+} < \text{Mn}^{2+}$ (B) $\text{Cu}^{2+} < \text{Cr}^{2+} < \text{V}^{2+} < \text{Mn}^{2+}$
(C) $\text{Mn}^{2+} < \text{V}^{2+} < \text{Cr}^{2+} < \text{Cu}^{2+}$ (D) $\text{Mn}^{2+} < \text{Cu}^{2+} < \text{Cr}^{2+} < \text{V}^{2+}$

65. $(\text{CH}_3)_2\text{CH} - \text{O} - \text{CH}_3 \xrightarrow{\text{Cold HI}} \text{X} + \text{Y}$



Identify X, Y and Z.

- (A) X \Rightarrow Propan-2-ol
Y \Rightarrow Iodomethane
Z \Rightarrow Propanone
- (B) X \Rightarrow Propan-1-ol
Y \Rightarrow Iodomethane
Z \Rightarrow Propanal
- (C) X \Rightarrow 2-Iodopropane
Y \Rightarrow Iodomethane
Z \Rightarrow Propanone
- (D) X \Rightarrow Propan-2-ol
Y \Rightarrow Methanol
Z \Rightarrow Propanone
66. The complex that follows effective atomic number rule is _____.
- (A) $[\text{Fe}(\text{CN})_6]^{3-}$ (B) $[\text{Cu}(\text{NH}_3)_4]^{2+}$ (C) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (D) $\text{Cr}(\text{CO})_4$
67. What is the chemical nature of soaps derived from natural oils?
- (A) Esters of glycerol (B) Sodium salts of fatty acids
(C) Quaternary ammonium salts (D) Long-chain alkyl sulphonic acids
68. A gas has a density of 2.86 g/L at 1 atm and 273 K. What is its molar mass?
(Given: $R = 0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$)
- (A) 22 g mol^{-1} (B) 64 g mol^{-1} (C) 44 g mol^{-1} (D) 28 g mol^{-1}
69. In $\text{H}_2 - \text{O}_2$ fuel cell the electrodes are made up of _____.
- (A) graphite (B) porous graphite
(C) metallic zinc strip (D) metallic copper strip
70. Which of the following is a CORRECT match for the polymer and its type?
- (A) Nylon 6 - Polyamide (B) Teflon - Polyester
(C) Bakelite - Polyurethane (D) Terylene - Polythene
71. What is the primary structural difference between amylose and amylopectin in starch?
- (A) Amylose is branched, while amylopectin is unbranched.
(B) Amylose has β -1,4 linkages, while amylopectin has α -1,4 linkages.
(C) Amylose is a linear polymer, while amylopectin is branched.
(D) Amylose contains fructose units, while amylopectin contains glucose units.
72. Which of the following pair has equal numbers of molecules?
- (A) 32 g of CH_4 and 36 g of H_2O (B) 8 g of O_2 and 22 g of CO_2
(C) 32 g of O_2 and 32 g of N_2 (D) 18 g of H_2O and 4 g of H_2
73. Which of the following will show the highest adsorption for a given gas at the same temperature and pressure?
- (A) Powdered charcoal (B) Granular charcoal
(C) Block of charcoal (D) Diamond
74. The van't Hoff factor will be highest for _____.
- (A) sodium chloride (B) magnesium chloride
(C) sodium phosphate (D) urea

75. For the reaction;

$$\text{C}_2\text{H}_5\text{OH} + \text{HX} \xrightarrow{\text{ZnCl}_2} \text{C}_2\text{H}_5\text{X} + \text{H}_2\text{O}$$
 where HX is a halogen acid, the order of reactivity of halogen acids for their reaction is:
 (A) $\text{HCl} > \text{HBr} > \text{HI}$ (B) $\text{HBr} > \text{HI} > \text{HCl}$
 (C) $\text{HI} > \text{HCl} > \text{HBr}$ (D) $\text{HI} > \text{HBr} > \text{HCl}$
76. Which of the following sets contain only non-biodegradable polymers?
 (A) Nylon 6, PVC (B) Nylon 6, PHBV
 (C) PHBV, Nylon 2-nylon 6 (D) PVC, Nylon 2-nylon 6
77. If enthalpy change for following reaction at 500 K is $+8 \text{ kJ mol}^{-1}$, find the entropy change of surrounding?

$$\text{H}_2\text{O}_{(s)} \longrightarrow \text{H}_2\text{O}_{(l)}$$
 (A) -42.0 J K^{-1} (B) -16 J K^{-1} (C) -30.7 J K^{-1} (D) -112 J K^{-1}
78. Catalyst
 i. increases the average kinetic energy of the molecules.
 ii. decreases the activation energy.
 iii. alters the reaction mechanism.
 iv. increases the surface area of the reactants.
 Which of the following are CORRECT?
 (A) i and ii (B) ii and iii (C) i and iv (D) i, ii, iii and iv
79. Which of the following orbitals does NOT exist?
 (A) 4d (B) 5p (C) 3f (D) 6s
80. Identify the products formed in the following reaction.

$$\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{C}_6\text{H}_5-\overset{\text{H}}{\text{C}}=\overset{\text{O}}{\parallel} \xrightarrow[\text{ii. H}_3\text{O}^+]{\text{i. conc. NaOH}}$$
- (A) Phenylmethanol and benzoic acid (B) Phenylmethanol and formic acid
 (C) Methanol and benzoic acid (D) Formic acid and benzoic acid
81. Which of the following amino acids contains a phenolic hydroxyl group in its side chain?
 (A) Serine (B) Threonine (C) Tyrosine (D) Cysteine
82. Match the following.

