NEET-UG EXAMINATION PAPER-2021

(Solved)

Time allowed : 3 hours | Maximum Marks : 800

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **200 questions.** All questions are **compulsory.**

ii. This question paper is divided into **1 sections.**

iii. **Section A** – questions number **1 to 200** are multiple choice questions

iv. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

v. Use of calculator is NOT allowed.

Section A

Question 1.

A body is executing simple harmonic motion with frequency 'n', the frequency of its potential energy is

[4 Marks]

(A) 2n

(B) 3n

(C) n

(D) 4n

Question 2.

Polar molecules are the molecules

[4 Marks]

(A) acquire a dipole moment only when magnetic field is absent

(B) having zero dipole moment

(C) having a permanent electric dipole moment

(D) acquire a dipole moment only in the presence of electric field due to displacement of charges

Question 3.

Column-I gives certain physical terms associated with flow of current through a metallic conductor. Column-II gives some mathematical relations involving electrical quantities. Match Column-I and Column-II with appropriate relations.

[4 Marks]

Column-I	Column-II
(A) Drift velocity	(i) $\frac{m}{ne^2\rho}$
(B) Electrical resistivity	(ii) nev_d
(C) Relaxation period	(iii) $\frac{eE}{m}\tau$
(D) Current density	(iv) $\frac{E}{J}$

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

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

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

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

Question 4.

Two charged spherical conductors of radius R_1 and R_2 are connected by a wire. Then the ratio of surface charge densities of the spheres (σ_1/σ_2) is

[4 Marks]

(A) $\sqrt{(R_1/R_2)}$

(B) R_2 / R_1

(C) R_1 / R_2

(D) R_1^2 / R_2^2

Question 5.

A parallel plate capacitor has a uniform electric field E vector in the space between the plates. If the distance between the plates is 'd' and the area of each plate is 'A', the energy stored in the capacitor is (ε_0 = permittivity of free space)

[4 Marks]

(A) $1/2\ \varepsilon_0 E^2 Ad$

(B) $\varepsilon_0 EAd$

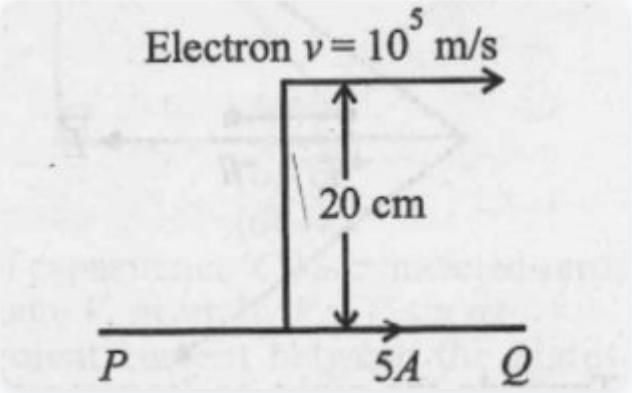
(C) $1/2\ \varepsilon_0 E^2$

(D) E^2Ad / ε_0

Question 6.

An infinitely long straight conductor carries a current of 5 A as shown. An electron is moving with a speed of 10^5 m/s parallel to the conductor. The perpendicular distance between the electron and the conductor is 20 cm at an instant. Calculate the magnitude of the force experienced by the electron at that instant.

[4 Marks]



(A) 8×10^{-20} N

(B) 4×10^{-20} N

(C) $8\pi \times 10^{-20}$

(D) $4\pi \times 10^{-20}$ N

Question 7.

If E and G respectively denote energy and gravitational constant, then E/G has the dimensions of

[4 Marks]

(A) $[M^2]\ [L^{-1}]\ [T^0]$

(B) $[M]\ [L^0]\ [T^0]$

(C) $[M^2]\ [L^{-2}]\ [T^{-1}]$

(D) $[M]\ [L^{-1}]\ [T^{-1}]$

Question 8.

A lens of large focal length and large aperture is best suited as an objective of an astronomical telescope since

[4 Marks]

(A) a large area of the objective ensures better light gathering power.

(B) all of the above

(C) alarge aperture provides a better resolution.

(D) a large aperture contributes to the quality and visibility of the images.

Question 9.

Match Column - I and Column - I and choose the correct match from the given choices.

[4 Marks]

Column - I	Column - II
(A) Root mean square speed of gas molecules	(i) $\frac{1}{3}nmv^{-2}$
(B) Pressure exerted by ideal gas	(ii) $\sqrt{\frac{3RT}{M}}$
(C) Average kinetic energy of a molecule	(iii) $\frac{5}{2}RT$
(D) Total internal energy of 1 mole of a diatomic gas	(iv) $\frac{3}{2}k_BT$

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

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

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

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

Question 10.

Consider the following statements (A) and (B) and identify the correct answer.

(A) A zener diode is connected in reverse bias, when used as a voltage regulator.

(B) The potential barrier of p-n junction lies between 0.1 V to 0.3 V.

[4 Marks]

(A) (A) and (B) both are correct.

(B) (A) is incorrect but (B) is correct.

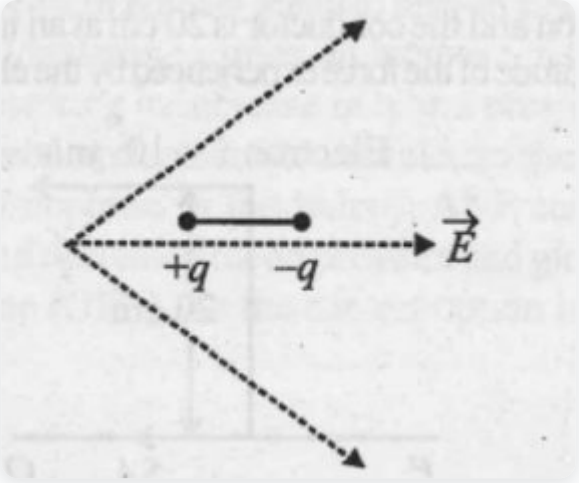
(C) (A) and (B) both are incorrect

(D) (A) is correct and (B) is incorrect.

Question 11.

A dipole is placed in an electric field as shown. In which direction will it move?

[4 Marks]



(A) Towards the left as its potential energy will increase.

(B) Towards the right as its potential energy will increase.

(C) Towards the left as its potential energy will decrease.

(D) Towards the right as its potential energy will decrease.

Question 12.

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

[4 Marks]

(A) 30

(B) 50

(C) 15

(D) 25

Question 13.

The escape velocity from the Earth's surface is v. The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is

[4 Marks]

(A) 4v

(B) 2v

(C) 3v

(D) v

Question 14. A radioactive nucleus undergoes spontaneous decay in the sequence

[4 Marks]

A radioactive nucleus ${}^{A}_{Z}X$ undergoes spontaneous decay in the sequence ${}^{A}_{Z}X \rightarrow_{z-1} B \rightarrow_{z-3} C \rightarrow_{z-2} D$, where Z is the atomic number of element X. The possible decay particles in the sequence are

(A) β^-, α, β^+

(B) α, β^+, β^-

(C) α, β^-, β^+

(D) β^+, α, β^-

Question 15. A screw gauge gives the following readings when used to measure the diameter of a wire Main scale reading : 0 mm Circular scale reading : 52 divisions Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is

[4 Marks]

(A) 0.052 cm

(B) 0.52 cm

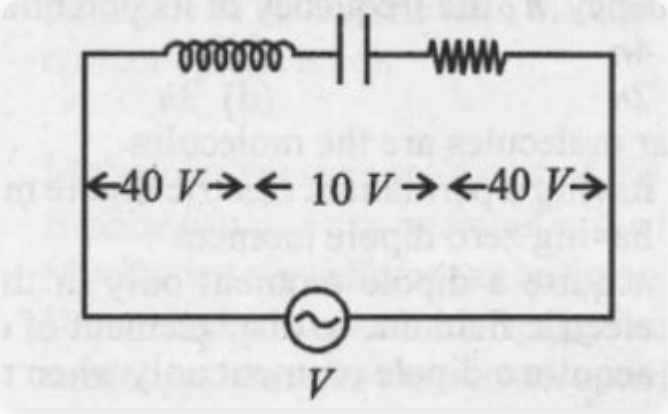
(C) 0.026 cm

(D) 0.26 cm

Question 16.

An inductor of inductance L, a capacitor of capacitance C and a resistor of resistance 'R' are connected in series to an ac source of potential difference 'V' volts as shown in figure. Potential difference across L, C and R is 40 V, 10 V and 40 V, respectively. The amplitude of current flowing through LCR series circuit is $10\sqrt{2}$ A. The impedance of the circuit is

[4 Marks]



(A) 4 Ω

(B) 5√2 Ω

(C) 5 Ω

(D) 4√2 Ω

Question 17.

A particle is released from height S from the surface of the Earth. At a certain height its kinetic energy is three times its potential energy. The height from the surface of earth and the speed of the particle at that instant are respectively

[4 Marks]

(A) S/2 , √[3gS]/2

(B) S/4 , 3gS/2

(C) S/2 , √[3gS]/2

(D) S/4 , √[3gS/2]

Question 18.

A small block slides down on a smooth inclined plane, starting from rest at time t = 0. Let S subscript n be the distance travelled by the block in the interval t = n − 1 to t = n. Then, the ratio S subscript (n) / S subscript (n+1) is

[4 Marks]

(A) (2n − 1) / (2n + 1)

(B) (2n + 1) / (2n − 1)

(C) (2n − 1) / 2n

(D) 2n / (2n − 1)

Question 19.

