

1. Consider the following two statements
Statement A: *p*-type semiconductor is electrically positive charged.

Statement B: The conductivity of pure germanium is given as $\sigma = n_i e (\mu_e + \mu_h)$, where n_i is intrinsic carrier concentration, μ_e is electron mobility and μ_h is hole mobility.

Choose the correct statement(s).

- (1) A only (2) B only
 (3) Both A and B (4) Neither A nor B

2. A uniform magnetic field acts right angles to the direction of motion of electrons. As a result, the electron moves in a circular path of radius 2 cm. If the speed of electrons is doubled, then the radius of the circular path will be

- (1) 2.0 cm (2) 0.5 cm
 (3) 4.0 cm (4) 1.0 cm

3. If the force on a rocket moving with a velocity of 300 m/s is 345 N, then the rate of combustion of the fuel, is

- (1) 0.55 kg/s (2) 0.75 kg/s
 (3) 1.15 kg/s (4) 2.25 kg/s

4. Match the column-I with column-II for physical quantity with its SI units.

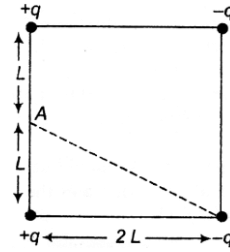
| | Column-I | | Column-II |
|----|----------------------|---|--------------------|
| A. | Angular acceleration | P | Js |
| B. | Moment of inertia | Q | kg m ² |
| C. | Torque | R | rad/s ² |
| D. | Angular momentum | S | N m |

- (1) A → R, B → Q, C → S, D → P
 (2) A → P, B → S, C → R, D → Q
 (3) A → S, B → P, C → Q, D → R
 (4) A → P, B → Q, C → S, D → R

5. A body of mass (4m) is lying in xy-plane at rest. It suddenly explodes into three pieces. Two pieces each of mass (m) move perpendicular to each other with equal speeds (v). The total kinetic energy generated due to explosion is –

- (1) mv^2 (2) $\frac{3}{2} mv^2$
 (3) $2 mv^2$ (4) $4 mv^2$

6. Four electric charges + q, + q, – q and – q are placed at the corners of a square of side 2L (see figure). The electric potential at point A, mid-way between the two charges + q and + q is –



- (1) $\frac{1}{4\pi\epsilon_0} \frac{2q}{L} \left(1 + \frac{1}{\sqrt{5}}\right)$ (2) $\frac{1}{4\pi\epsilon_0} \frac{2q}{L} \left(1 - \frac{1}{\sqrt{5}}\right)$
 (3) Zero (4) $\frac{1}{4\pi\epsilon_0} \frac{2q}{L} (1 + \sqrt{5})$

7. Two persons of masses 55 kg and 65 kg respectively, are at the opposite ends of a boat. The length of the boat is 3.0 m and weighs 100 kg. The 55 kg man walks up to the 65 kg man and sits with him. If the boat is in still water the centre of mass of the system shifts by –

- (1) 3.0 m (2) 2.3 m
 (3) zero (4) 0.75 m

8. A cart of mass M is tied to one end of a massless rope of length 10 m. The other end of the rope is in the hands of a man of mass M. The entire system is on a smooth horizontal surface. The man is at $x = 0$ and the cart at $x = 10$ m. If the man pulls the cart by the rope, the man and the cart will meet at the point

- (1) They will never meet
 (2) $x = 10$ m
 (3) $x = 5$ m
 (4) $x = 0$

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

- (1) 5 (2) 4
 (3) 3 (4) 2

10. The bulk modulus of a spherical object is 'B'. If it is subjected to uniform pressure 'P', the fractional decrease in radius is –

- (1) $\frac{B}{3p}$ (2) $\frac{3p}{B}$
 (3) $\frac{p}{3B}$ (4) $\frac{p}{B}$

11. Light travels a distance x in time t_1 in air and $10x$ in time t_2 in another denser medium. What is the critical angle for this medium?

- (1) $\sin^{-1}\left(\frac{10t_2}{t_1}\right)$ (2) $\sin^{-1}\left(\frac{t_1}{10t_2}\right)$
 (3) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$ (4) $\sin^{-1}\left(\frac{t_2}{t_1}\right)$

12. The ratio of the dimensions of Planck's constant and that of the moment of inertia is the dimension of

- (1) Frequency
 (2) Velocity
 (3) Angular momentum
 (4) Time

13. The coefficients of linear expansions of brass and steel are α_1 and α_2 respectively. When we take a brass rod of length ℓ_1 and a steel rod of length ℓ_2 at 0°C , then the difference in their lengths ($\ell_2 - \ell_1$) will remain the same at all temperatures, if

- (1) $\alpha_1 \ell_1 = \alpha_2 \ell_2$ (2) $\alpha_1 \ell_2 = \alpha_2 \ell_1$
 (3) $\alpha_1^2 \ell_2 = \alpha_2^2 \ell_1$ (4) $\alpha_1 \ell_2^2 = \alpha_2 \ell_1^2$

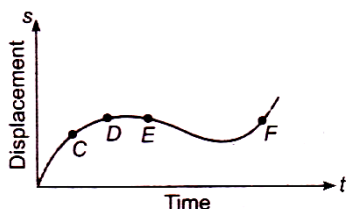
14. The equation of state for 5g of oxygen at a pressure p and temperature T , when occupying a volume V , will be

- (1) $pV = \left(\frac{5}{32}\right)RT$ (2) $pV = 5RT$
 (3) $pV = \left(\frac{5}{2}\right)RT$ (4) $pV = \left(\frac{5}{16}\right)RT$

15. The temperature of a gas is raised from 27°C to 927°C . The root mean square speed

- (1) Is $\sqrt{\left(\frac{927}{27}\right)}$ times the earlier value
 (2) Remains the same
 (3) Gets halved
 (4) Gets doubled

16. The displacement-time graph of moving particle is shown below.



The instantaneous velocity of the particle is negative at the point

- (1) D (2) F
 (3) C (4) E

17. Point charges $+4q$, $-q$ and $+4q$ are kept on the x -axis at points $x = 0$, $x = a$ and $x = 2a$, respectively. Then

- (1) Only $-q$ is in stable equilibrium
 (2) None of the charges is in equilibrium P
 (3) All the charges are in unstable equilibrium
 (4) All the charges are in stable equilibrium

18. A $4\ \mu\text{F}$ conductor is charged to $400\ \text{V}$ and then its plates are joined through a resistance of $1\ \text{k}\Omega$. The heat produced in the resistance is

- (1) $0.16\ \text{J}$ (2) $1.28\ \text{J}$
 (3) $0.64\ \text{J}$ (4) $0.32\ \text{J}$

19. The effective resistance of a parallel connection that consists of four wires of equal length, equal area of cross-section and same material is 0.25 .

What will be the effective resistance if they are connected in series?

- (1) $4\ \Omega$ (2) $0.25\ \Omega$
 (3) $0.5\ \Omega$ (4) $1\ \Omega$

20. A beam of electrons is moving with constant velocity in a region having simultaneous perpendicular electric and magnetic fields of strength $20\ \text{Vm}^{-1}$ and $0.5\ \text{T}$, respectively at right angles to the direction of motion of the electrons.