	Column I		Column II
i.	Acidic oxide	a.	Al_2O_3
ii.	Basic oxide	b.	Cl_2O_7
iii.	Amphoteric oxide	c.	NO
iv.	Neutral oxide	d.	CaO

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

83. In the preparation of KMnO_4 from MnO_2 , what is the role of KClO_3 in the chemical oxidation process?
- (A) It acts as a reducing agent (B) It provides oxygen to oxidize MnO_2
(C) It neutralizes the reaction mixture (D) It forms a precipitate with Mn
84. Phenol is obtained from cumene _____.
- (A) by atmospheric oxidation followed by autoxidation
(B) by atmospheric oxidation followed by reduction
(C) by reduction followed by hydrolysis
(D) by hydrolysis followed by oxidation
85. The cell reaction $\text{Zn}_{(s)} + 2\text{Ag}^+(1\text{M}) \longrightarrow \text{Zn}^{2+}(1\text{M}) + 2\text{Ag}_{(s)}$ is best represented by _____.
- (A) $\text{Ag}_{(s)} | \text{Ag}^+(1\text{M}) || \text{Zn}_{(s)} | \text{Zn}^{2+}(1\text{M})$
(B) $\text{Zn}_{(s)} | \text{Zn}^{2+}(1\text{M}) || \text{Ag}^+(1\text{M}) | \text{Ag}_{(s)}$
(C) $2\text{Ag}_{(s)} | \text{Ag}^+(1\text{M}) || \text{Zn}_{(s)} | \text{Zn}^{2+}(1\text{M})$
(D) $\text{Zn}_{(s)} | \text{Zn}^{2+}(1\text{M}) || 2\text{Ag}_{(s)} | \text{Ag}^+(1\text{M})$
86. The heat produced during combustion of 15.6 g $\text{C}_6\text{H}_6(l)$ at constant volume forming $\text{H}_2\text{O}(l)$ and $\text{CO}_2(g)$ is 70 kJ at 27 °C. The heat of combustion at constant pressure is _____.
- (A) 350 kJ mol^{-1} (B) $-36.25\text{ kJ mol}^{-1}$ (C) 53.74 kJ mol^{-1} (D) $-353.74\text{ kJ mol}^{-1}$
87. Identify A, B and C in the following series of reactions.
- $$\text{C}_2\text{H}_5\text{-NO}_2 \xrightarrow{\text{LiAlH}_4} \text{A} \xrightarrow{\text{C}_2\text{H}_5\text{Br}} \text{B} \xrightarrow{\text{C}_2\text{H}_5\text{Br}} \text{C}$$
- (A) A = Ethylamine, B = Diethylamine, C = Triethylamine
(B) A = Ethylamine, B = Ethyl bromide, C = 1,2-Dibromoethane
(C) A = Ethylamine, B = Ethyl bromide, C = Butyl bromide
(D) A = Ethanamide, B = Diethylamine, C = Triethylamine
88. Which of the following reactions is NOT associated with the Solvay process of manufacture of sodium carbonate?
- (A) $\text{NH}_3 + \text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{NH}_4\text{HCO}_3$
(B) $\text{NaCl} + \text{NH}_4\text{HCO}_3 \longrightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$
(C) $2\text{NaHCO}_3 \longrightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$
(D) $2\text{NaOH} + \text{CO}_2 \longrightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$
89. Aluminium crystallizes in cubic close packed structure with unit cell edge length of 353.6 pm. How many unit cells are there in 1.00 cm^3 of Al?
- (A) 2.26×10^{22} (B) 4.42×10^{22} (C) 5.36×10^{22} (D) 7.07×10^{22}

90. Which one is most reactive towards S_N1 reaction?
 (A) PhCH_2Cl (B) PhCH(Ph)Cl (C) $\text{PhCH(CH}_3\text{)Cl}$ (D) $\text{PhC(CH}_3\text{)(Ph)Cl}$
91. The oxidation number of the underlined element in $\text{K}_4\underline{\text{P}}_2\text{O}_7$ is _____.
 (A) +3 (B) -5 (C) +5 (D) +6
92. Dry ice + A \longrightarrow 2,3-Dimethylbutanoic acid
 In this reaction, 'A' is _____.
 (A) $\text{CH}_3\text{CH(CH}_3\text{)CH}_2\text{MgBr}$ (B) $\text{CH}_3\text{CH(CH}_3\text{)CH(CH}_3\text{)MgBr}$
 (C) $\text{CH}_3\text{CH(C}_2\text{H}_5\text{)CH}_2\text{MgBr}$ (D) $\text{C}_2\text{H}_5\text{CH}_2\text{MgBr}$
93. HCHO on reaction with 'A' followed by hydrolysis gives $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$. A is _____.
 (A) $\text{C}_2\text{H}_5\text{MgI}$ (B) $\text{C}_3\text{H}_7\text{MgI}$ (C) CH_3MgI (D) $\text{C}_2\text{H}_5\text{I}$
94. A metal (X) forms the chloride XCl_3 . Electrolysis of this molten chloride by a current of 3.9 A for 9.65 minutes deposits 0.25 g of the metal X. The molar mass of the metal X is _____ g mol^{-1} .
 (A) 96.15 (B) 104.0 (C) 32.05 (D) 23.72
95. What is the pH of 0.002 M solution of ammonium hydroxide which is 5% dissociated?
 (A) 3.00 (B) 8.00 (C) 10.00 (D) 11.00
96. At 40 °C, the vapour pressure of pure liquid benzene and toluene are 160 mm Hg and 60 mm Hg respectively. At the same temperature, the vapour pressure of a solution containing equal moles of benzene and toluene is _____ mm Hg.
 (A) 140 (B) 120 (C) 110 (D) 100
97. Which method is not commonly used to prepare alkanes?
 (A) Wurtz reaction (B) Kolbe's electrolysis
 (C) Ozonolysis of alkenes (D) Hydrogenation of alkenes
98. The total numbers of voids (tetrahedral + octahedral) formed by 0.5 mol of a compound having hcp structure is:
 (A) 1.2044×10^{23} (B) 9.033×10^{23} (C) 3.011×10^{23} (D) 3.6132×10^{23}
99. 2-Methylbutan-1-ol contains 1 chirality centre. Enantiomer of 2-methylbutan-1-ol will differ in _____.
 (A) boiling point (B) density
 (C) specific rotation (D) refractive index
100. Find the CORRECT match.
 (A) Salt of weak acid and weak base: NH_4Cl (B) Salt of weak acid and strong base: KCN
 (C) Salt of strong acid and strong base: Na_2CO_3 (D) Salt of strong acid and weak base: Na_2SO_4