The half-life of a radioactive nuclide is 100 hours. The fraction of original activity that will remain after 150 hours would be

[4 Marks]

(A) 2 / 3

(B) 1 / (2√2)

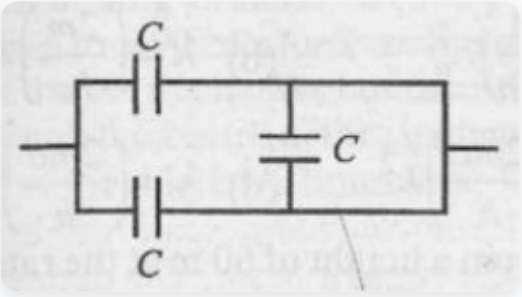
(C) 1 / 2

(D) 2 / (3√2)

Question 20.

The equivalent capacitance of the combination shown in the figure is

[4 Marks]



(A) 3C / 2

(B) C / 2

(C) 2C

(D) 3C

Question 21.

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

[4 Marks]

(A) 1 Ω

(B) 0.5 Ω

(C) 4 Ω

(D) 0.25 Ω

Question 22.

A nucleus with mass number 240 breaks into two fragments each of mass number 120, the binding energy per nucleon of unfragmented nuclei is 7.6 MeV while that of fragments is 8.5 MeV. The total gain in the binding energy in the process is

[4 Marks]

(A) 9.4 MeV

(B) 804 MeV

(C) 216 MeV

(D) 0.9 MeV

Question 23.

The number of photons per second on an average emitted by the source of mono-chromatic light of wavelength 600 nm, when it delivers the power of 3.3×10^{-3} watt will be ($h = 6.6 \times 10^{-34}$ J s)

[4 Marks]

(A) 10^{16}

(B) 10^{18}

(C) 10^{15}

(D) 10^{17}

Question 24.

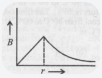
A thick current carrying cable of radius 'R' carries current ' uniformly distributed across its cross-section. The variation of magnetic field B(r) due to the cable with the distance ' from the axis of the cable is represented by

[4 Marks]

(A)



(B)



(C)



(D)



Question 25.

A capacitor of capacitance 'C', is connected across an ac source of voltage V, given by $V = V_0 \sin \omega t$ The displacement current between the plates of the capacitor, would then be given by

[4 Marks]

(A) $I_{(d)} = (V_0 / \omega C) \sin \omega t$

(B) $I_{(d)} = (V_0 / \omega C) \cos \omega t$

(C) $I_{(d)} = V_0 \omega C \sin \omega t$

(D) $I_{(d)} = V_0 \omega C \cos \omega t$

Question 26.

The velocity of a small ball of mass M and density d, when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is d/2, then the viscous force acting on the ball will be

[4 Marks]

(A) Mg / 2

(B) Mg

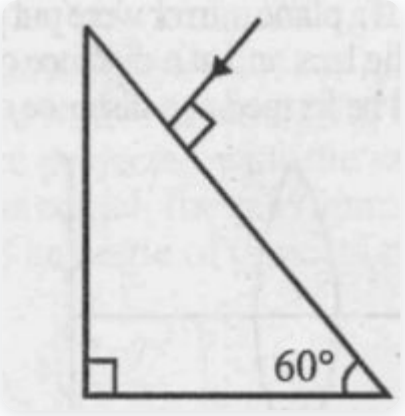
(C) (3 / 2) Mg

(D) 2 Mg

Question 27.

Find the value of the angle of emergence from the prism. Refractive index of the glass is $\sqrt{3}$.

[4 Marks]



(A) 60°

(B) 90°

(C) 30°

(D) 45°

Question 28.

If force [F], acceleration [A] and time [T] are chosen as the fundamental physical quantities. Find the dimensions of energy.

[4 Marks]

(A) $[F][A][T^2]$

(B) $[F][A^{-1}][T]$

(C) [F][A][T]

(D) $[F][A][T^{-1}]$

Question 29.

In a potentiometer circuit a cell of EMF 1.5 V gives balance point at 36 cm length of wire. If another cell of EMF 2.5 V replaces the first cell, then at what length of the wire, the balance point occurs?

[4 Marks]

(A) 21.6 cm

(B) 64 cm

(C) 62 cm

(D) 60 cm

Question 30.

A spring is stretched by 5 cm by a force 10 N. The time period of the oscillations when a mass of 2 kg is suspended by it is

[4 Marks]

(A) 3.14 s

(B) 6.28 s

(C) 0.0628 s

(D) 0.628 s

Question 31.

For a plane electromagnetic wave propagating in x-direction, which one of the following combination gives the correct possible directions for electric field (E) and magnetic field (B) respectively?

[4 Marks]

(A) $\hat{j} + \hat{k}$, $-\hat{j} - \hat{k}$

(B) $\hat{j} + \hat{k}$, $\hat{j} + \hat{k}$

(C) $-\hat{j} + \hat{k}$, $-\hat{j} - \hat{k}$

(D) $-\hat{j} + \hat{k}$, $-\hat{j} + \hat{k}$

Question 32. A cup of coffee cools from 90°C to 80°C in t minutes, when the room temperature is 20°C. The time taken by a similar cup of coffee to cool from 80°C to 60°C at a room temperature same at 20°C is

[4 Marks]

(A) (5 / 13) t

(B) (13 / 10) t

(C) (13 / 5) t

(D) (10 / 13) t

Question 33.

An electromagnetic wave of wavelength 'λ' is incident on a photosensitive surface of negligible work function. If 'm' mass is of photoelectron emitted from the surface has de-Broglie wavelength λ_d, then

[4 Marks]

(A) λ Subscript d = (2mc / h) λ²

(B) λ = (2m / hc) λ Subscript d²

(C) λ = (2mc / h) λ Subscript d²

(D) λ = (2h / mc) λ Subscript d²

Question 34.

Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The losses due to frictional force are 10% of the input energy. How much power is generated by the turbine? (g = 10 m/s²)

[4 Marks]

(A) 12.3 kW

(B) 8.1 kW

(C) 10.2 kW

(D) 7.0 kW

Question 35.

Twenty seven drops of same size are charged at 220 V each. They combine to form a bigger drop. Calculate the potential of the bigger drop.

[4 Marks]

(A) 1320 V

(B) 1980 V

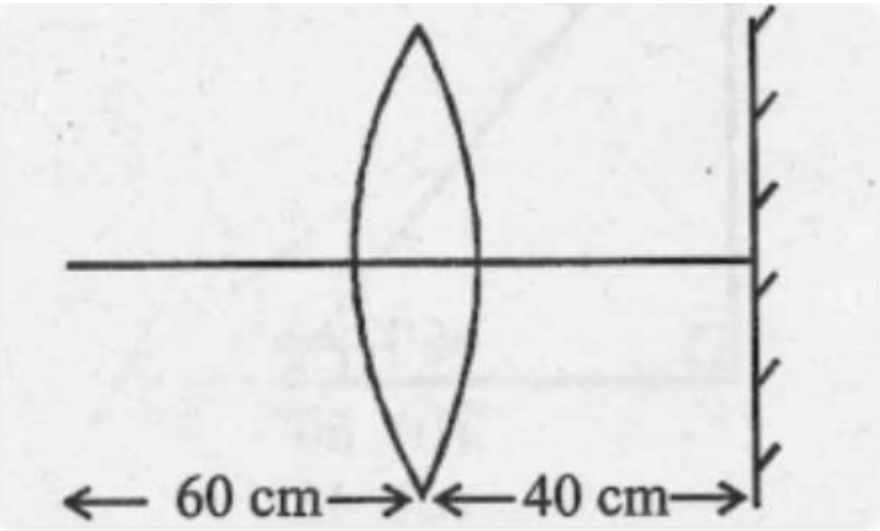
(C) 1520 V

(D) 660 V

Question 36.

A point object is placed at a distance of 60 cm from a convex lens of focal length 30 cm. If a plane mirror were put perpendicular to the principal axis of the lens and at a distance of 40 cm from it, the final image would be formed at a distance of

[4 Marks]



(A) 20 cm from the lens, it would be a real image

(B) 20 cm from the plane mirror, it would be a virtual image

(C) 30 cm from the plane mirror, it would be a virtual image

(D) 30 cm from the lens, it would be a real image

Question 37. A particle of mass 'm' is projected with a velocity v = k VSubscript (e) (k < 1) from the surface of the earth. (V Subscript (e) = escape velocity) The maximum height above the surface reached by the particle is

[4 Marks]

(A) $R k^2 / (1 - k^2)$

(B) $R (k / (1 + k))^2$

(C) $R^2 k / (1 + k)$

(D) $R (k / (1 - k))^2$

Question 38.

In the product F vector = q (v vector × B vector) = q v vector × (B î + B ĵ + B_0 k̂) For q = 1 and v vector = 2î + 4ĵ + 6k̂ and F vector = 4î - 20ĵ + 12k̂ What will be the complete expression for B vector

[4 Marks]

(A) -8î - 8ĵ - 6k̂

(B) 6î + 6ĵ - 8k̂

(C) -6î - 6ĵ - 8k̂

(D) 8î + 8ĵ - 6k̂

Question 39.

Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 >> R_2$, the mutual inductance M between them will be directly proportional to

[4 Marks]

(A) R_2 / R_1

(B) R_1 / R_2

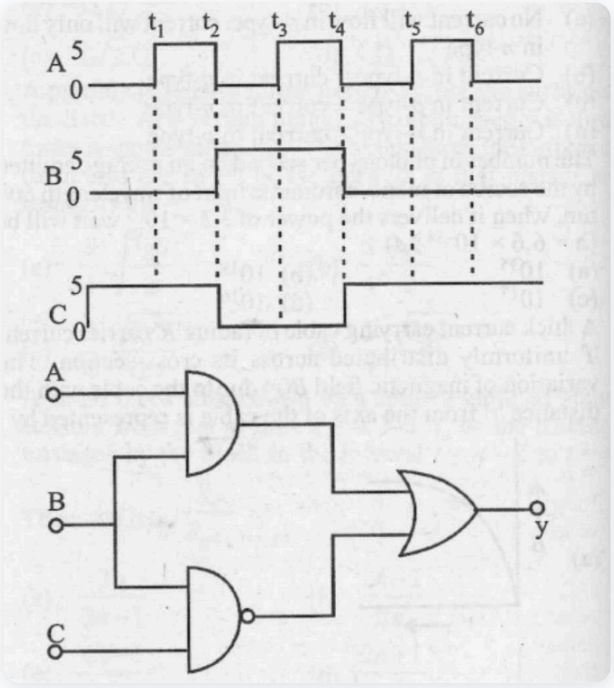
(C) R_2^2 / R_1

(D) R_1^2 / R_2

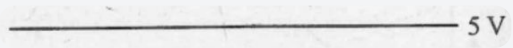
Question 40.

For the given circuit, the input digital signals are applied at the terminals A, B and C. What would be the output at the terminal y?

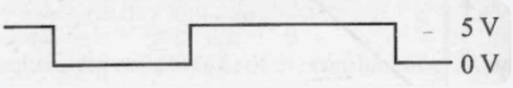
[4 Marks]



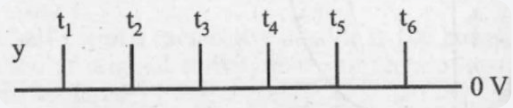
(A)



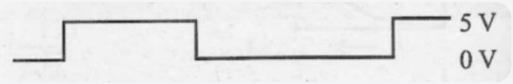
(B)



(C)



(D)



Question 41.

From a circular ring of mass 'M' and radius 'R' an arc corresponding to a 90° sector is removed. The moment of inertia of the remaining part of the ring about an axis passing through the centre of the ring and perpendicular to the plane of the ring is 'K' times 'MR^2'. Then the value of 'K' is

[4 Marks]

(A) 3 / 4

(B) 7 / 8

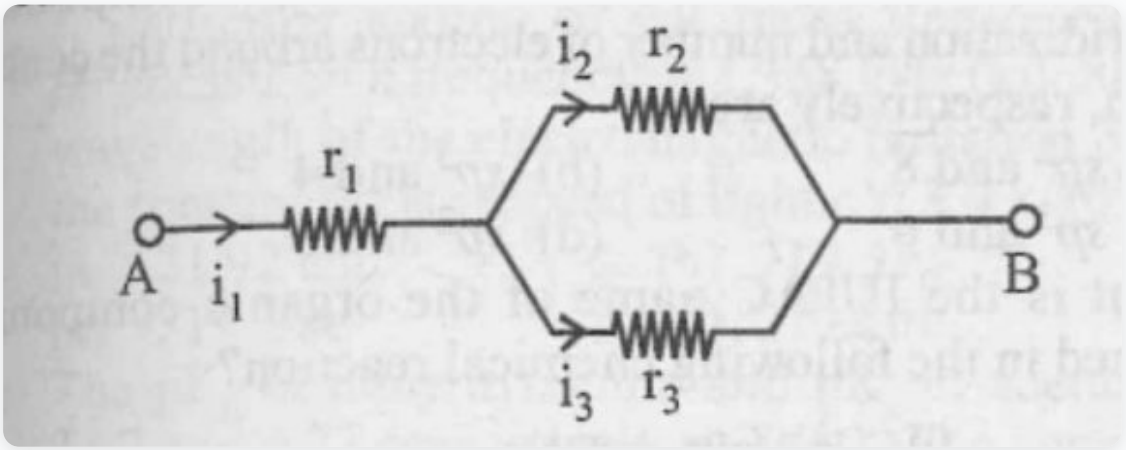
(C) 1 / 4

(D) 1 / 8

Question 42.

Three resistors having resistances r_1, r_2 and r_3 are connected as shown in the given circuit. The ratio i_3 / i_1 of currents in terms of resistances used in the circuit is

[4 Marks]



(A) $r_2 / (r_2 + r_3)$

(B) $r_1 / (r_1 + r_2)$

(C) $r_1 / (r_2 + r_3)$

(D) $r_2 / (r_1 + r_3)$

Question 43.

A car starts from rest and accelerates at 5 m/s². At t = 4 s, a ball is dropped out of a window by a person sitting in the car. What is the velocity and acceleration of the ball at t = 6 s? (Take g = 10 m/s²)

[4 Marks]

(A) 20√2 m/s, 0

(B) 20 m/s, 5 m/s²

(C) 20 m/s, 0

(D) 20√2 m/s, 10 m/s²

Question 44.

A step down transformer connected to an ac mains supply of 220 V is made to operate at 11 V, 44 W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit?

[4 Marks]

(A) 4 A

(B) 0.4 A

(C) 2 A

(D) 0.2 A

Question 45.

A ball of mass 0.15 kg is dropped from a height 10 m, strikes the ground and rebounds to the same height. The magnitude of impulse imparted to the ball is (g = 10 m/s²) nearly

[4 Marks]

(A) 4.2 kg m/s

(B) 2.1 kg m/s

(C) 0 kg m/s

(D) 1.4 kg m/s

Question 46.

A series LCR circuit containing 5.0 H inductor, 80μ F capacitor and 40 Ω resistor is connected to 230V variable frequency ac source. The angular frequencies of the source at which power transferred to the circuit is half the power at the resonant angular frequency are likely to be

[4 Marks]

(A) 46 rad/s and 54 rad/s

(B) 50rad/s and 25 rad/s

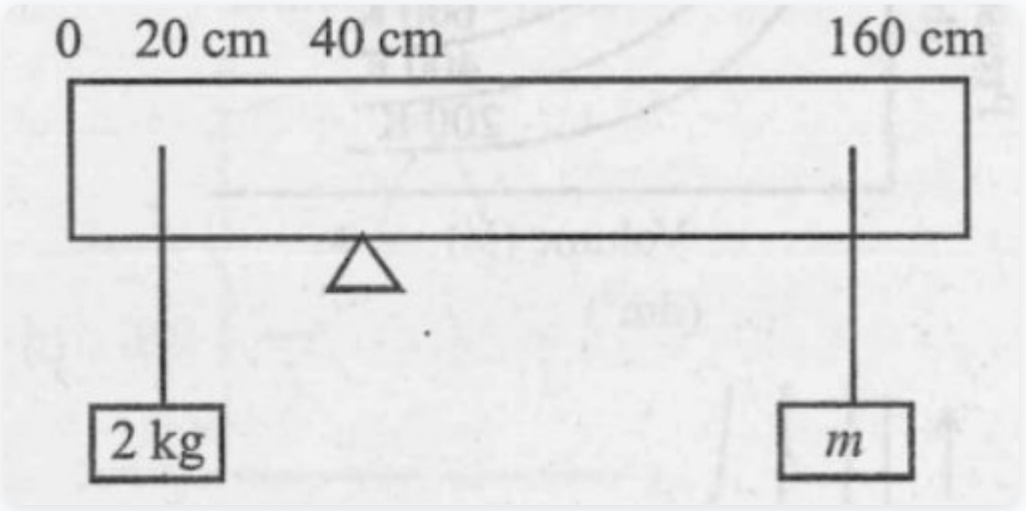
(C) 42rad/s and 58 rad/s

(D) .25 rad/s and 75 rad/s

Question 47.

A uniform rod of length 200 cm and mass 500 g is balanced on a wedge placed at 40 cm mark. A mass of 2 kg is suspended from the rod at 20 cm and another unknown mass 'm' is suspended from the rod at 160 cm mark as shown in the figure. Find the value of 'm' such that the rod is in equilibrium. ($g = 10\ m/s^2$)

[4 Marks]



(A) 1 / 6 kg

(B) 1 / 12 kg

(C) 1 / 3 kg

(D) 1 / 2 kg

Question 48. A particle moving in a circle of radius R with a uniform speed takes a time T to complete one revolution. If this particle were projected with the same speed at an angle 'θ' to the horizontal, the maximum height attained by it equals 4R. The angle of projection, θ, is then given by :

[4 Marks]

(A) $\theta = \cos^{-1} [(gT^2) / (\pi^2 R)]^{1/2}$

(B) $\theta = \sin^{-1} [(2gT^2) / (\pi^2 R)]^{1/2}$

(C) $\theta = \cos^{-1} [(\pi^2 R) / (gT^2)]^{1/2}$

(D) $\theta = \sin^{-1} [(\pi^2 R) / (gT^2)]^{1/2}$

Question 49.

A uniform conducting wire of length 12a and resistance 'R' is wound up as a current carrying coil in the shape of, (i) an equilateral triangle of side 'a'. (ii) a square of side 'a'. The magnetic dipole moments of the coil in each case respectively are

[4 Marks]

(A) $4\ Ia^2$ and $3\ Ia^2$

(B) $\sqrt{3}\ Ia^2$ and $3\ Ia^2$

(C) $3\ Ia^2$ and Ia^2

(D) $3\ Ia^2$ and $4\ Ia^2$

Question 50.

Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are :

[4 Marks]

(A) 2, 1

(B) 6, 12

(C) 8, 4

(D) 12, 6

Question 51. Zr (Z = 40) and Hf (Z = 72) have similar atomic and ionic radii because of :

[4 Marks]

(A) Having similar chemical properties

(B) Belonging to same group

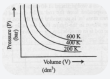
(C) Lanthanoid contraction

(D) Diagonal relationship

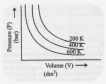
Question 52. Choose the correct option for graphical representation of Boyle's law, which shows a graph of pressure vs. volume of a gas at different temperatures :

[4 Marks]

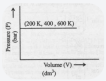
(A)



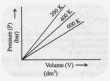
(B)



(C)



(D)



Question 53. The right option for the statement "Tyndall effect is exhibited by", is :

[4 Marks]

(A) Urea solution

(B) NaCl solution

(C) Glucose solution

(D) Starch solution

Question 54.

Which one among the following is the correct option for right relationship between $\mathbf{C}_p$ and $\mathbf{C}_v$ for one mole of ideal gas?

[4 Marks]

(A) $\mathbf{C}_p + \mathbf{C}_v = \mathbf{R}$

(B) $\mathbf{C}_v = \mathbf{R}\mathbf{C}_p$

(C) $\mathbf{C}_p = \mathbf{R}\mathbf{C}_v$

(D) $\mathbf{C}_p - \mathbf{C}_v = \mathbf{R}$

Question 55.

The structures of beryllium chloride in solid state and vapour phase, are :

[4 Marks]

(A) Dimer and Linear, respectively

(B) Chain and dimer, respectively

(C) Chain in both

(D) Linear in both

Question 56. Tritium, a radioactive isotope of hydrogen, emits which of the following particles?

[4 Marks]

(A) Beta (β^-)

(B) Neutron (n)

(C) Alpha (α)

(D) Gamma (γ)

Question 57.

The major product formed in dehydrohalogenation reaction of 2-Bromo pentane is Pent-2-ene. This product formation is based on?

[4 Marks]

(A) Huckel's Rule

(B) Saytzeff's Rule

(C) Hofmann Rule

(D) Hund's Rule

Question 58.

BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are :

[4 Marks]

(A) sp^2 and 6

(B) sp^3 and 6

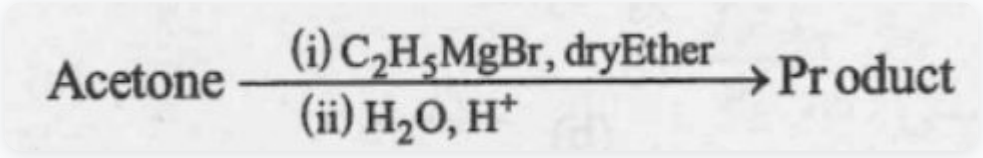
(C) sp^3 and 4

(D) sp^2 and 8

Question 59.

'What is the IUPAC name of the organic compound formed in the following chemical reaction?

[4 Marks]



(A) 2-methylbutan-2-ol

(B) 2-methylpropan-2-ol

(C) pentan-3-ol

(D) pentan-2-ol

Question 60.

The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91.0 S cm^2 mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution is. Choose the right option for your answer.

[4 Marks]

(A) 201.28 S cm^2 mol^{-1}

(B) 540.48 S cm^2 mol^{-1}

(C) 390.71 S cm^2 mol^{-1}

(D) 698.28 S cm^2 mol^{-1}

Question 61.

The incorrect statement among the following is:

[4 Marks]

(A) Lanthanoids are good conductors of heat and electricity

(B) Actinoid contraction is greater for element to element than lanthanoid contraction

(C) Most of the trivalent Lanthanoid ions are colorless in the solid state

(D) Actinoids are highly reactive metals, especially when finely divided.

Question 62.

Statement I : Acid strength increases in the order given as HF << HCl << HBr << HI.

Statement II : As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases. In the light of the above statements, choose the correct answer from the options given below.

[4 Marks]

(A) Statement I is correct but statement II is false

(B) Both Statement I and Statement II are false

(C) Both statement I and Statement II are true

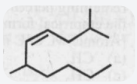
(D) Statement I is incorrect but Statement II is true

Question 63.

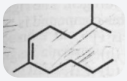
The correct structure of 2, 6-Dimethyl-dec-4-ene is

[4 Marks]

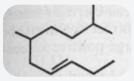
(A)



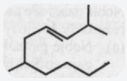
(B)



(C)



(D)



Question 64.

The correct sequence of bond enthalpy of 'C—X' bond is :

[4 Marks]

(A) $CH_3 – F < CH_3–Cl > CH_3 –Br > CH_3–I$

(B) $CH_3–F < CH_3–Cl < CH_3–Br < CH_3–I$

(C) $CH_3–F > CH_3–Cl > CH_3–Br > CH_3–I$

(D) $CH_3–Cl > CH_3–F > CH_3 –Br > CH_3–I$

Question 65.

A particular station of All India Radio, New Delhi broadcasts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is : [speed of light $c = 3.0 \times 10^8\ ms^{-1}$]

[4 Marks]

(A) 219.3 m

(B) 2192 m

(C) 219.2 m

(D) 21.92 cm

Question 66.

The p K Subscript (b) of dimethylamine and p K_a of acetic acid are 3.27 and 4.77 respectively at T (K). The correct option for the pH of dimethylammonium acetate solution is :

[4 Marks]

(A) 6.25

(B) 5.50

(C) 7.75

(D) 8.50

Question 67.

The following solutions were prepared by dissolving 10 g of glucose ($C_6H_{12}O_6$) in 250 mL of water (P_1), 10 g of urea (CH_4N_2O) in 250 mL of water (P_2) and 10 g of sucrose ($C_{12}H_{22}O_{11}$) in 250 mL of

water (P_3). The right option for the decreasing order of osmotic pressure of these solutions is :

[4 Marks]

(A) $P_3 > P_1 > P_2$

(B) $P_2 > P_1 > P_3$

(C) $P_1 > P_2 > P_3$

(D) $P_2 > P_3 > P_1$

Question 68. The correct option for the number of body centred unit cells in all 14 types of Bravais lattice unit cells is :

[4 Marks]

(A) 3

(B) 7

(C) 2

(D) 5

Question 69. The maximum temperature that can be achieved in blast furnace is :

[4 Marks]

(A) Upto 5000 K

(B) Upto 1200 K

(C) Upto 1900 K

(D) Upto 2200 K

Question 70.

For a reaction A → B, enthalpy of reaction is −4.2 kJ mol^{-1} and enthalpy of activation is 9.6 kJ mol^{-1}. The correct potential energy profile for the reaction is shown in option.

[4 Marks]

(A)



(B)



(C)



(D)



Question 71.

The compound which shows metamerism is :

[4 Marks]

(A) C_5H_{12}

(B) C_3H_8O

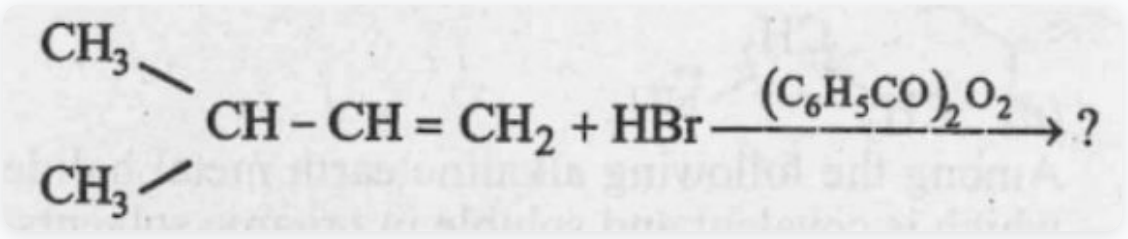
(C) $C_4H_{10}O$

(D) C_3H_6O

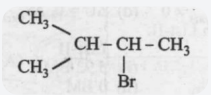
Question 72.

The major product of the following chemical reaction is:

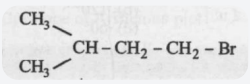
[4 Marks]



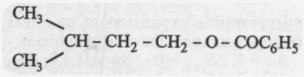
(A)



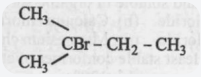
(B)



(C)



(D)



Question 73.

Which of the following reactions is the metal displacement reaction? Choose the right option.

[4 Marks]

(A)

$$2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$$

(B)

$$2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2\uparrow$$

(C)

$$Fe + 2HCl \rightarrow FeCl_2 + H_2\uparrow$$

(D)

$$Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$$

Question 74. Given below are two statements : Statement I : Aspirin and Paracetamol belong to the class of narcotic analgesics. Statement II : Morphine and Heroin are non-narcotic analgesics. In the light of the above statements, choose the correct answer from the options given below.

[4 Marks]

(A) Statement I is incorrect but Statement II is true.

(B) Both Statement I and Statement II are true

(C) Both Statement I and Statement II are false

(D) Statement I is correct but statement II is false

Question 75.

Ethylene diaminetetraacetate (EDTA) ion is :

[4 Marks]

(A) Bidentate ligand with two "N" donor atoms

(B) Unidentate ligand

(C) Tridentate ligand with three "N" donor atoms

(D) Hexadentate ligand with four "O" and two "N" donor atoms

Question 76. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature?