Then the velocity of electrons must be

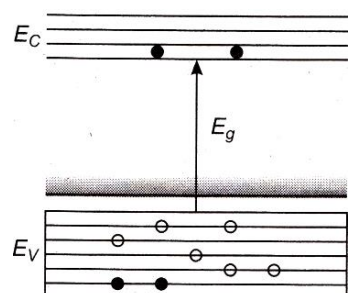
- (1) $8\ \text{m/s}$ (2) $20\ \text{m/s}$
 (3) $40\ \text{m/s}$ (4) $\frac{1}{40}\ \text{m/s}$

21. The magnetic field \vec{dB} due to a small element (\vec{dl}) at a distance \vec{r} and carrying current i is

- (1) $\vec{dB} = \frac{\mu_0}{4\pi} i \left(\frac{\vec{dl} \times \vec{r}}{r} \right)$ (2) $\vec{dB} = \frac{\mu_0}{4\pi} i^2 \left(\frac{\vec{dl} \times \vec{r}}{r^2} \right)$
 (3) $\vec{dB} = \frac{\mu_0}{4\pi} i^2 \left(\frac{\vec{dl} \times \vec{r}}{r} \right)$ (4) $\vec{dB} = \frac{\mu_0}{4\pi} i \left(\frac{\vec{dl} \times \vec{r}}{r^3} \right)$

22. The net magnetic flux through any closed surface is:

- (1) Positive (2) Infinity
 (3) Negative (4) Zero

23. A big circular coil of 1000 turns and average radius 10 m is rotating about its horizontal diameter at 2 rad s^{-1} . If the vertical magnetic field at that place in $2 \times 10^{-5} \text{ T}$ and electrical resistance of the coil is 12.56Ω , then the maximum induced current in the coil will be"
- (1) 1.5 A (2) 1 A
(3) 2 A (4) 0.25 A
24. A series LCR circuit with inductance 10 H, capacitance $10 \mu\text{F}$, resistance 50Ω is connected to an ac source of voltage, $V = 200 \sin(100t)$ volt. If the resonant frequency of the LCR circuit is ν_0 and the frequency of the ac source is ν , then :
- (1) $\nu_0 = \nu = \frac{50}{\pi} \text{ Hz}$
(2) $\nu_0 = \nu = \frac{50}{\pi} \text{ Hz}, \nu = 50 \text{ Hz}$
(3) $\nu = 100 \text{ Hz} : \nu_0 = \nu = \frac{100}{\pi} \text{ Hz}$
(4) $\nu_0 = \nu = 50 \text{ Hz}$
25. The ratio of contributions made by the electric field and magnetic field components to the intensity of an electromagnetic wave is :
(c = speed of electromagnetic waves)
- (1) $c : 1$ (2) $1 : 1$
(3) $1 : c$ (4) $1 : c^2$
26. Two Polaroids P_1 and P_2 are placed with their axis perpendicular to each other. Unpolarised light I_0 is incident on P_1 . A third polaroid P_3 is kept in between P_1 and P_2 such that its axis makes an angle 45° with that of P_1 . The intensity of transmitted light through P_2 is –
- (1) $\frac{I_0}{4}$ (2) $\frac{I_0}{8}$
(3) $\frac{I_0}{16}$ (4) $\frac{I_0}{2}$
27. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled?
- (1) doubled (2) four times
(3) one-fourth (4) zero
28. The potential difference that must be applied to stop the fastest photoelectrons emitted by a nickel surface, having work function 5.01 eV , when ultraviolet light of 200 nm falls on it, must be –
- (1) 2.4 V
(2) -1.2 V
(3) -2.4 V
(4) 1.2 V
29. The ratio of wavelengths of the last line of Balmer series and the last line of Lyman series is –
- (1) 1 (2) 4
(3) 0.5 (4) 2
30. A nucleus of mass number 189 splits into two nuclei having mass number 125 and 64. The ratio of radius of two daughter nuclei respectively is :
- (1) 4 : 5
(2) 5 : 4
(3) 25 : 16
(4) 1 : 1
31. For a p-type semiconductor, which of the following statements is true?
- (1) Holes are the majority carriers and trivalent atoms are the dopants.
(2) Holes are the majority carriers and pentavalent atoms are the dopants.
(3) Electrons are the majority carriers and pentavalent atoms are the dopants.
(4) Electrons are the majority carriers and trivalent atoms are the dopants.
32. In the energy band diagram of a material shown below, the open circles and filled circles denote holes and electrons respectively. The material is a/an.
- 
- (1) p-type semiconductor
(2) Insulator
(3) Metal
(4) n-type semiconductor

33. **Assertion :** The speed of revolution of an artificial satellite revolving very near the earth is 8 km s^{-1} .

Reason : Orbital velocity of a satellite, become independent of height of near satellite.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are true and (R) is NOT the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

34. What will be the formula of the mass in terms of g , R and G ? (R = radius of earth)

- (1) $g^2 \frac{R}{G}$
- (2) $G \frac{R^2}{g}$
- (3) $G \frac{R}{g}$
- (4) $g \frac{R^2}{G}$

35. A bus is moving with a speed of 10 ms^{-1} on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1 km from the scooterist, with what speed should the scooterist chase, the bus?

- (1) 20 ms^{-1}
- (2) 40 ms^{-1}
- (3) 25 ms^{-1}
- (4) 10 ms^{-1}

36. A particle moves along a circle of radius $\left(\frac{20}{\pi}\right)\text{ m}$ with constant tangential acceleration. If the velocity of the particle is 80 m/s at the end of the second revolution after motion has begun, the tangential acceleration is

- (1) $160\pi\text{ m/s}^2$
- (2) 40 m/s^2
- (3) $40\pi\text{ m/s}^2$
- (4) $640\pi\text{ m/s}^2$

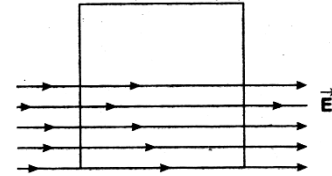
37. For hydrogen gas $C_p - C_v = a$ and for oxygen gas $C_p - C_v = b$, so the relation between a and b is given by (C_p and C_v are gram molar specific heats.)

- (1) $a = 16b$
- (2) $2b = a$
- (3) $a = 4b$
- (4) $a = b$

38. 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

- (1) $2\pi\text{ s}$
- (2) 2 s
- (3) $\pi\text{ s}$
- (4) 1 s

39. A square surface of side L metre is in the plane of the paper. A uniform electric field \vec{E} (V/m), also in the plane of the paper, is limited only to the lower half of the square surface, (see figure). The electric flux in SI units associated with the surface is

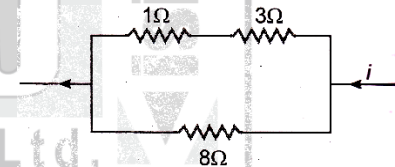


- (1) $\frac{EL^2}{(2\epsilon_0)}$
- (2) $\frac{EL^2}{2}$
- (3) zero
- (4) EL^2

40. The unit of permittivity of free space, ϵ_0 is

- (1) Coulomb/newton-metre
- (2) Newton-metre²/coulomb²
- (3) Coulomb²/newton-metre²
- (4) Coulomb²/(newton-metre)²

41. Power dissipated across the $8\ \Omega$ resistor in the circuit shown here is 2 W. The power dissipated in watt units across the $3\ \Omega$ resistor is



- (1) 2.0
- (2) 1.0
- (3) 0.5
- (4) 3.0

42. A convex lens 'A' of focal length 20 cm and a concave lens 'B' of focal length 5 cm are kept along the same axis with a distance 'd' between them. If a parallel beam of light falling on 'A' leaves 'B' as a parallel beam, then the distance 'd' in cm will be :

- (1) 30
- (2) 25
- (3) 15
- (4) 50

43. A biconvex lens has a radius of curvature of magnitude 20 cm. Which one of the following options describe best the image formed of an object of height 2 cm placed 30 cm from the lens?