101. Complete the following by choosing the proper option.

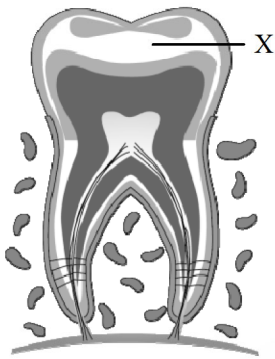
Stomata : Transpiration : : Hydathode : _____

- (A) Synthesis (B) Translocation (C) Guttation (D) Secretion

102. Which one of the following is the correct sequence of cytochromes in the order of their participation in respiratory chain?

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

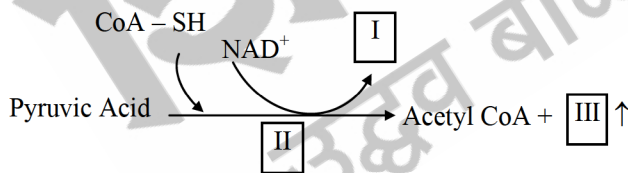
103.



In the above diagram identify the part 'X' and it can be correctly described as:

- (A) Dentine; Hardest substance and covers the entire tooth.
(B) Dentine; Hardest substance and forms basic shape of tooth.
(C) Enamel; Formed of connective tissue and covers the crown of tooth only.
(D) Enamel; made up of Calcium phosphate and Calcium carbonate, which covers only the crown of tooth.

104.



What does I, II and III depict in the above reaction?

	I	II	III
(A)	Pyruvate dehydrogenase complex	CO_2	$\text{NADH} + \text{H}^+$
(B)	$\text{NADH} + \text{H}^+$	Pyruvate dehydrogenase complex	CO_2
(C)	CO_2	$\text{NADH} + \text{H}^+$	Pyruvate dehydrogenase complex
(D)	Pyruvate dehydrogenase complex	$\text{NADH} + \text{H}^+$	CO_2

105. Yam Plant (*Dioscorea*) produces a steroid compound called _____.

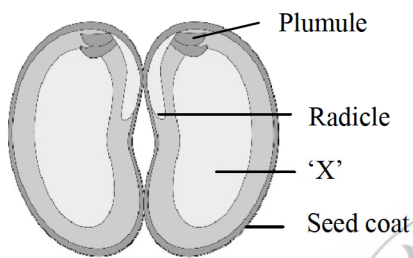
- (A) diosgenin (B) adrenocorticoid (C) progesterone (D) estrogen

106. Genetic code has distinct polarity. This means
- (A) genetic code can be read in 5' → 3' direction on mRNA.
 - (B) two or more codons can specify the same amino acids.
 - (C) each codon specifies a particular amino acid.
 - (D) genetic code is present in all organisms.
107. Which of the following statements are correct?
- i. Vaccines have eliminated small pox and polio.
 - ii. There are edible vaccines.
 - iii. Immunogenic proteins of certain pathogens are found to be active when administered orally.
 - iv. Oral vaccines are expensive and difficult to store.
 - v. Generally vaccines can be produced without any microorganism.
- Choose the correct option:
- (A) i and ii only
 - (B) i, ii and iii only
 - (C) i, ii and iv only
 - (D) iv and v only
108. Generative cell of a microspore undergoes which type of division?
- (A) Mitosis
 - (B) Meiosis
 - (C) Endomitosis
 - (D) Budding
109. Given below are two statements.
- Statement I** - Guard cells of stomata are kidney shaped in dicotyledons and dumbbell shaped in monocotyledons.
- Statement II** - In *Cyperus*, both kidney and dumbbell shaped guard cells are present.
- 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.
110. A person accidentally touches a hot object and immediately withdraws their hand before feeling the pain. What is the correct pathway of this reflex action?
- (A) Sensory neuron → Brain → Motor neuron → Effector
 - (B) Receptor → Sensory neuron → Spinal cord → Motor neuron → Effector
 - (C) Receptor → Motor neuron → Sensory neuron → Spinal cord → Effector
 - (D) Sensory neuron → Spinal cord → Brain → Motor neuron → Effector