[4 Marks]

(A) Zone refining

(B) Electrolysis

(C) Distillation

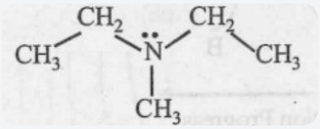
(D) Chromatography

Question 77.

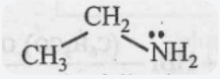
Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali.

[4 Marks]

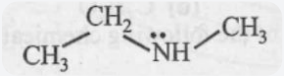
(A)



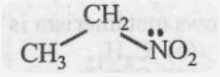
(B)



(C)



(D)



Question 78. Among the following alkaline earth metal halides, one which is covalent and soluble in organic solvents is :

[4 Marks]

(A) Beryllium chloride

(B) Calcium chloride

(C) Strontium chloride

(D) Magnesium chloride

Question 79.

Dihedral angle of least stable conformer of ethane is :

[4 Marks]

(A) 180°

(B) 0°

(C) 120°

(D) 60°

Question 80. Given below are two statements : Statement I: Aspirin and Paracetamol belong to the class ofnarcotic analgesics. Statement II : Morphine and Heroin are non-narcotic analgesics. In the light of the above statements, choose the correct answer from the options given below.

[4 Marks]

(A) Statement I is incorrect but Statement II is true.

(B) Both Statement I and Statement II are true

(C) Statement I is correct but Statement II is false

(D) Both Statement I and Statement II are false

Question 81.

An organic compound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is : [Atomic wt. of C is 12, H is 1]

[4 Marks]

(A) CH_3

(B) CH

(C) CH_2

(D) CH_4

Question 82.

Noble gases are named because of their inertness towards reactivity. Identify an incorrect statement about them.

[4 Marks]

(A) Noble gases have weak dispersion forces

(B) Noble gases have very high melting and boiling points

(C) Noble gases have large positive values of electron gain enthalpy

(D) Noble gases are sparingly soluble in water

Question 83.

Which one of the following polymers is prepared by addition polymerisation?

[4 Marks]

(A) Novolac

(B) Dacron

(C) Nylon-66

(D) Teflon

Question 84.

Match List-I with List-II. Choose the correct answer from the options given below.

[4 Marks]

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

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

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

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

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

Question 85.

For irreversible expansion of an ideal gas under isothermal condition, the correct option is:

[4 Marks]

(A) $\Delta U \neq 0, \Delta S_{total} \neq 0$

(B) $\Delta U = 0, \Delta S_{total} \neq 0$

(C) $\Delta U = 0, \Delta S_{total} = 0$

(D) $\Delta U \neq 0, \Delta S_{total} = 0$

Question 86.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List-I	List-II
(A) $[Fe(CN)_6]^{3-}$	(i) 5.92 BM
(B) $[Fe(H_2O)_6]^{3+}$	(ii) 0 BM
(C) $[Fe(CN)_6]^{4-}$	(iii) 4.90 BM
(D) $[Fe(H_2O)_6]^{2+}$	(iv) 1.73 BM

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

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

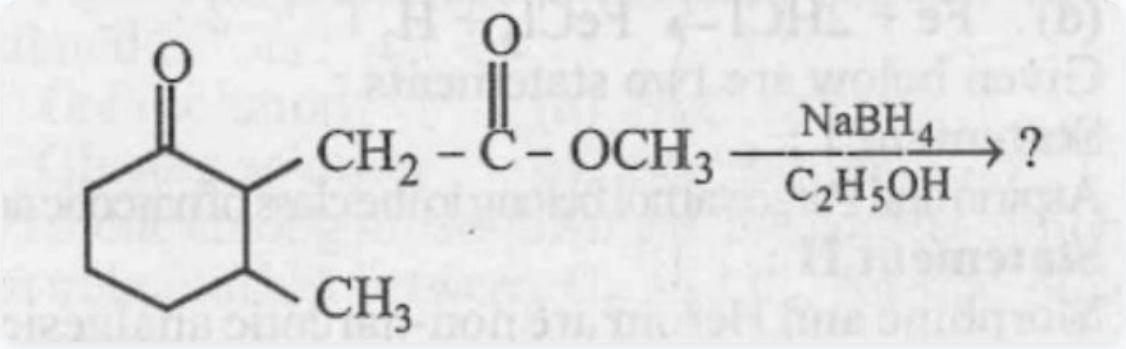
(C) A-(ii), B-(iv), C-(iii), D-(i)

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

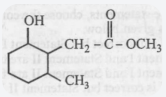
Question 87.

The product formed in the following chemical reaction is:

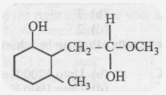
[4 Marks]



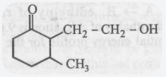
(A)



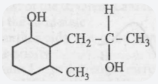
(B)



(C)



(D)



Question 88.

In which one of the following arrangements the give sequence is not strictly according to the properties indicated against it?

[4 Marks]

(A) $NH_3 < PH_3 < AsH_3 < SbH_3$: Increasing acidic character

(B) HF < HCl < HBr < HI : Increasing acidic strength

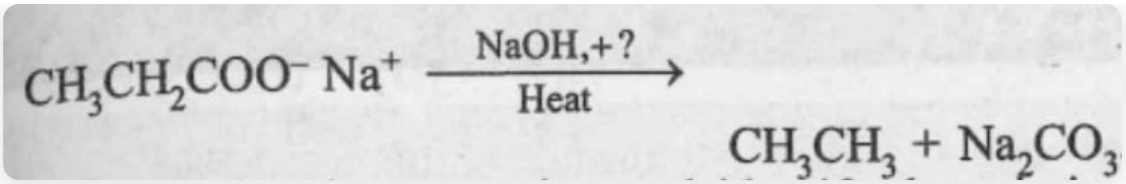
(C) $H_2O < H_2S < H_2Se < H_2Te$: Increasing pK_a values

(D) $CO_2 < SiO_2 < SnO_2 < PbO_2$: Increasing oxidizing power

Question 89.

Consider the above reaction and identify the missing reagent/chemical.

[4 Marks]



(A) B_2H_6

(B) Red Phosphorus

(C) CaO

(D) DIBAL-H

Question 90.

Which of the following molecules is non-polar in nature?

[4 Marks]

(A) NO_2

(B) $POCl_3$

(C) CH_2O

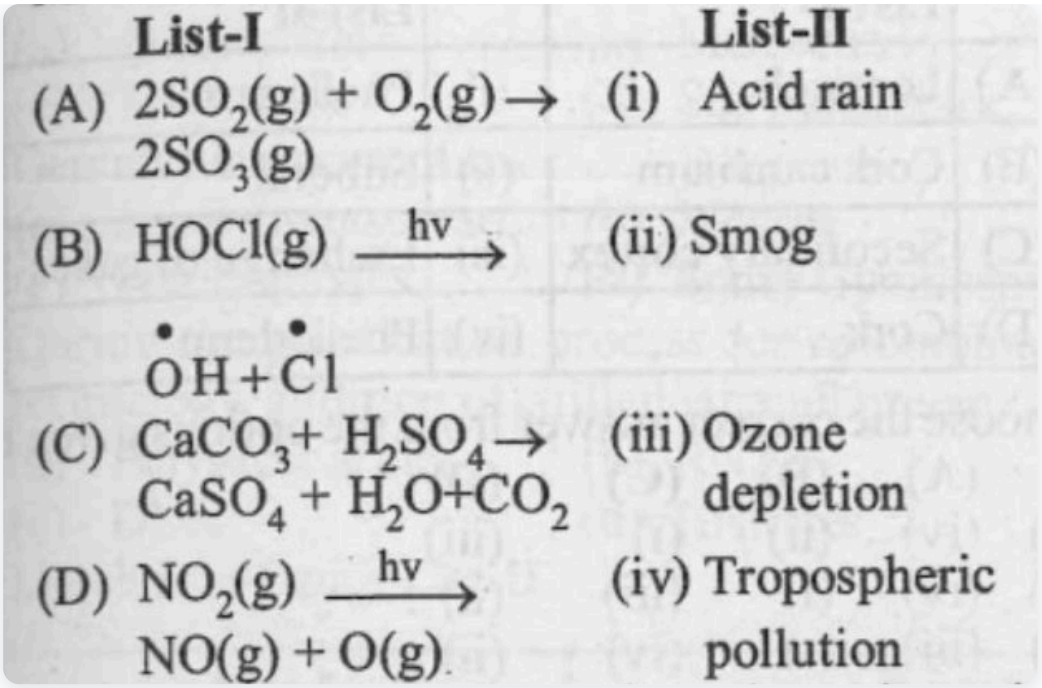
(D) $SbCl_5$

Question 91.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]



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

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

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

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

Question 92. The molar conductivity of 0.007 M acetic acid is 20 S cm^2 mol^{-1}. What is the dissociation constant of acetic acid? Choose the correct option. [$\Lambda°H^+$ = 350 S cm^2 mol^{-1} $\Lambda°CH_3COO^-$ = 50 S cm^2 mol^{-1}]

[4 Marks]

(A) 2.50×10^{-5} mol L^{-1}

(B) 1.75×10^{-4} mol L^{-1}

(C) 2.50×10^{-4} mol L^{-1}

(D) 1.75×10^{-5} mol L^{-1}

Question 93.