- (1) Virtual, upright, height = 0.5 cm
- (2) Real, inverted, height = 4 cm
- (3) Real, inverted, height = 1 cm
- (4) Virtual, upright, height = 1 cm

44. Electric field associated with EM wave in free space is given by $\vec{E} = 30\sin(6 \times 10^8 t + kz)\hat{i}$ then match the following columns.

| Column-I | | Column-II | |
|----------|--|-----------|--------------------|
| (i) | Direction of propagation of EM wave | (a) | -y axis |
| (ii) | Wave length of EM wave | (b) | 2 m^{-1} |
| (iii) | Direction of magnetic field of EM wave | (c) | 3.14 m |
| (iv) | Propagation constant 'k' | (d) | '-z' axis |

- (1) i-a, ii-c, iii-d, iv- c
 (2) i- d, ii-c, iii- a, iv-b
 (3) i- a, ii-b, iii- d, iv-d
 (4) i- d, ii-c, iii- a, iv-a

45. In The heavier stable nuclei tend to have larger N/Z ratio because -
- a neutron is heavier than a proton
 - a neutron is an unstable particle
 - a neutron does not exert electric repulsion
 - Coulomb forces have longer range compared to nuclear forces
- (1) Only a and c
 (2) Only c and d
 (3) Only b and c
 (4) a, b, c



46. What is the weight of oxygen required for the complete combustion of 2.8 kg of ethylene?
- (1) 2.8 kg (2) 6.4 kg
(3) 9.6 kg (4) 96 kg

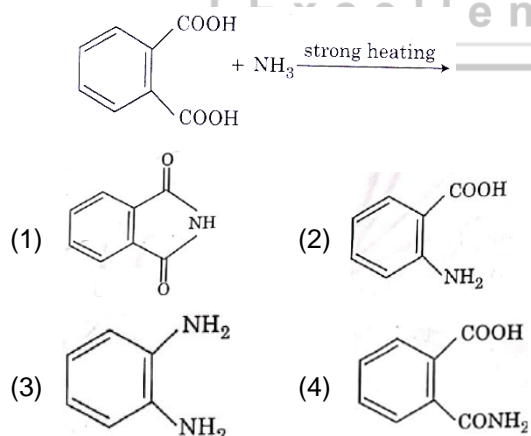
47. The number of spherical nodes in 3p orbitals is
- (1) One (2) Three
(3) None (4) Two

48. Consider the following set of quantum numbers

| | <i>n</i> | <i>l</i> | <i>m</i> | <i>s</i> |
|-------|----------|----------|----------|----------|
| (i) | 3 | 0 | 0 | +1/2 |
| (ii) | 2 | 2 | 1 | +1/2 |
| (iii) | 4 | 3 | -2 | -1/2 |
| (iv) | 1 | 0 | -1 | -1/2 |
| (v) | 3 | 2 | 3 | +1/2 |

Which of the following sets of quantum number is/are not possible?

- (1) (i), (ii) (iii) and (iv) (2) (ii), (iv) and (v)
(3) (i) and (iii) (4) (ii), (iii) and (iv)
49. Which of the following alkane cannot be made in good yield by Wurtz reaction?
- (1) n-Hexane
(2) 2, 3-Dimethylbutane
(3) n-Heptane
(4) n-Butane
50. The major product of the following reaction is



51. The enthalpy and entropy change for the reaction $Br_2(l) + Cl_2(g) \rightarrow 2BrCl(g)$ are 30 kJ mol^{-1} and $105\text{ JK}^{-1}\text{ mol}^{-1}$ respectively. The temperature at which the reaction will be in equilibrium is
- (1) 273 K (2) 450 K
(3) 300 K (4) 285.7 K

52. In which case change in entropy is negative?
- (1) Expansion of a gas at constant temperature
(2) Sublimation of solid to gas
(3) $2H(g) \rightarrow H_2(g)$
(4) Evaporation of water
53. In which of the following the solubility of AgCl will be minimum?
- (1) 0.1 M $NaNO_3$
(2) Water
(3) 0.1 M NaCl
(4) 0.1 M NaBr
54. The rapid change of pH near the stoichiometric point of an acid-base titration is the basis of indicator detection. pH of the solution is related to ratio of the concentrations of the conjugate acid (HIn) and base (In^-) forms of the indicator by the expression

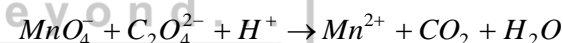
$$(1) \log \frac{[In^-]}{[HIn]} = pK_{In} - pH$$

$$(2) \log \frac{[In^-]}{[HIn]} = pH - pK_{In}$$

$$(3) \log \frac{[HIn]}{[In^-]} = pK - pK_{In}$$

(4) None of these

55. For the redox reaction

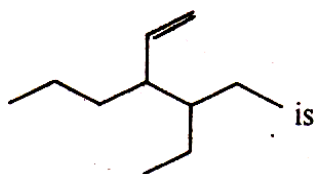


The correct coefficients of the reactants for the balanced equation are

| | MnO_4^- | $C_2O_4^{2-}$ | H^+ |
|-----|-----------|---------------|-------|
| (1) | 16 | 5 | 2 |
| (2) | 2 | 16 | 5 |
| (3) | 2 | 5 | 16 |
| (4) | 5 | 16 | 2 |

56. The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence:
- (1) Ga < In < Al < Tl
(2) Al < Ga < In < Tl
(3) Tl < In < Ga < Al
(4) In < Tl < Ga < Al

57. The correct IUPAC name of the compound



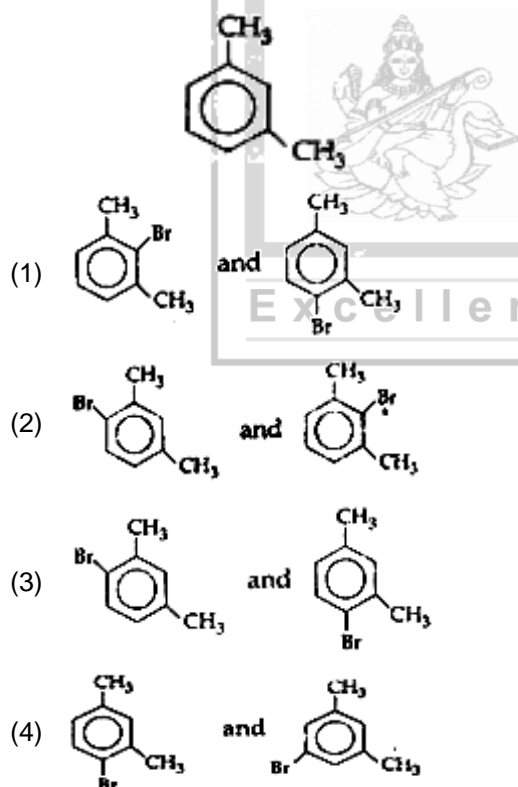
- (1) 4-Ethyl-3-propyl hex-1-ene
 (2) 3-Ethyl-4-ethenyl heptane
 (3) 3-Ethyl-4-ethenyl heptane
 (4) 3-(1-ethylpropyl) hex-1-ene

58. Identify the incorrect match.

| Name | IUPAC Official Name |
|----------------|---------------------|
| a. Unnilunium | i. Mendeleevium |
| b. Unniltrium | ii. Lawrencium |
| c. Unnilhexium | iii. Seaborgium |
| d. Unununnium | iv. Darmstadtium |

- (1) (1), (i) (2) (2), (ii)
 (3) (3), (iii) (4) (4), (iv)

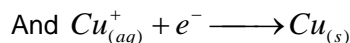
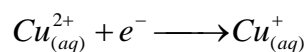
59. What products are formed when the following compound is treated with Br_2 in the presence of FeBr_3 ?