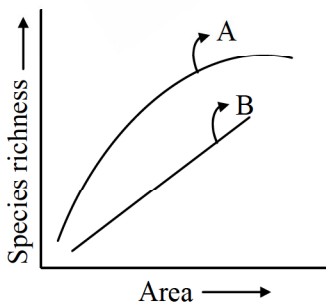
111. Which of the following is INCORRECT regarding Alzheimer's disease?
- (A) It is the most common form of dementia.
 (B) It shows symptoms like loss of cognitive functioning, thinking and remembering, reasoning and behavioural abilities.
 (C) It occurs due to loss of cholinergic and other neurons in the CNS, accumulation of amyloid proteins.
 (D) Alzheimer's disease can be cured
112. Which one of the following chemical compounds of medicinal use is produced by *Rauwolfia serpentina*?
- (A) Reserpine (B) Opium
 (C) Lysergic acid (D) Vincristine
113. Which of the following is the correct sequence of succession on rocks?
- (A) Crustose lichens – Bryophytes and mosses – Herbaceous plants – Forest community
 (B) Forest community – Bryophytes and mosses – Crustose lichens – Herbaceous plants
 (C) Crustose lichens – Herbaceous plants – bryophytes and mosses – Forest community
 (D) Bryophytes and mosses – Crustose lichens – Herbaceous plants – Forest community
114. Which one of the following is an example of the first transgenic plant?
- (A) Tobacco (B) Maize
 (C) Oat (D) Tomato
115. **Statement I:** Pepsin is secreted in an inactive form called pepsinogen.
Statement II: Pepsinogen is activated by hydrochloric acid (HCl) in the stomach.
- (A) Both Statement I and Statement II are correct.
 (B) Both Statement I and Statement II are incorrect.
 (C) Statement I is correct, but Statement II is incorrect.
 (D) Statement I is incorrect, but Statement II is correct.
116. To prove what can be the genetic material Griffith used _____ for his experiments.
- (A) *Escherichia coli* (B) *Saccharomyces cerevisiae*
 (C) *Streptococcus pneumoniae* (D) *Phytophthora palmivora*
117. Blood that enters the descending limb of the vasa recta has normal osmolarity of about
- (A) 300 mOsm/L (B) 100 mOsm/L
 (C) 500 mOsm/L (D) 1000 mOsm/L
118. Fossa ovalis is a remnant of an embryonic aperture
- (A) foramen ovalis (B) Thebesian valve
 (C) Eustachian valve (D) sinus venosus

119. Identify the correct order of events in pollen-pistil interaction from the options given below:
- I. Release of male gametes into the embryo sac.
 - II. Deposition of pollen grains on stigma.
 - III. Entry of pollen tube into embryo sac.
 - IV. Development of pollen tube.
 - V. Entry of pollen tube into the Ovule.
- (A) IV → III → II → I → V (B) II → IV → V → III → I
(C) II → IV → III → V → I (D) V → IV → III → II → I
120. If the diploid number of an angiospermic plant is 24, the number of chromosomes in the pollen grain, endosperm and integument will be
- (A) 12, 36, 12 (B) 12, 24, 36
(C) 12, 12, 36 (D) 12, 36, 24
121. The working of electrostatic precipitators is based on
- (A) use of spray of water or lime
 - (B) use of high voltage and electric discharge to ionize air
 - (C) use of reduction block where oxides of nitrogen react to form nitrogen and oxygen
 - (D) use of dry or wet packing material to remove gases like SO₂
122. Find out the INCORRECT statement.
- (A) *Saccharum barberi* is a native variety of cabbage of North India.
 - (B) CO 419, 421, 453 are high yielding varieties of sugarcane.
 - (C) *Sonalika* and *Kalyan Sona* are hybrid wheat varieties grown in India.
 - (D) *Jaya*, *Padma* and *Ratna* are hybrid semi-dwarf rice varieties.
123. Which condition is TRUE for HDN?
- (A) Rh +ve mother conceives Rh -ve foetus
 - (B) Rh -ve mother conceives Rh +ve foetus
 - (C) Rh -ve mother conceives Rh -ve foetus
 - (D) Rh +ve mother conceives Rh +ve foetus
124. Statement I: The glomerulus is the primary site for filtration of blood in the nephron.
Statement II: The Loop of Henle is involved in reabsorption of glucose.
- (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.

125. From the reappearance of recessive trait in F_2 generation, Mendel concluded that
- factors remain together in F_1 generation but do not mix with each other.
 - factors are present on same chromosomes.
 - factors mix with each other in F_1 generation.
 - factors are present on different chromosomes but mix in F_1 generation.
126. Presence of _____ is an indication of abdominal origin of testis.
- Tunica vascularis
 - Tunica media
 - Tunica vaginalis
 - Tunica albuginea
127. Identify the part 'X' marked in the diagram of an open bean seed.