Choose the correct option for the total pressure (in atm.) in a mixture of 4 g O_2 and 2 g H_2 confined in a total volume of one litre at 0°C is: [Given R = 0.082 L atm mol^{-1} K^{-1}, T = 273 K]

[4 Marks]

(A) 2.602

(B) 25.18

(C) 2.518

(D) 26.02

Question 94.

The correct option for the value of vapour pressure of a solution at 45°C with benzene to octane in molar ratio 3 : 2 is: [At 45°C vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

[4 Marks]

(A) 168 mm of Hg

(B) 336 mm of Hg

(C) 350 mm of Hg

(D) 160 mm of Hg

Question 95.

From the following pairs of ions which one is not an iso-electronic pair?

[4 Marks]

(A) Fe^{2+}, Mn^{2+}

(B) Na^{+}, Mg^{2+}

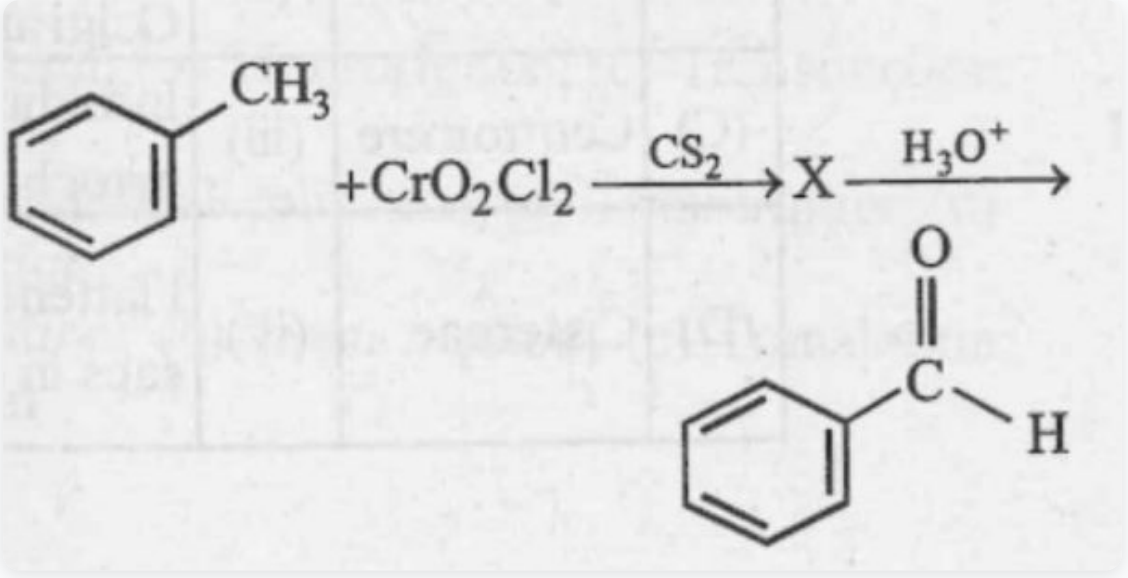
(C) Mn^{2+}, Fe^{3+}

(D) O^{2-}, F^{-}

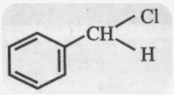
Question 96.

The intermediate compound 'X' in the following chemical reaction is:

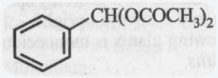
[4 Marks]



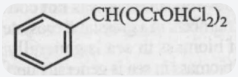
(A)



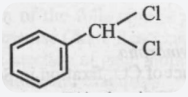
(B)



(C)



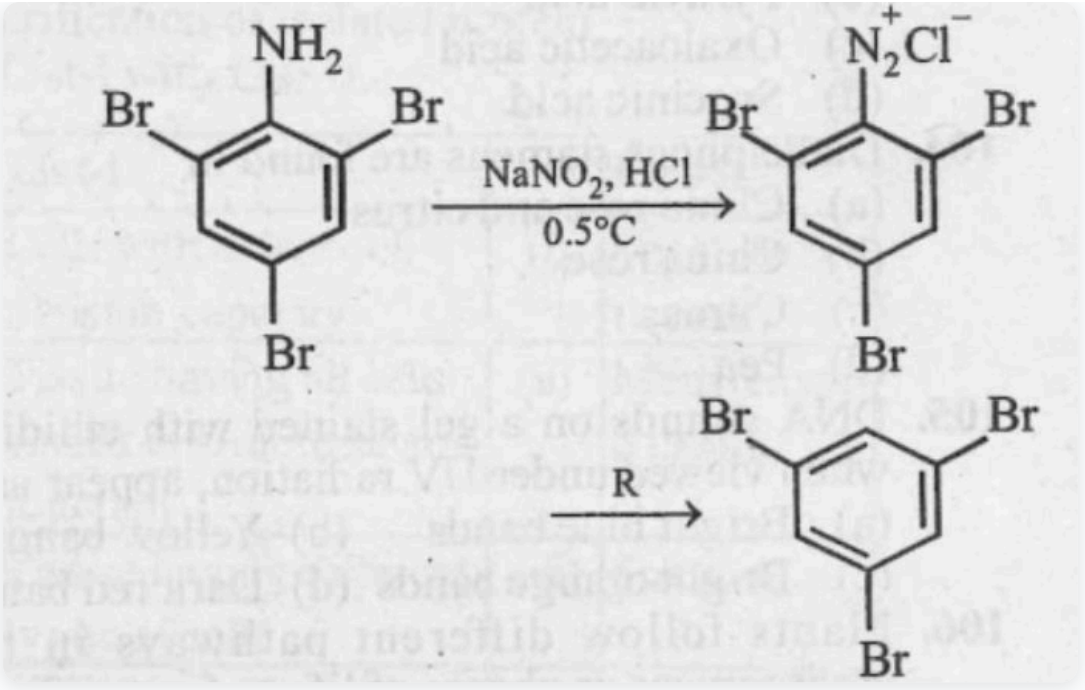
(D)



Question 97.

The reagent 'R! in the given sequence of chemical reaction is:

[4 Marks]



(A) HI

(B) CH_3CH_2OH

(C) CuCN/KCN

(D) H_2O

Question 98.

The slope of Arrhenius plot (ln k v/s 1/T) of first order reaction is -5×10^3 K. The value of E_a of the reaction is. Choose the correct option for your answer. [Given R = 8.314 J K^{-1} mol^{-1}]

[4 Marks]

(A) 166 kJ mol^{-1}

(B) 83.0 kJ mol^{-1}

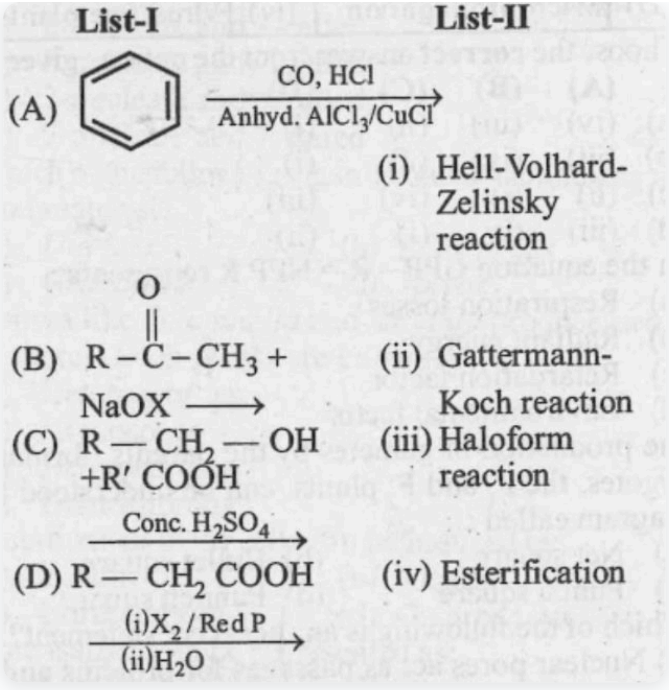
(C) 41.5 kJ mol^{-1}

(D) −83 kJ mol^{-1}

Question 99.

Match List-I with List-II Choose the correct answer from the options given below.

[4 Marks]



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

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

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

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

Question 100.

Which of the following statements is not correct?

[4 Marks]

(A) Pyramid of biomass in sea is generally upright.

(B) Pyramid of energy is always upright.

(C) Pyramid of numbers ina grassland ecosystem is upright.

(D) Pyramid of biomass in sea is generally inverted.

Question 101.

Which of the following plants is monoecious?

[4 Marks]

(A) Chara

(B) Marchantia polymorpha

(C) Cycas circinalis

(D) Carica papaya

Question 102.

The first stable product of CO_2 fixation in Sorghum is

[4 Marks]

(A) Succinic acid

(B) Pyruvic acid

(C) Oxaloacetic acid

(D) Phosphoglyceric acid

Question 103.

Diadelphous stamens are found in

[4 Marks]

(A) Citrus

(B) China rose

(C) Pea

(D) China rose and citrus

Question 104.

DNA strands on a gel stained with ethidium bromide when viewed under UV radiation, appear as

[4 Marks]

(A) Dark red bands

(B) Bright orange bands

(C) Yellow bands

(D) Bright blue bands

Question 105.

Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called

[4 Marks]

(A) Plasticity

(B) Flexibility

(C) Elasticity

(D) Maturity

Question 106. Match List-I with List-II Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Protoplast fusion	(i)	Totipotency
(B)	Plant tissue culture	(ii)	Pomato
(C)	Meristem culture	(iii)	Somaclones
(D)	Micropropagation	(iv)	Virus free plants

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

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

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

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

Question 107.