60. The mixture which shows positive deviation from Raoult's law is :

- (1) Ethanol + Acetone
 (2) Benzene + Toluene
 (3) Acetone + Chloroform
 (4) Chloroethane + Bromoethane

61. The electrode potentials for



Are +0.15 V and +0.50, respectively. The value of $E^\circ_{\text{Cu}^{2+}/\text{Cu}}$ will be:

- (1) 0.500 V
 (2) 0.325 V
 (3) 0.650 V
 (4) 0.150 V

62. When initial concentration of the reactant is doubled, the half-life period of a zero order reaction is -

- (1) Halved
 (2) Tripled
 (3) Doubled
 (4) Remains unchanged

63. **Assertion A:** A reaction can have zero activation energy.

Reason R: The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

- (1) Both A and R are true but R is NOT the correct explanation of A.
 (2) A is true but R is false.
 (3) A is false but R is true.
 (4) Both A and R are true but R is the correct explanation of A.

64. IUPAC name of $[\text{Pt}(\text{NH}_3)_3(\text{Br})(\text{NO}_2)\text{Cl}] \text{Cl}$ is

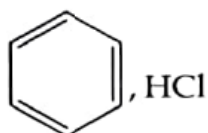
- (1) Triamminechlorobromonitroplatinum (IV) chloride
 (2) Triamminebromonitroplatinum (IV) chloride
 (3) Triamminebromochloronitroplatinum (IV) chloride
 (4) Triamminenitrochlorobromoplatinum (IV) chloride

65. In an $\text{S}_{\text{N}}1$ reaction on chiral centres, there is:

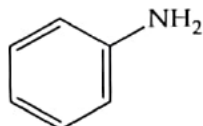
- (1) 100% racemization
 (2) Inversion more than retention leading partial racemisation
 (3) 100% retention
 (4) 100% inversion

66. Which of the following sequence of reactions is suitable to synthesize chlorobenzene?

(1) Phenol, NaNO_2 , HCl , CuCl



(3)



(5)

(6) Benzene, Cl_2 , anhydrous FeCl_3

67. The oxidation of phenol with chromic acid gives.

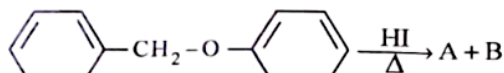
(1) An aldehyde

(2) A simple diketone

(3) A conjugated diketone

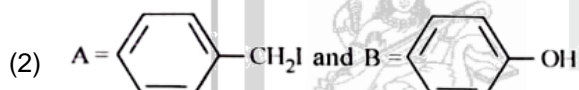
(4) Ortho benzoquinone

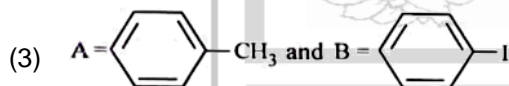
68. Consider the following reaction

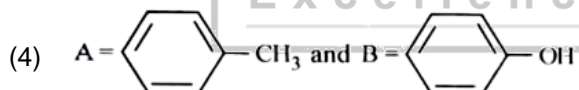


Identify products A and B.

(1) 

(2) 

(3) 

(4) 

69. **Statement I:** In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. $\text{HCl} + \text{ZnCl}_2$, known as Lucas Reagent.

Statement II: Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent.


(1) Both Statement I and Statement II are incorrect

(2) Statement I is correct but Statement II is incorrect

(3) Statement I is incorrect but Statement II is correct

(4) Both Statement I and Statement II are correct

70. Match List – I with List – II:

| List – I | List – II |
|---|-------------------------------------|
| (1)  $\xrightarrow[\text{CuCl}]{\text{CO, HCl, Anhyd. AlCl}_3}$ | (i) Hell – VolhardZelinsky reaction |
| (2) $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 + \text{NaOX} \longrightarrow$ | (ii) Gattermann – Koch reaction |
| (3) $\text{R}-\text{CH}_2-\text{OH} + \text{R}'\text{COOH} \xrightarrow{\text{Conc. H}_2\text{SO}_4}$ | (iii) Haloform reaction |
| (4) $\text{R}-\text{CH}_2\text{COOH} \xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) X}_2/\text{Red P}}$ | (iv) Esterification |

Choose the correct answer from the option given below.

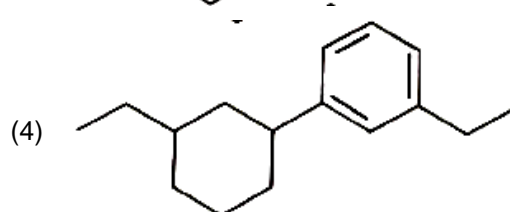
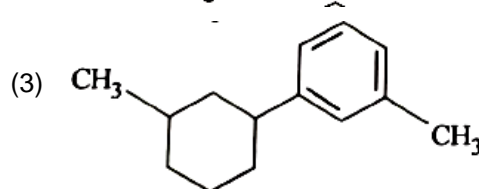
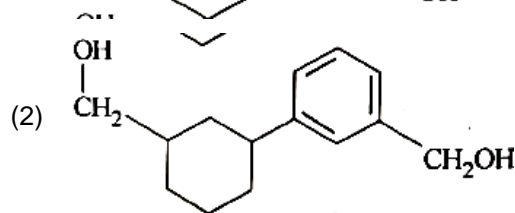
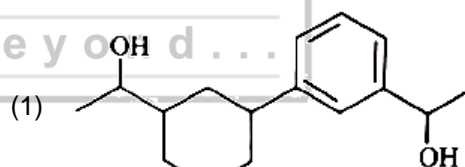
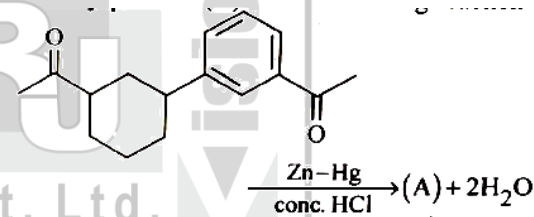
(1) (1)-(ii), (2)-(iii), (3)-(iv), (4)-(i)

(2) (1)-(iv), (2)-(i), (3)-(ii), (4)-(iii)

(3) (1)-(iii), (2)-(ii), (3)-(i), (4)-(iv)

(4) (1)-(i), (2)-(iv), (3)-(iii), (4)-(ii)

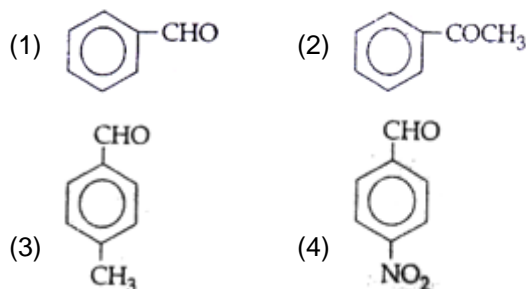
71. Identify product (A) in the following reaction:



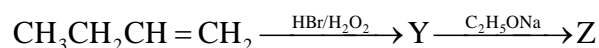
72. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?