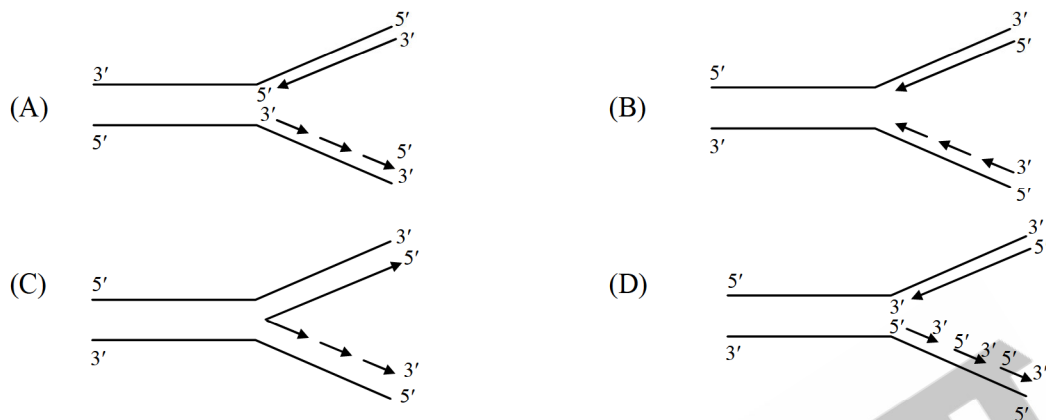


- Endosperm
 - Cotyledon
 - Epicotyl
 - Hypocotyl
128. Which of the following occurs during phase of cell enlargement?
- Meristematic cell undergoes mitotic division to form two new cells.
 - New cell wall materials and other materials are synthesized.
 - Cell becomes specialized to perform specific function.
 - Rate of growth slows down and comes to a steady state.
129. Darwin's finches in the Galapagos Islands evolved into multiple species with different beak shapes adapted to various food sources. This is an example of:
- Convergent evolution
 - Genetic drift
 - Adaptive radiation
 - Coevolution
130. Observe the graph and select CORRECT option.



- Line A represents, $S=CA^2$
- Line B represents, $\log C = \log A + Z \log S$
- Line A represents, $S=CA^Z$
- Line B represents, $\log S = \log Z + C \log A$

131. Which one of the following correctly represents the manner of replication of DNA?



132. Choose the correct statement for 'Allen's Rule'.

- (A) Mammals from colder climates generally have longer ears and shorter limbs to minimise heat loss
- (B) Mammals from colder climates generally have longer ears and longer limbs to minimise heat loss
- (C) Mammals from colder climates generally have shorter ears and shorter limbs to minimise heat loss
- (D) Mammals from colder climates generally have shorter ears and longer limbs to minimise heat loss

133. Water in plants acts as a thermal buffer because _____

- (A) it can easily evaporate.
- (B) it can easily freeze.
- (C) of the hydrogen bonds between water molecules.
- (D) it has high surface tension.

134. Identify the INCORRECT statement.

- (A) Villi are supplied with a network of capillaries and lymph vessels called lacteals.
- (B) Crypts of Lieberkuhn are formed in between the bases of villi.
- (C) Submucosa of small intestine forms finger like foldings called villi.
- (D) Intestinal villi are lined by brush border or epithelial cells.

135. Which of the following factors reduces the affinity of haemoglobin for oxygen?

- (A) Low temperature and low CO_2 concentration
- (B) High pH and low 2,3-BPG levels
- (C) High temperature and high CO_2 concentration
- (D) High oxygen partial pressure and low temperature

136. Which of the following statements regarding double fertilization are correct?

- I. It occurs in angiosperms.
- II. It involves the fusion of one male gamete with the egg and another with the polar nuclei.
- III. It produces a triploid endosperm.

IV. The process occurs in the ovary.

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

137. Following are the trophic levels of a single pyramid of numbers EXCEPT _____.

- (A) insects feeding on a single tree
(B) smaller birds feeding on insects
(C) parasites on those birds which feed on the insects
(D) all the trees in the forest

138. Match List-I with List-II.

List – I		List – II	
(i)	<i>Nitrococcus</i>	(a)	Denitrification
(ii)	<i>Rhizobium</i>	(b)	Conversion of ammonia to nitrite
(iii)	<i>Thiobacillus</i>	(c)	Conversion of nitrite to nitrate
(iv)	<i>Nitrobacter</i>	(d)	Conversion of atmospheric nitrogen to ammonia

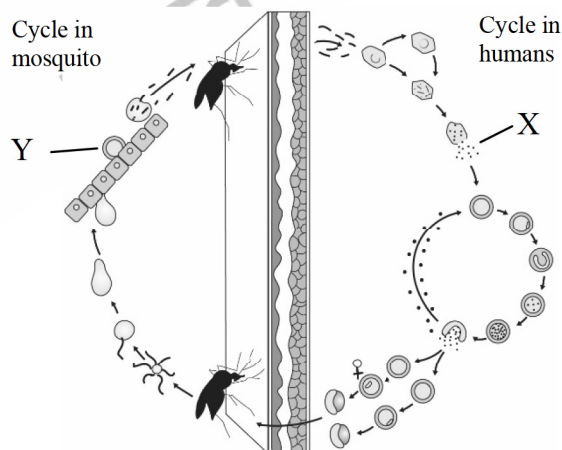
Choose the correct answer from the options given below.