In the equation GPP − R = NPP, R represents:

[4 Marks]

(A) Environmental factor

(B) Radiant energy

(C) Respiration losses

(D) Retardation factor

Question 108.

The production of gametes by the parents, formation of zygotes, the F_1 and F_2 plants, can be understood from a diagram called:

[4 Marks]

(A) Net square

(B) Bullet square

(C) Punnett square

(D) Punch square

Question 109.

Which of the following is an incorrect statement?

[4 Marks]

(A) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm

(B) Microbodies are present both in plant and animal cells

(C) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles

(D) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm

Question 110. Match List-I with List-II. Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Lenticels	(i)	Phellogen
(B)	Cork cambium	(ii)	Suberin
(C)	Secondary cortex	(iii)	Exchange of gases
(D)	Cork	(iv)	Phelloderm

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

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

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

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

Question 111.

The amount of nutrients, such as carbon, nitrogen, phosphorus and calcium present in the soil at any given time, is referred as:

[4 Marks]

(A) Standing state

(B) Climax community

(C) Climax

(D) Standing crop

Question 112.

The term used for transfer of pollen grains from anthers of one plant to stigma of a different plant which, during pollination, brings genetically different types of pollen grains to stigma, is :

[4 Marks]

(A) Chasmogamy

(B) Geitonogamy

(C) Cleistogamy

(D) Xenogamy

Question 113.

Which of the following stages of meiosis involves division of centromere?

[4 Marks]

(A) Anaphase II

(B) Metaphase II

(C) Telophase II

(D) Metaphase I

Question 114.

Which of the following is a correct sequence of steps in a PCR (Polymerase Chain Reaction)?

[4 Marks]

(A) Denaturation, Extension, Annealing

(B) Extension, Denaturation, Annealing

(C) Denaturation, Annealing, Extension

(D) Annealing, Denaturation, Extension

Question 115.

When gene targeting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as:

[4 Marks]

(A) Gene therapy

(B) Molecular diagnosis

(C) Biopiracy

(D) Safety testing

Question 116.

Match List-I with List-II. Choosethe correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Cristae	(i)	Primary constriction in chromosome
(B)	Thylakoids	(ii)	Disc-shaped sacs in Golgi apparatus
(C)	Centromere	(iii)	Infoldings in mitochondria
(D)	Cisternae	(iv)	Flattened membranous sacs in stroma of plastids

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

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

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

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

Question 117.

The factor that leads to Founder effect in a population is :

[4 Marks]

(A) Mutation

(B) Genetic recombination

(C) Natural selection

(D) Genetic drift

Question 118.

When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as :

[4 Marks]

(A) Sub-metacentric

(B) Telocentric

(C) Metacentric

(D) Acrocentric

Question 119.

Gemmae are present in

[4 Marks]

(A) Some Gymnosperms

(B) Mosses

(C) Some Liverworts

(D) Pteridophytes

Question 120.

During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out :

[4 Marks]

(A) Histones

(B) RNA

(C) Polysaccharides

(D) DNA

Question 121.

Match List-I with List-II. Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Cohesion	(i)	More attraction in liquid phase
(B)	Adhesion	(ii)	Mutual attraction among water molecules
(C)	Surface tension	(iii)	Water loss in liquid phase
(D)	Guttation	(iv)	Attraction towards polar surfaces

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

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

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

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

Question 122.

The site of perception of light in plants during photoperiodism is

[4 Marks]

(A) Stem

(B) Axillary bud

(C) Shoot apex

(D) Leaf

Question 123.

The plant hormone used to destroy weeds in a field

[4 Marks]

(A) 2,4-D

(B) IBA

(C) NAA

(D) IAA

Question 124.

Which of the following algae produce Carrageen?

[4 Marks]

(A) Green algae

(B) Blue-green algae

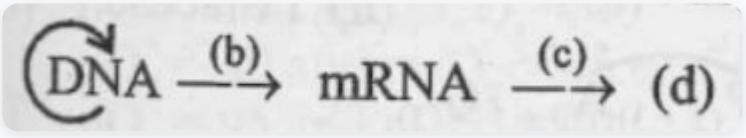
(C) Red algae

(D) Brown algae

Question 125.

Complete the flow chart on central dogma.

[4 Marks]



(A) (a)-Translation; (b)-Replication; (c)-Transcription; (d)-Transduction

(B) (a)-Replication; (b)-Transcription; (c)-Translation; (d)-Protein

(C) (a)-Replication; (b)-Transcription; (c)-Transduction; (d)-Protein

(D) (a)-Transduction; (b)-Translation; (c)-Replication; (d)-Protein

Question 126. Which of the following are not secondary metabolites in plants?

[4 Marks]

(A) Rubber, gums

(B) Morphine, codeine

(C) Vinblastin, curcumin

(D) Amino acids, glucose

Question 127.

Inspite of interspecific competition in nature, which mechanism the competing species might have evolved for their survival?

[4 Marks]

(A) Competitive release

(B) Resource partitioning

(C) Mutualism

(D) Predation

Question 128.

Which of the following is not an application of PCR (Polymerase Chain Reaction)?

[4 Marks]

(A) Purification of isolated protein

(B) Detection of gene mutation

(C) Gene amplification

(D) Molecular diagnosis

Question 129.

Match List-I with List-II. Select the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Cells with active cell division capacity	(i)	Vascular tissues
(B)	Tissue having all cells similar in structurer and function	(ii)	Meristematic tissue
(C)	Tissue having different types of cells	(iii)	Sclereids
(D)	Dead cells with highly thickened walls and narrow lumen	(iv)	Simple tissue

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

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

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

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

Question 130.

A typical angiosperm embryo sac at maturity is:

[4 Marks]

(A) 7-nucleate and 7-celled

(B) 8-nucleate and 7-celled

(C) 8-nucleate and 8-celled

(D) 7-nucleate and 8-celled

Question 131.

Which of the following algae contains mannitol as reserve food material?

[4 Marks]

(A) Ectocarpus

(B) Ulothrix

(C) Gracilaria

(D) Volvox

Question 132.

Genera like Selaginella and Salvinia produce two kinds of spores. Such plants are known as:

[4 Marks]

(A) Homosorus

(B) Heterosorus

(C) Heterosporous

(D) Homosporous

Question 133. Mutations in plant cells can be induced by:

[4 Marks]

(A) Zeatin

(B) Kinetin

(C) Gamma rays

(D) Infrared rays

Question 134.

Amensalism can be represented as:

[4 Marks]

(A) Species A (+); Species B (+)

(B) Species A (−); Species B (−)

(C) Species A (−); Species B (0)

(D) Species A (+); Species B (0)

Question 135.

What is the role of RNA polymerase III in the process of transcription in eukaryotes?

[4 Marks]

(A) Transcribes precursor of mRNA

(B) Transcribes tRNA, 5S rRNA and snRNA

(C) Transcribes rRNAs (28S, 18S and 5.8S)

(D) Transcribes only snRNAs

Question 136.

Select the correct pair.

[4 Marks]

(A) In dicot leaves, vascular bundles are surrounded by large thick-walled cells — Conjunctive tissue

(B) Loose parenchyma cells rupturing the epidermis and forming a lens shaped opening in bark — Spongy parenchyma

(C) Large colorless empty cells in the epidermis of grass leaves — Subsidiary cells

(D) Cells of medullary rays that form part of cambial ring — Interfascicular cambium

Question 137.

Plasmid pBR322 has PstI restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an E.coli strain

[4 Marks]

(A) It will lead to lysis of host cell

(B) The transformed cells will have the ability to resist ampicillin as well as produce β-galactoside

(C) It will be able to produce a novel protein with dual ability

(D) It will not be able to confer ampicillin resistance to the host cell

Question 138.

DNA fingerprinting involves identifying differences in some specific regions in DNA sequence, called as

[4 Marks]

(A) Repetitive DNA

(B) Single nucleotides

(C) Polymorphic DNA

(D) Satellite DNA

Question 139.

In the exponential growth equation $N_t = N_0e^{rt}$, e represents

[4 Marks]

(A) The base of natural logarithms

(B) The base of exponential logarithms

(C) The base of number logarithms

(D) The base of geometric logarithms

Question 140.

Which of the following statements is incorrect?

[4 Marks]

(A) Grana lamellae have both PS I and PS II

(B) Stroma lamellae have PS I only and lack NADP reductase

(C) Both ATP and NADPH + H^+ are synthesized during non-cyclic photophosphorylation

(D) Cyclic photophosphorylation involves both PS I and PS II

Question 141.

Which of the following statements is correct?

[4 Marks]

(A) Organisms that depend on living plants are called saprophytes

(B) Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells

(C) Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy

(D) Fusion of two cells is called Karyogamy

Question 142. Match Column-I with Column-II Choose the correct answer from options given below.

[4 Marks]

	Column-I		Column-II
(A)	*Nitrococcus*	(i)	Denitrification
(B)	*Rhizobium*	(ii)	Conversion of ammonia to nitrite
(C)	*Thiobacillus*	(iii)	Conversion of nitrite to nitrate
(D)	*Nitrobacter*	(iv)	Conversion of atmospheric nitrogen to ammonia

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

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

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

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

Question 143.

Which of the following statements is incorrect?