- (1) $S < O < Cl < F$ (2) $Cl < F < S < O$
 (3) $F < Cl < O < S$ (4) $O < S < F < Cl$

73. Which one is most reactive towards Nucleophilic addition reaction?



74. Identify Z in the sequence of reactions:



- (1) $CH_3 - (CH_2)_3 - O - CH_2CH_3$
 (2) $(CH_3)_2CH_2 - O - CH_2CH_3$
 (3) $CH_3(CH_2)_4 - O - CH_3$
 (4) $CH_3CH_2 - CH(CH_3) - O - CH_2CH_3$

75. RNA and DNA are chiral molecules, their chirality is due to:

- (1) Chiral bases
 (2) Chiral phosphate ester units
 (3) D – sugar component
 (4) L – sugar component

76. Select the correct statement(s) :

- (a) The rate law of the elementary reaction; $2A \rightarrow B + C$, must be $r = k[A]^2$
 (b) The rate law for the complex reaction $A + B \rightarrow C$, might not be $r = k[A][B]$
 (c) If the partial orders differ from the coefficients in the balanced reaction, the reaction must be complex
 (d) If the partial orders are equal to corresponding coefficients in the balanced reaction, the reaction must be elementary

The correct statements are

- (1) (a) and (b) only
 (2) (b) and (c) only
 (3) (a), (b) and (c)
 (4) (b), (c) and (d)

77. The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is

- (1) 8 σ bonds and 5 π bonds
 (2) 11 σ bonds and 2 π bonds
 (3) 13 σ bonds and no π bonds
 (4) 10 σ bonds and 3 π bonds

78. Considered the following statement:

- (a) Propane on hydroboration oxidation reaction gives propan – 2 – ol as major product.
 (b) Phenol is more acidic than ethanol.
 (c) Phenol evolves hydrogen gas on reaction with sodium.

The correct statements are

- (1) (a) and (b) only
 (2) (b) and (c) only
 (3) (a), (b) and (c)
 (4) (a) and (c) only

79. **Assertion (A):** ICl is more reactive than I_2 .

Reason (R) : I-Cl bond is weaker than I-I bond.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both (A) and (R) are correct but (R) is the not correct explanation of (A)
 (2) (A) is correct but (R) is not correct
 (3) (A) is not correct but (R) is correct
 (4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

80. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 g mL^{-1} . Volume of acid required to make one litre of 0.1 M H_2SO_4 solution is

- (1) 16.65 ml
 (2) 22.20 mL
 (3) 5.55 mL
 (4) 11.10 mL

81. Uncertainly in position of an electron (mass = $9.1 \times 10^{-28} \text{g}$) moving with a velocity of $3 \times 10^4 \text{ cm/s}$ accurate upto 0.001% will be (Use $h/4\pi$) in uncertainty expression where $h = 6.626 \times 10^{-27} \text{ erg – second}$)

- (1) 1.93 cm (2) 3.84 cm
 (3) 5.76 cm (4) 7.68 cm

82. For the second period elements the correct increasing order of first ionisation enthalpy is
- $Li < B < Be < C < O < N < F < Ne$
 - $Li < B < Be < C < N < O < F < Ne$
 - $Li < Be < B < C < O < N < F < Ne$
 - $Li < Be < B < C < N < O < F < Ne$
83. Decreasing order of stability of O_2 , O_2^- , O_2^+ and O_2^{2-} is:
- $O_2^+ > O_2 > O_2^- > O_2^{2-}$
 - $O_2^{2-} > O_2^- > O_2 > O_2^+$
 - $O_2 > O_2^+ > O_2^{2-} > O_2^-$
 - $O_2^- > O_2^{2-} > O_2^+ > O_2$
84. Given the reaction between 2 gases represented by A_2 and B_2 to give the compound $AB(g)$.
- $$A_2(g) + B_2(g) \rightleftharpoons 2 AB(g).$$
- At equilibrium, the concentration of
- $$A_2 = 3.0 \times 10^{-3} \text{ M of}$$
- $$B_2 = 4.2 \times 10^{-3} \text{ M of}$$
- $$AB = 2.8 \times 10^{-3} \text{ M}$$
- If the reaction takes place in a sealed vessel at 527°C , then the value of K_c will be:
- 2.0
 - 1.9
 - 0.62
 - 4.5
85. The number of moles of $KMnO_4$ reduced by one mole of KI in alkaline medium is:
- One
 - Two
 - Five
 - Six
86. Dihedral angle of least stable conformer of ethane is:
- 0°
 - 120°
 - 180°
 - 60°
87. An alkene "A" on reaction with O_3 and $Zn-H_2O$ gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is :
- $$H_3C-CH_2-\overset{\overset{CH_2Cl}{|}}{CH}-CH_3$$
 - $$H_3C-CH_2-\overset{\overset{CH_3}{|}}{C}-CH_3$$

$$|$$

$$Cl$$
 - $$H_3C-\underset{\underset{Cl}{|}}{CH}-\overset{\overset{CH_3}{|}}{CH}$$

$$|$$

$$CH_3$$
 - $$Cl-CH_2-CH_2-\overset{\overset{CH_3}{|}}{CH}$$

$$|$$

$$CH_3$$
88. Which of the following 0.10 m aqueous solutions, will exhibit the largest freezing point depression?
- KCl
 - $C_6H_{12}O_6$
 - $Al_2(SO_4)_3$
 - K_2SO_4
89. When ice melts at 1°C :
- an increase in entropy
 - an decrease in enthalpy
 - a decrease in free energy
 - process is spontaneous
- The correct statements are
- (a) and (b) only
 - (b) and (c) only
 - (a), (b) and (c)
 - (a), (c) and (d)
90. Match List – I with List – II.
- | List – I | List – II |
|-------------|---------------------------|
| (a) PCl_5 | (i) Square pyramidal |
| (b) SF_6 | (ii) Trigonal planar |
| (c) BrF_5 | (iii) Octahedral |
| (d) BF_3 | (iv) Trigonal bipyramidal |

Choose the correct answer from the options given below.

- (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
- (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
- (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
- (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

91. Alexander Von Humbolt described for the first time
- (1) Laws of limiting factor
 - (2) Species area relationships
 - (3) Population Growth equation
 - (4) Ecological Biodiversity
92. Which one of the following is **not** a method of *in situ* conservation of biodiversity?
- (1) Wildlife Sanctuary (2) Botanical Garden
 - (3) Sacred Grove (4) Biosphere reserve
93. The region Biosphere Reserve which is legally protected and where no human activity is allowed is known as:
- (1) Buffer zone (2) Transition zone
 - (3) Restoration zone (4) Core zone
94. Identify the type of flowers based on the position of calyx, corolla and androecium with respect to the ovary from the given figure (a) and (b)



- (1) (a) Epigynous: (b) Hypogynous
 - (2) (a) Hypogynous: (b) Epigynous
 - (3) (a) Perigynous: (b) Epigynous
 - (4) (a) Perigynous: (b) Perigynous
95. Which one of the following processes during decomposition is correctly described?
- (1) Fragmentation – Carried out by organisms such as earthworm
 - (2) Humification – Leads to the accumulation of a dark coloured substance humus which undergoes microbial action at a very fast rate
 - (3) Catabolism – Last step in the decomposition under fully anaerobic condition
 - (4) Leaching – Water soluble inorganic nutrients rise to the top layers of soil
96. Which of the following ecological pyramids is generally inverted?
- (1) Pyramid of energy
 - (2) Pyramid of biomass in a forest
 - (3) Pyramid of biomass in a sea
 - (4) Pyramid of numbers in grassland

97. **Statements I:** RNA mutates at a faster rate
Statements II: Viruses having RNA genome and shorter life span mutate and evolve faster.
- (1) Both Statement I and Statement II are false
 - (2) Statement I is true but Statement II is False
 - (3) Statement I is false but Statement II is true
 - (4) Both Statement I and Statement II are true
98. What is a keystone species?
- (1) A species which makes up only a small proportion of the total biomass of a community, yet has a huge impact on the community's organization and survival
 - (2) A common species that has plenty of biomass, yet has a fairly low impact on the community's organization
 - (3) A rare species that has minimal impact on the biomass and on other species in the community
 - (4) A dominant species that constitutes a large proportion of the biomass and which affects many other species.