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

139. Microspore mother cells in anther are immediately enclosed by

- (A) epidermis (B) tapetum (C) middle layers (D) endothecium

140. Identify the labels 'X' and 'Y' of the malarial life cycle.



- (A) X – Gametocyte, Y – Hypnozoite (B) X – Merozoites, Y – Oocyst
(C) X – Sporozoite, Y – Trophozoite (D) X – Trophozoite, Y – Schizont

141. In the given food chain, identify the primary consumer.
Grass → Grasshopper → Frog → Snake
- (A) Grasshopper (B) Frog
(C) Snake (D) Grass
142. Which of the following statements is INCORRECT?
- (A) Inspiration occurs due to pressure gradient formed between lungs and the atmosphere.
(B) Inspiration is a passive process.
(C) Diaphragm becomes dome shaped during expiration.
(D) Thoracic volume decreases during expiration.
143. The R.Q. of some substrates is 1, 0.9 and 0.7. These substrates belong to the category of _____ respectively.
- (A) protein, fat and carbohydrate (B) fat, protein and carbohydrate
(C) carbohydrate, fat and protein (D) carbohydrate, protein and fat
144. Select CORRECT match
- (A) Polycythemia – Process by which WBCs move out of capillary walls into tissue.
(B) Diapedesis – Condition of decrease in total number of RBCs in blood below normal.
(C) Haematocrit – Ratio of volume of RBCs to total blood volume.
(D) Electrocardiogram – An instrument called ECG machine used for recording heart function.
145. Identify the correct statement for suspension culture.
- (A) The callus transferred in liquid nutrient medium remains intact even after agitation.
(B) Agitation of the medium is not necessary.
(C) This does not need sub-culturing at all.
(D) This culture grows much faster than callus culture.
146. Gause's principle of competitive exclusion states that
- (A) no two species can occupy the same niche indefinitely for the same limiting resources.
(B) larger organisms exclude smaller ones through competition
(C) more abundant species will exclude the less abundant species through competition.
(D) competition for the same resources excludes species having different food preferences.
147. Which one of the following is NOT an adverse effect of eutrophication?
- (A) Overgrowth of algae (B) Seasonal rise in water temperature
(C) Death of aquatic life (D) Depletion of dissolved oxygen

148. Which of the following statements are CORRECT regarding X and Y chromosomes in humans?
- X chromosome is straight, rod like and longer than Y chromosome.
 - X chromosome is acrocentric, while Y chromosome is metacentric.
 - X chromosome has large amount of euchromatin and small amount of heterochromatin.
 - Y chromosome has small amount of heterochromatin and large amount of euchromatin.
- (A) Only i (B) i and ii (C) Only ii and iv (D) i and iii
149. Which type of bond stabilizes the secondary structure of proteins?
- (A) Peptide bond (B) Hydrogen bond
(C) Disulfide bond (D) Phosphodiester bond
150. A population of insects is exposed to a new pesticide. Initially, most insects die, but after several generations, the population recovers, and the pesticide is no longer effective. Which principle of evolution explains this phenomenon?
- (A) Genetic drift (B) Natural selection (C) Founder effect (D) Adaptive radiation
151. Match type of disorder in Column I with their chromosomal causes in Column II.

Column I (Type of disorder)		Column II (Chromosomal causes)	
i.	Colourblindness	a.	Autosomal recessive disorder
ii.	Huntington's disease	b.	X – linked recessive disorder
iii.	Sickle cell anaemia	c.	Y – linked recessive disorder
iv.	Hypertrichosis	d.	Autosomal dominant disorder

- (A) i – b, ii – a, iii – d, iv – c (B) i – c, ii – d, iii – b, iv – a
(C) i – b, ii – d, iii – a, iv – c (D) i – d, ii – c, iii – b, iv – a
152. Estrogen hormone forms hormone-receptor complex within the uterine cell and direct protein synthesis. It shows
- (A) Hormone action through intracellular receptors.
(B) Release of enzyme – adenylate cyclase by hormone receptor complex.
(C) Hormone action through membrane receptors.
(D) Formation of second messenger.
153. In the decomposition process, mineralization takes place by _____.
- (A) Breaking down of detritus into smaller particles
(B) Direct, enzymatic degradation of detritus
(C) Precipitation of water-soluble inorganic nutrients into the soil only
(D) Degradation of humus by some microbes

154. Match the Column – I with Column – II.

	Column – I (Type of kidney stones)		Column – II (Cause)
a.	Calcium stones	i.	Genetic disorder
b.	Struvite stones	ii.	Calcium oxalates
c.	Uric acid stones	iii.	Formed in response to infection by urea splitting bacteria
d.	Cystine stones	iv.	High protein diet

Select the correct option –

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

155. Chylomicrons are

- (A) undigested proteins
(B) undigested carbohydrates
(C) fat globules coated with proteins
(D) fat droplets coated with phospholipids

156. Which of the following hormones maintains the uterine lining after ovulation, preventing menstruation?

- (A) Luteinizing Hormone (LH)
(B) Follicle-Stimulating Hormone (FSH)
(C) Progesterone
(D) Estrogen

157. During the ventricular systole phase, which of the following occurs?

- (A) Atrioventricular (AV) valves open, and semilunar valves close
(B) Atrioventricular (AV) valves close, and semilunar valves open
(C) Both AV and semilunar valves remain closed
(D) Both AV and semilunar valves remain open

158. Select the correct statement/s and choose the option from given below.

- i. Progesterone inhibits uterine contraction during pregnancy.
ii. Inhibin prevents secretion of LH from pituitary gland.
iii. Plasma levels of LH are maintained through negative feedback control.
iv. The principal estrogen in human being is estradiol.
v. Corpus luteum secretes hormone relaxin at the end of gestation period, to relax pelvic ligaments to accommodate enlarging uterus.