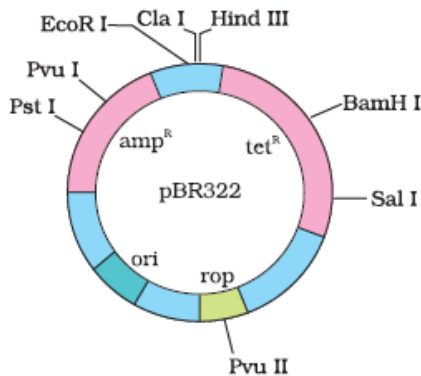
99. Which of the following statements is not true for cancer cells in relation to mutations.
- (1) Mutations in proto-oncogenes accelerate the cell cycle
 - (2) Mutations destroy telomerase inhibitor
 - (3) Mutations inactivate the cell control
 - (4) Mutations inhibit production of telomerase
100. Match the List – I and List – II.

| List – I | List – II |
|----------------------------------|-------------------|
| (a) <i>Aspergillus niger</i> | (i) Acetic acid |
| (b) <i>Acetobacter aceti</i> | (ii) Lactic acid |
| (c) <i>Clostridium butylicum</i> | (iii) Citric acid |
| (d) <i>Lacto bacillus</i> | (iv) Butyric acid |

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

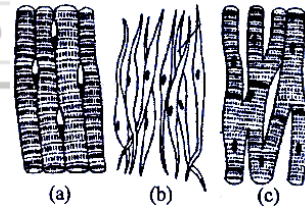
- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|-------|-------|
| (1) | (iv) | (ii) | (i) | (iii) |
| (2) | (iii) | (i) | (iv) | (ii) |
| (3) | (i) | (ii) | (iii) | (iv) |
| (4) | (ii) | (iii) | (i) | (iv) |
101. Ethanol is commercially produced through a particular species of
- (1) *Clostridium* (2) *Trichoderma*
 - (3) *Aspergillus* (4) *Saccharomyces*

102. A mutually beneficial association necessary for survival of both partners is
- (1) Mutualism/Symbiosis
 - (2) Commensalism
 - (3) Amensalism
 - (4) Both A and B
103. While explaining interspecific interaction of population, (+) sign is assigned for beneficial interaction, (–) sign is assigned for detrimental interaction and (0) for neutral interaction. Which of the following interactions can be assigned (+) for one species and (–) for another species involved in the interaction?
- (1) Predation
 - (2) Amensalism
 - (3) Commensalism
 - (4) Competition
104. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment?
- (1) Serum and Urine analysis
 - (2) Polymerase Chain Reaction (PCR) technique
 - (3) Enzyme Linked Immuno - Sorbent Assay (ELISA) Technology
 - (4) Recombinant DNA Technology
105. The capacity to generate a whole plant from any cell of the plant is called:
- (1) Totipotency
 - (2) Micropropagation
 - (3) Differentiation
 - (4) Somatic hybridization
106. The figure below is the diagrammatic representation of the E.Coli vector pBR 322. Which one of the given options correctly identifies its certain component(s)?



- (1) Ori-original restriction enzyme
- (2) Rop-reduced osmotic pressure
- (3) Hind III, EcoRI-selectable markers
- (4) amp^R, tet^R-antibiotic resistance genes

107. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out
- (1) DNA
 - (2) Histones
 - (3) Polysaccharides
 - (4) RNA
108. In gel electrophoresis, separated DNA fragments can be visualized with the help of:
- (1) Acetocarmine in bright blue light
 - (2) Ethidium bromide UV radiation
 - (3) Acetocarmine in UV radiation
 - (4) Ethidium bromide in infrared radiation
109. **Statement I:** Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.
Statement II: Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.
- (1) Both statement I and statement II are correct.
 - (2) Both statement I and statement II are incorrect.
 - (3) Statement I is correct but statement II is incorrect
 - (4) Statement I is incorrect but statement II is correct.
110. Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



Name of muscle/location

- (1) (a) Smooth – Toes
(b) Skeletal – Legs
(c) Cardiac – Heart.
- (2) (a) Skeletal – Triceps
(b) Smooth – Stomach
(c) Cardiac – Heart.
- (3) (a) Skeletal – Biceps
(b) Involuntary - Intestine
(c) Smooth – Heart.
- (4) (a) Involuntary – Nose tip
(b) Skeletal – Bone
(c) Cardiac – Heart.

111. Which of the following structures is homologous to the wing of birds?
 (1) Dorsal fin of a Shark
 (2) Wing of a Moth
 (3) Hind limb of Rabbit
 (4) Flipper of Whale
112. According to Hugo de Vries, the mechanism of evolution is
 (1) Multiple step mutations
 (2) Phenotypic variations
 (3) Saltation
 (4) Minor mutations
113. The chronological order of human evolution from early to the recent is
 (1) Ramapithecus → Australopithecus → Homo habilis → Homo erectus
 (2) Ramapithecus → Homo habilis → Australopithecus → Homo erectus
 (3) Australopithecus → Homo habilis → Ramapithecus → Homo erectus
 (4) Australopithecus → Ramapithecus → Homo habilis → Homo erectus
114. Point mutation involves
 (1) change in single base pair
 (2) duplication
 (3) deletion
 (4) insertion
115. One of the most frequency used techniques in DNA fingerprinting is
 (1) VNTR (2) SSCP
 (3) SCAR (4) AFLP
116. Which character studied by Mendel in garden pea (*Pisum sativum*) was dominant
 (1) Wrinkled seed shape
 (2) Green pod colour
 (3) Green seed colour
 (4) Terminal flower position
117. Which one of the following animals has two separate circulatory pathways?
 (1) Lizard
 (2) Whale
 (3) Shark
 (4) Frog
118. Sex is determined in human beings
 (1) By ovum
 (2) At times of fertilization
 (3) 40 days after fertilization
 (4) Seven to eight week when genitals differentiate in Foetus
119. As per ABO blood grouping system, the blood group of father is B⁺, mother is A⁺ and child is O⁺. Their respective genotype can be
 A. I^Bi / I^Ai/ii
 B. I^BI^B / I^AI^A / ii
 C. I^AI^B / ii^A / I^Bi
 D. I^Ai / I^Bi / I^Ai
 E. ii^B / ii^A / I^AI^B
- Choose the most appropriate answer from the options given below:
 (1) A only (2) B only
 (3) C & B only (4) D & E only
120. Select the hormone-releasing Intra-Uterine Devices.
 (1) Multiload 375, Progestasert
 (2) Progestasert, LNG – 20
 (3) Lippes Loop, Multiload 375
 (4) Vaults, LNG – 20
121. Match List I with List II
- | | List-I | | List-II |
|----|--------------|------|---|
| A. | Pons | I. | Provides additional space for Neurons, regulates posture and balance. |
| B. | Hypothalamus | II. | Controls respiration and gastric secretions. |
| C. | Medulla | III. | Connects different regions of the brain |
| D. | Cerebellum | IV. | Neuron Secretory cells |
- Choose the correct answer from the options given below:
 (1) A-II, B-III, C-I, D-IV
 (2) A-III, B-IV, C-II, D-I
 (3) A-I, B-III, C-II, D-IV
 (4) A-II, B-I, C-III, D-IV

122. Which part of human brain is concerned with the regulation of body temperature?

- (1) cerebellum (2) cerebrum
(3) hypothalamus (4) medulla oblongata

123. The main function of mammalian corpus luteum is to produce:

- (1) Estrogen only
(2) Progesterone
(3) Human chorionic gonadotropin
(4) Relaxin only

124. What is sarcomere?

- (1) Part between two H-lines
(2) Part between two A-lines
(3) Part between two I-bands
(4) Part between two Z-lines

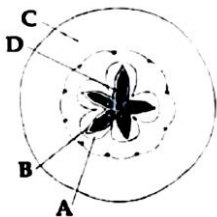
125. Veneral diseases can spread through:

- (a) Using sterile needles
(b) Transfusion of blood from infected person
(c) Infected mother to foetus
(d) Kissing
(e) Inheritance

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

- (1) (a) and (c) only (2) (a), (b) and (c) only
(3) (b), (c) and (d) only (4) (b) and (c) only

126. Which part of the fruit, labelled in the given figure makes it a false fruit?



- (1) B → Endocarp (2) C → Thalamus
(3) D → Seed (4) A → Mesocarp

127. Thymosin is responsible for:

- (1) Decreased production of T- lymphocytes
(2) Inhibiting the production of antibodies
(3) Decreasing the blood calcium level in old individuals
(4) Increased production of T-lymphocytes

128. How many different proteins does the ribosome consist of?

- (1) 60 (2) 40
(3) 20 (4) 80

129. Which of the following is not a steroid hormone?

- (1) Cortisol (2) Testosterone
(3) Progesterone (4) Glucagon.