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

159. Match Column I with Column II and select the correct option.

	Column 'I' (Antibiotic)		Column 'II' (Microbial sources)
i.	Chloromycetin	a.	<i>Streptomyces erythreus</i>
ii.	Erythromycin	b.	<i>Streptomyces venezuelae</i>
iii.	Bacitracin	c.	<i>Streptomyces aureofaciens</i>
iv.	Terramycin	d.	<i>Bacillus licheniformis</i>

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

160. Complete the analogy.

Winter : Hibernation :: Summer : _____

- (A) Dormancy (B) Migration (C) Conformation (D) Aestivation

161. Which one of the following is NOT an example of plant associated with biopiracy?

- (A) Neem (B) Basmati (C) Soyabean (D) Haldi (turmeric)

162. Arrange the following in the correct sequence in the evolution of nervous system.

- i. Formation of centralised nervous system.
- ii. Diffused nervous system in *Hydra*.
- iii. Formation of ganglion.
- iv. Nervous system is lacking in sponges.

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

163. Which one of the following is NOT a significance of polyembryony?

- i. Polyembryony increases the chance of survival of the new plants.
- ii. Nucellar polyembryony is greatly useful in horticulture.
- iii. Seedless fruits are formed.
- iv. Genetically identical plants are produced due to cleavage polyembryony.

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

164. Which of the following statements best describes the function of the lac operon in *E. coli*?

- (A) It is always active, regardless of environmental conditions.
(B) It is activated when lactose is present and glucose is absent.
(C) It produces enzymes that break down glucose for energy.
(D) It is permanently repressed and never produces enzymes.

165. _____ is the vertical distribution of different species of plants and animals occupying different levels in the ecosystem.
- (A) Zonation (B) Fragmentation
(C) Stratification (D) Ecological succession
166. Ethylene is a simple gaseous plant growth regulator.
Identify in which of the following the ethylene is synthesized in large amounts by tissues?
- I. Senescence
II. Ripening of fruits
III. Actively growing apices of stems and roots.
IV. Cell division promoting activity
- (A) I and II (B) II and III (C) III and IV (D) IV and I
167. Endonuclease enzyme cuts DNA at specific location making pieces of variable length. This process is called _____
- (A) Electrophoresis (B) Amplification (C) Hybridization (D) Restriction digestion
168. Which evidence provides the strongest support for the idea that humans and chimpanzees share a recent common ancestor?
- (A) Both species walk upright.
(B) Humans and chimps have identical mitochondrial DNA.
(C) Humans and chimps share approximately 98% of their DNA.
(D) Both species have opposable thumbs.
169. Which of the following is TRUE for Axons?
- (A) They carry impulses away from the cytons.
(B) They carry impulses from dendrons to cytons.
(C) They further branch into dendrites.
(D) They are present in neuroglial cells.
170. Which of the following were the main aims of the Human Genome Project?
- I. Mapping the entire human genome at the level of nucleotide sequences.
II. To store the information collected from the project in databases.
III. To develop tools and techniques for analysis of the data.
IV. Transfer of the related technologies to the private sectors, such as industries.
V. Taking care of the legal, ethical and social issues which may arise from project.
- (A) I, II and V (B) II, III and V
(C) I and V only (D) I, II, III, IV, V

171. Study the following table and pick up the CORRECT combinations.

Sr.No.	Interaction	Species A	Species B
I.	Mutualism	+	+
II.	Competition	-	+
III.	Predation	+	-
IV.	Parasitism	-	-
V.	Commensalism	0	+
VI.	Amensalism	-	0

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

172. Read the following statements and select the correct option.

- Crossbreeding involves breeding of superior male of one breed with superior female of another breed.
- Inter-specific hybridization results in the formation of animals with desirable characters from both the parents.
- Mule is an example of inbreeding.
- Hissardale* is an example of inter-specific hybridization.
- Artificial insemination is done to over the problems of mating.

- (A) i, ii iv and v are correct (B) ii, iii, v are incorrect
(C) i, ii, v are correct (D) iii, iv, v are incorrect

173. The oncogenes *myc* and *ras* were analysed to find out if they lead to _____ cancer in mice transformed with these genes.

- (A) liver (B) pancreas
(C) uterine (D) breast

174. Given below are the statements related to ozone.

Select the correct statements.

- Ozone is generated by absorption of short wavelength U.V. radiations.
- Thickness of ozone is more towards the equator.
- Chlorine acts as a catalyst and degrades ozone, releasing molecular oxygen.
- Depletion of ozone is particularly marked over the Antarctic region.
- Ultra violet rays reaching earth, breakdown the chemical bonds within DNA and protein molecules causing damage to the cell.

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

175. Which of the following is WRONG with respect to Niche?
(A) Niche deals with the flow of energy from one organism to another.
(B) Niche supports numerous species at a time.
(C) Niche is an activity performed by organisms.
(D) Niche is species specific.
176. WBCs move out of capillaries by the process of diapedesis through pores called _____.
(A) Tessellations (B) Foramen ovalis (C) Spiracles (D) Fenestrae
177. Signal for uterine contractions and parturition originates when _____.
(A) Oxytocin is secreted from pituitary gland of mother.
(B) Corticosteroids are secreted from adrenal gland of mother.
(C) ACTH is secreted from pituitary gland of foetus.
(D) ACTH is secreted from pituitary gland of mother.
178. In a population that is in Hardy-Weinberg equilibrium, the frequency of recessive homozygotes is 0.01. What is the percentage of individuals homozygous for the dominant allele?
(A) 81% (B) 36% (C) 16% (D) 64%
179. According to lock and key model postulated by Emil Fischer,
(A) key is the enzyme and lock is the substrate.
(B) lock is the enzyme and key is the substrate.
(C) a substrate induces a conformational change in the enzyme.
(D) enzymes are flexible structures in which the active site continually reshapes.
180. In man, kidneys are present on either side of the vertebral column at the level of
(A) 10th thoracic to 3rd lumbar vertebrae (B) 12th thoracic to 5th lumbar vertebrae
(C) 12th thoracic to 3rd lumbar vertebrae (D) 10th thoracic to 5th lumbar vertebrae
181. Secondary metabolites like glucosinolates are produced by cabbage to
(A) protect it from many pests (B) attract insects for pollination
(C) kills weeds around it (D) improve soil fertilization
182. According to the "Theory of special creation"
(A) all the living beings on earth were created by God or supernatural power.
(B) all the living beings on earth were in the form of spores or microorganisms.
(C) all the living beings on earth originated from non-living material.
(D) all the living beings originated from pre-existing living forms.
183. T-cells that produce lymphokines for performing several types of functions like stimulation of B-cells, are
(A) cytotoxic T- cells (B) suppressor T- cells (C) helper T- cells (D) memory T cells

184. Which one of the following is NOT a function of acute phase proteins?
 (A) To enhance host resistance
 (B) To prevent tissue injury.
 (C) To promote repair of inflammatory lesions.
 (D) To produce interferons.
185. Select the correct expression about solubility of excretory substances in water.
 (A) Urea > Uric acid > Ammonia (B) Ammonia > Urea > Uric Acid
 (C) Ammonia > Uric acid > Urea (D) Uric acid > Urea > Ammonia
186. Which one of the following groups of drugs is called cannabinoids?
 (A) Heroin, hashish, cocaine (B) Marijuana, hashish, charas
 (C) Barbiturates, amphetamines, benzodiazepines (D) Morphine, heroin, LSD
187. Which of the following correctly represents population density at time $t+1$?
 (A) $[N_{t+1} = N_t + [(B - I) + (D + E)]]$ (B) $[N_{t+1} = N_t - [(B - I) + (D - E)]]$
 (C) $[N_{t+1} = N_t + [(B + I) - (D + E)]]$ (D) $[N_{t+1} = N_t + [(I - D) - (B - E)]]$
188. Which one of the following pair of restriction enzymes produce blunt ends of DNA cuts in the palindromic sequence?
 (A) *HindII* and *BamHI* (B) *EcoRI* and *AluI*
 (C) *AluI* and *HindII* (D) *BamHI* and *AluI*
189. SCP refers to
 (A) crude, or refined edible protein, extracted from pure microbial cultures or from dead or dried cell biomass
 (B) Wild species and relatives of the cultivated species having desired traits
 (C) pure F_1 hybrids obtained after selfing
 (D) hybrid pest resistant plant varieties
190. The _____ is NOT an organ included in lymphatic system.
 (A) Spleen (B) Thymus gland (C) Tonsil (D) Liver
191. Which type of pollination most likely occurs in flowers where the anther and stigma mature at different times?
 (A) Autogamy (B) Geitonogamy (C) Cleistogamy (D) Xenogamy
192. Which one of the following is NOT a risk associated with amniocentesis?
 (A) Miscarriage. (B) Development of congenital disease.
 (C) Leaking of amniotic fluid. (D) Needle injury to foetus.

193. Which of the following is **correct** regarding the formation of functional spermatozoa during spermatogenesis?
- (A) Spermatogonia undergo meiosis I to form spermatozoa.
 (B) Secondary spermatocytes divide by mitosis to form spermatids.
 (C) Spermiogenesis is the process of transformation of spermatids into spermatozoa.
 (D) Sertoli cells provide hormonal support for sperm production.
194. Which one of the following crosses will result in F_1 hybrids?
- (A) $rrYY \times rrYY$ (B) $RRYY \times RRYy$ (C) $RRyy \times rrYY$ (D) $RrYy \times RrYy$
195. Arithmetic growth can be represented mathematically as
- (A) $L_t = L_0 + rt$ (B) $L_0 = L_t + rt$ (C) $W_1 = W_0 e^{rt}$ (D) $W_0 = W_1 e^{rt}$
196. The organ of Corti is located on the _____ membrane.
- (A) basilar (B) Reissner's (C) tectorial (D) tympanic
197. Human immunodeficiency virus (HIV) is a retrovirus with centrally located two ssRNA molecules. It is covered by outer layer of **I** protein and inner layer made up of **II** protein.
- | | I | II |
|-----|----------|-----------|
| (A) | GP120 | p17 |
| (B) | p24 | GP41 |
| (C) | GP41 | p120 |
| (D) | p17 | p24 |
198. Following are the psychological disorders EXCEPT
- (A) Autism spectrum disorder (B) Bipolar disorder
 (C) Anxiety disorder (D) Parkinson's disease
199. If cell 'A' is having osmotic pressure = 12 bars, turgor pressure = 10 bars and cell 'B' is having osmotic pressure = 10 bars, turgor pressure = 10 bars then the flow of water occurs _____.
- (A) from cell 'A' to cell 'B'
 (B) from cell 'B' to cell 'A'
 (C) from both cell 'A' to cell 'B' and from cell 'B' to cell 'A'
 (D) in neither direction
200. Aqueous humor is
- (A) a transparent gelatinous fluid present in aqueous chamber.
 (B) a thin watery fluid present in aqueous chamber.
 (C) a thick opaque gelatinous fluid present in aqueous chamber.
 (D) a thin colourful fluid present in aqueous chamber.