130. During the propagation of a nerve impulse, the action potential results from the movement of

- (1) K^+ ions from intracellular fluid to extracellular fluid
(2) Na^+ ions from extracellular fluid to intracellular fluid
(3) K^+ ions from extracellular fluid to extracellular fluid
(4) Na^+ ions from intracellular fluid to extracellular fluid.

131. Which one of the following is the correct matching of these items and their grouping category?

| | Items | Group |
|-----|----------------------------|-----------------------------|
| (1) | Ilium, ischium, pubis | Coxal bone of pelvic girdle |
| (2) | Actin, myosin, rhodopsin | Muscle proteins |
| (3) | Cytosine, uracil, thiamine | Pyrimidines |
| (4) | Malleus, incus, cochlea | Ear ossicles |

132. The pivot joint between atlas and axis is a type of:

- (1) cartilaginous joint (2) synovial joint
(3) saddle joint (4) fibrous joint

133. Nitrogenous waste products are eliminated mainly as

- (1) Urea in tadpole and ammonia in adult frog
(2) Ammonia in tadpole and urea in adult frog
(3) Urea in both tadpole and adult frog
(4) Urea in tadpole and uric acid in adult frog

134. Which of the following statements is correct?

- (1) The descending limb of loop of Henle is impermeable to water
(2) The ascending limb of loop of Henle is permeable to water
(3) The descending limb of loop of Henle is permeable to electrolytes
(4) The ascending limb of loop of Henle is impermeable to water

135. What will happen if the stretch receptors of the urinary bladder wall are totally removed?
- (1) Micturition will continue
 - (2) Urine will continue to collect normally in the bladder
 - (3) There will be no micturition
 - (4) Urine will not collect in the bladder

136. Match the items given in Column I with those in Column II and select the correct option given below:

Column I

- a. Fibrinogen
- b. Globulin
- c. Albumin

Column II

- i. Osmotic balance
- ii. Blood clotting
- iii. Defence mechanism

a b c

- (1) iii ii i
- (2) i iii ii
- (3) i ii iii
- (4) ii iii i

137. Arteries carry oxygenated blood except

- (1) Pulmonary
- (2) Cardiac
- (3) Hepatic
- (4) Systemic

138. Which one of the following helps in absorption of phosphorus from soil by plants?

- (1) Rhizobium
- (2) Frankia
- (3) Anabaena
- (4) Glomus

139. Widal test is used for the diagnosis of:

- (1) Malaria
- (2) Pneumonia
- (3) Tuberculosis
- (4) Typhoid

140. **Assertion A:** FSH acts upon ovarian follicles in female and Leydig cells in male.

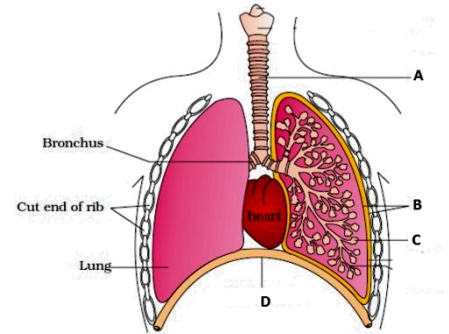
Reason R: Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is NOT the correct explanation of A
- (3) A is true but R is false
- (4) A is false but R is true

141. The hormone responsible for apical dominance

- (1) IAA
- (2) GA
- (3) ABA
- (4) Florigen

142. The figure shows a diagrammatic view of human respiratory system with labels A, B, C and D. Select the option which gives correct identification and main function and /or characteristic.



- (1) A – trachea – long tube supported by complete cartilaginous rings for conducting inspired air
- (2) B – pleural membrane – surround ribs on both sides to provide cushion against rubbing
- (3) C – Alveoli – thin walled vascular bag like structures for exchange of gases
- (4) D – Lower end of lungs – diaphragm pulls it down during inspiration.

143. What is vital capacity of our lungs?

- (1) Inspiratory reserve volume plus expiratory reserve volume
- (2) Total lung capacity minus residual volume
- (3) Inspiratory reserve volume plus tidal volume
- (4) Total lung capacity minus expiratory reserve volume.

144. Which hormone promotes internode/petiole elongation in deep water rice?

- (1) kinetin
- (2) Ethylene
- (3) 2, 4-D
- (4) GA₃

145. **Assertion A:** ATP is used at two steps in glycolysis.

Reason R: First ATP is used in converting glucose into glucose -6- phosphate and second ATP is used in conversion of fructose-6- phosphate into fructose -1-6 diphosphate

- (1) Both A and R are true but R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true
- (4) Both A and R are true and R is the correct explanation of A.

146. Which of the following statements is **incorrect**?
- (1) Oxidation-reduction reactions produce proton gradient in respiration.
 - (2) During aerobic respiration, role of oxygen is limited to the terminal stage.
 - (3) In ETC (Electron Transport Chain), one molecule of $\text{NADH} + \text{H}^+$ gives rise to 2 ATP molecules and one FADH_2 gives rise to 3 ATP molecules
 - (4) ATP is synthesized through complex V.
147. Select the incorrect statement with reference to mitosis :
- (1) Spindle fibres attach to centromere of chromosomes.
 - (2) Chromosomes decondense at telophase.
 - (3) Splitting of centromere occurs at anaphase.
 - (4) All the chromosomes lie at the equator at metaphase.
148. How many ATP and NADPH_2 are required for the synthesis of one molecules of Glucose during Calvin cycle?
- (1) 18 ATP and 12 NADPH_2
 - (2) 12 ATP and 16 NADPH_2
 - (3) 18 ATP and 16 NADPH_2
 - (4) 12 ATP and 12 NADPH_2
149. Match List I with List II
- | | List-I | | List-II |
|----|----------|------|---------------------|
| A. | Lipase | I. | Peptide bond |
| B. | Nuclease | II. | Ester bond |
| C. | Protease | III. | Glycosidic bond |
| D. | Amylase | IV. | Phosphodiester bond |
- Choose the correct answer from the options given
- (1) A-IV,B-II,C-III,D-I
 - (2) A-III,B-II,C-I,D-IV
 - (3) A-II,B-IV,C-I,D-III
 - (4) A-IV,B-I,C-III,D-II
150. EMP can produce a total of
- (1) 6 ATP
 - (2) 8 ATP
 - (3) 24 ATP
 - (4) 38 ATP
151. The principle of limiting factors was proposed by
- (1) Blackman
 - (2) Hill
 - (3) Arnol
 - (4) Liebig
152. The plant hormone used to destroy weeds in a field is:
- (1) IBA
 - (2) IAA
 - (3) NAA
 - (4) 2, 4-D
153. Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?
- (1) Pachytene
 - (2) Leptotene
 - (3) Zygotene
 - (4) Diakinesis
154. Spindle fibers attach to kinetochores of chromosomes during
- (1) Prophase
 - (2) Metaphase
 - (3) Anaphase
 - (4) Telophase
155. **Statement I:** Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
- Statement II:** When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.
- (1) Both Statement I and Statement II are false.
 - (2) Statement I is true but Statement II is false.
 - (3) Statement I is false but Statement II is true.
 - (4) Both Statement I and Statement II are true.
156. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells?
- (1) Endoplasmic reticulum
 - (2) Peroxisomes
 - (3) Golgi bodies
 - (4) Polysomes
157. Which of the following is an **incorrect** statement?
- (1) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.
 - (2) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.
 - (3) Microbodies are present both in plant and animal cells.
 - (4) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm

158. Kranz anatomy is typical of
 (1) C₄ plants (2) C₃ plants
 (3) C₂ plants (4) CAM plants

159. **Statements I:** Mitochondria and chloroplasts are both double membrane bound organelles.

Statements II: Inner membrane of mitochondria is relatively less permeable, as compared to chloroplast.

- (1) Both statement I and statement II are correct.
 (2) Both statement I and statement II are incorrect.
 (3) Statement I is correct but statement II is incorrect.
 (4) Statement I is incorrect but statement II is

160. Frogs heart when taken out of the body continues to beat for sometime. Select the best option from the following statement

- (a) Frog is a poikilotherm
 (b) Frog does not have any coronary circulation.
 (c) Heart is “myogenic” in nature.
 (d) Heart is autoexcitable.

Options:

- (1) Only (d) (2) (a) and (b)
 (3) (c) and (d) (4) Only (c)





161. Specialized epidermal cells surrounding the guard cells are called:

- (1) Complementary cells
 (2) Subsidiary cells
 (3) Bulliform cells
 (4) Lenticels

162. Pith and cortex do not differentiate in

- (1) Monocot stem
 (2) Dicot stem
 (3) Monocot root
 (4) Dicot root

163. Aestivation of petals in the flower of cotton is correctly shown in

- (1)  (2) 
 (3)  (4) 

164. Tetradynamous stamens are characteristic of:

- (1) Brassicaceae (2) Solanaceae
 (3) Fabaceae (4) Liliaceae

165. Radial symmetry is NOT found in adults of phylum _____.

- (1) Hemichordata (2) Coelenterata
 (3) Echinodermata (4) Ctenophora

166. One of the representatives of Phylum Arthropoda is:

- (1) Cuttlefish (2) Silverfish
 (3) Pufferfish (4) Flying fish

167. Match List I with List II:

| | List-I | | List-II |
|----|---------------|------|--------------|
| A. | Pleurobrachia | I. | Mollusca |
| B. | Radula | II. | Ctenophora |
| C. | Stomochord | III. | Osteichthyes |
| D. | Air bladder | IV. | Hemichordata |

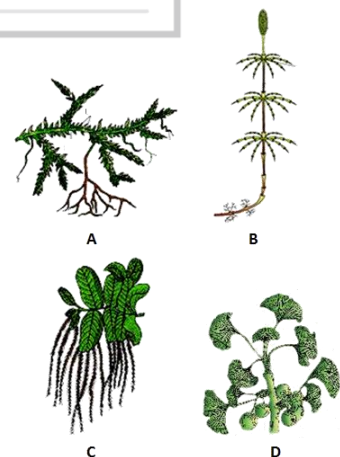
Choose the correct answer from the options given below:

- (1) A-IV,B-II,C-III,D-I
 (2) A-II,B-I,C-IV,D-III
 (3) A-II,B-IV,C-I,D-III
 (4) A-IV,B-III,C-II,D-I

168. Which of the following is incorrectly matched?

- (1) *Ulothrix* – Mannitol
 (2) *Porphyra* – Floridian Starch
 (3) *Volvox* – Starch
 (4) *Ectocarpus* – Fucoxanthin

169. Examine the figures A, B, C and D. In which one of the four options all the items A, B, C and D are correct?



- (1) A: Chara, B; Marchantia, C: Fucus, D: Pinus
 (2) A: Equisetum, B: Ginkgo, C: Selaginella, D: Lycopodium
 (3) A: Selaginella, B: Equisetum, C; Salvinia, D: Ginkgo
 (4) A: Funaria, B: Adiantum, C: Salvinia, D: Riccia

170. HIV that causes AIDS, first starts destroying:
- (1) B-Lymphocytes
 - (2) Leucocytes
 - (3) Helper T-Lymphocytes
 - (4) Thrombocytes
171. Which was absent in the atmosphere at the time of origin of life?
- (1) NH₂
 - (2) H₂
 - (3) O₂
 - (4) CH₄
172. **Statement I:** Mycoplasma can pass through less than 1 micron filter size.
Statement II : Mycoplasma are bacteria with cell wall.
- (1) Both Statement I and Statement II are incorrect
 - (2) Statement I is correct but Statement II is incorrect
 - (3) Statement I is incorrect but Statement II is correct
 - (4) Both Statement I and Statement II are correct
173. Select the wrong statement:
- (1) 'Diatomaceous earth' is formed by the cell walls of diatoms
 - (2) Diatoms are chief producers in the oceans
 - (3) Diatoms are chief microscopic and float passively in water
 - (4) The walls of diatoms are easily destructible
174. Which one of the following is not a criterion for classification of fungi?
- (1) Morphology of mycelium
 - (2) Mode of nutrition
 - (3) Mode of spore formation
 - (4) Fruiting body
175. Which one of the following may required pollinators, but genetically similar to autogamy?
- (1) Geitonogamy
 - (2) Xenogamy
 - (3) Apogamy
 - (4) Cleistogamy
176. Binomial nomenclature consists of two words
- (1) Genus and species
 - (2) Order and family
 - (3) Family and genus
 - (4) Species and variety

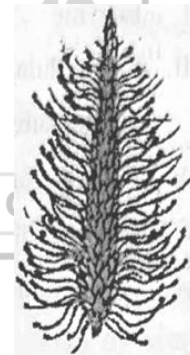
177. Which group of vertebrates comprises the highest number of endangered species?
- (1) Birds
 - (2) Mammals
 - (3) Fishes
 - (4) Reptiles
178. Match List I with List II:

| List I | | List II | |
|--------|-------------|---------|--|
| A. | P wave | I. | Heart muscles are electrically silent. |
| B. | QRS complex | II. | Depolarisation of ventricles. |
| C. | T wave | III. | Depolarisation of atria. |
| D. | T-P gap | IV. | Repolarisation of ventricles. |

- (1) A – I, B- III, C –IV, D -II
- (2) A – III, B- II, C –IV, D -I
- (3) A – II, B- III, C –I, D -IV
- (4) A – IV, B- II, C –I, D –III

179. Transformation was discovered by
- (1) Meselson and Stahl
 - (2) Hershey and Chase
 - (3) Griffith
 - (4) Watson and Crick

180. Identify the correct description about the given figure



- (1) Compact involucre showing complete autogamy.
- (2) Water pollinated flowers showing stamens with mucilaginous covering.
- (3) Cleistogamous flower showing autogamy.
- (4) Wind pollinated plant inflorescence showing flower with well exposed stamens.

Syllabus

FT – 14

| | | |
|------------|---|----------------------|
| Day & Date | : | 16 June, 2026 |
| Time | : | 2: 00 PM to 5: 00 PM |
| Physics | : | FULL COURSE |
| Chemistry | : | FULL COURSE |
| Biology | : | FULL COURSE |