[4 Marks]

(A) During aerobic respiration, role of oxygen is limited to the terminal stage

(B) Oxidation-reduction reactions produce proton gradient in respiration

(C) In ETC (Electron Transport Chain), one molecule of NADH + H^+ gives rise to 2 ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules

(D) ATP is synthesized through complex V

Question 144.

In some members of which of the following pairs of families, pollen grains retain their viability for months after release?

[4 Marks]

(A) Poaceae; Leguminosae

(B) Rosaceae; Leguminosae

(C) Poaceae; Rosaceae

(D) Poaceae; Solanaceae

Question 145.

Identify the correct statement.

[4 Marks]

(A) Split gene arrangement is characteristic of prokaryotes

(B) In capping, methyl guanosine triphosphate is added to the 3' end of hnRNA

(C) RNA polymerase binds with Rho factor to terminate the process of transcription in bacteria

(D) The coding strand in a transcription unit is copied to an mRNA

Question 146.

Match Column-I with Column-II

Select the correct answer from the options given below.

[4 Marks]

Column-I	Column-II
(A) $\%\male\female K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$	(i) Brassicaceae
(B) $\oplus\male\female K_{(5)} \overbrace{C_{(5)} A_5}\underline{G}_{(2)}$	(ii) Liliaceae
(C) $\oplus\male\female \overbrace{P_{(3+3)} A_{3+3}}\underline{G}_{(3)}$	(iii) Fabaceae
(D) $\oplus\male\female K_{2+2} C_4 A_{2-4} \underline{G}_{(2)}$	(iv) Solanaceae

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

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

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

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

Question 147.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List-I		List-II
(A) Protein	(i)	C = C double bonds
(B) Unsaturated fatty acid	(ii)	Phosphodiester bonds
(C) Nucleic acid	(iii)	Glycosidic bonds
(D) Polysaccharide	(iv)	Peptide bonds

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

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

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

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

Question 148.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List-I		List-II
(A) S phase	(i)	Proteins are synthesized
(B) G_2 phase	(ii)	Inactive phase
(C) Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication

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

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

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

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

Question 149.

Now a days it is possible to detect the mutated gene causing cancer by allowing radioactive probe to hybridise its complimentary DNA in a clone of cells, followed by its detection using autoradiography because :

[4 Marks]

(A) mutated gene does not appear on a photographic film as the probe has no complementarity with it

(B) mutated gene completely and clearly appears on a photographic film

(C) mutated gene partially appears on a photographic film

(D) mutated gene does not appear on photographic film as the probe has complementarity with it

Question 150.

Erythropoietin hormone which stimulates R.B.C. formation is produced by:

[4 Marks]

(A) Alpha cells of pancreas

(B) The cells of bone marrow

(C) The cells of rostral adenohypophysis

(D) Juxtaglomerular cells of the kidney

Question 151.

Which of the following characteristics is incorrect with respect to cockroach?

[4 Marks]

(A) In females, 7th–9th sterna together form a genital pouch

(B) Hypopharynx lies within the cavity enclosed by the mouth parts

(C) A ring of gastric caeca is present at the junction of midgut and hind gut

(D) 10th abdominal segment in both sexes, bears a pair of anal cerci

Question 152.

Succus entericus is referred to as:

[4 Marks]

(A) Chyme

(B) Intestinal juice

(C) Pancreatic juice

(D) Gastric juice

Question 153.

Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?

[4 Marks]

(A) Pachytene

(B) Leptotene

(C) Zygotene

(D) Diakinesis

Question 154.

The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are:

[4 Marks]

(A) $pO_2 = 95$ and $pCO_2 = 40$

(B) $pO_2 = 40$ and $pCO_2 = 45$

(C) $pO_2 = 159$ and $pCO_2 = 0.3$

(D) $pO_2 = 104$ and $pCO_2 = 40$

Question 155.

Match the following:

[4 Marks]

	List-I		List-II
(A)	*Physalia*	(i)	Pearl oyster
(B)	*Limulus*	(ii)	Portuguese Man of War
(C)	*Ancylostoma*	(iii)	Living fossil
(D)	*Pinctada*	(iv)	Hookworm

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

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

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

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

Question 156.

During the process of gene amplification using PCR, if very high temperature is not maintained in the beginning, then which of the following steps of PCR will be affected first?

[4 Marks]

(A) Extension

(B) Denaturation

(C) Annealing

(D) Ligation

Question 157.

Match the following:

Choose the correct answer from the options given below

[4 Marks]

List-I	List-II
(A) *Aspergillus niger*	(i) Acetic Acid
(B) *Acetobacter aceti*	(ii) Lactic Acid
(C) *Clostridium butylicum*	(iii) Citric Acid
(D) *Lactobacillus*	(iv) Butyric Acid

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

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

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

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

Question 158.

Which of the following statements wrongly represents the nature of smooth muscle?

[4 Marks]

(A) These muscles are present in the wall of blood vessels

(B) Communication among the cells is performed by intercalated discs

(C) These muscle have no striations

(D) They are involuntary muscles

Question 159.

Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as:

[4 Marks]

(A) Muscular dystrophy

(B) Arthritis

(C) Myasthenia gravis

(D) Gout

Question 160.

Persons with 'AB' blood group are called as "Universal recipients". This is due to :

[4 Marks]

(A) Presence of antibodies, anti-A and anti-B, on RBCs

(B) Absence of antigens A and B on the surface of RBCs

(C) Absence of antigens A and B in plasma

(D) Absence of antibodies, anti-A and anti-B, in plasma

Question 161.

The fruit fly has 8 chromosomes (2n) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase?

[4 Marks]

(A) 32

(B) 8

(C) 4

(D) 16

Question 162.

Receptors for sperm binding in mammals are present on :

[4 Marks]

(A) Perivitelline space

(B) Vitelline membrane

(C) Corona radiata

(D) Zona pellucida

Question 163.

Which one of the following belongs to the family Muscidae?

[4 Marks]

(A) Cockroach

(B) Grasshopper

(C) Fire fly

(D) House fly

Question 164.

Identify the incorrect pair

[4 Marks]

(A) Drugs – Ricin

(B) Alkaloids – Codeine

(C) Toxin – Abrin

(D) Lectins – Concanavalin A

Question 165.

Venereal 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 option given below

[4 Marks]

(A) (B) and (C) only

(B) (A) and (C) only

(C) (B), (C) and (D) only

(D) (A), (B) and (C) only

Question 166.

The organelles that are included in the endomembrane system are

[4 Marks]

(A) Golgi complex, Mitochondria, Ribosomes and Lysosomes

(B) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles

(C) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes

(D) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes

Question 167.

For effective treatment of the disease, early diagnosis and understanding its pathophysiology is very important. Which of the following molecular diagnostic techniques is very useful for early detection?

[4 Marks]

(A) Southern Blotting Technique

(B) ELISA Technique

(C) Western Blotting Technique

(D) Hybridization Technique

Question 168.

With regard to insulin choose correct options.
(A) C-peptide is not present in mature insulin.

(B) The insulin produced by rDNA technology has C- peptide.
(C) The pro-insulin has C-peptide.
(D) A-peptide and B-peptide of insulin are interconnected by disulphide bridges.

Choose the correct answer from the options given below

[4 Marks]

(A) (A), (C) and (D) only

(B) (A) and (D) only

(C) (B) and (C) only

(D) (B) and (D) only

Question 169.

A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is:

[4 Marks]

(A) Palindromic Nucleotide sequences

(B) Okazaki sequences

(C) Degenerate primer sequence

(D) Poly(A) tail sequences

Question 170.

Which is the "Only enzyme" that has "Capability" to catalyse Initiation, Elongation and Termination in the process of transcription in prokaryotes?

[4 Marks]

(A) DNA Ligase

(B) DNA dependent RNA polymerase

(C) DNA dependent DNA polymerase

(D) DNase

Question 171.

Which one of the following organisms bears hollow and pneumatic long bones?

[4 Marks]

(A) Ornithorhynchus

(B) Neophron

(C) Hemidactylus

(D) Macropus

Question 172.

Read the following statements
(A) Metagenesis is observed in Helminths.
(B) Echinoderms are triploblastic and coelomate animals.
(C) Round worms have organ-system level of body organization.
(D) Comb plates present in ctenophores help in digestion.
(E) Water vascular system is characteristic of Echinoderms.

Choose the correct answer from the options given below.

[4 Marks]

(A) (B), (C) and (E) are correct

(B) (C), (D) and (E) are correct

(C) (A), (B) and (C) are correct

(D) (A), (D) and (E) are correct

Question 173.

Match List-I with List-IL.

Choose the correct answer from the option given below

[4 Marks]

	List-I		List-II
(A)	Vaults	(i)	Entry of sperm through Cervix is blocked
(B)	IUDs	(ii)	Removal of Vas deferens
(C)	Vasectomy	(iii)	Phagocytosis of sperms within the Uterus
(D)	Tubectomy	(iv)	Removal of fallopian tube

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

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

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

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

Question 174.

Sphincter of oddi is present at:

[4 Marks]

(A) Junction of jejunum and duodenum

(B) Ileo-caecal junction

(C) Junction of hepato-pancreatic duct and duodenum

(D) Gastro-oesophageal junction

Question 175.

If Adenine makes 30% of the DNA molecule, what will be the percentage of Thymine, Guanine and Cytosine in it?

[4 Marks]

(A) T : 20 ; G : 20 ; C : 30

(B) T : 30 ; G : 20 ; C : 20

(C) T : 20 ; G : 30 ; C : 20

(D) T : 20 ; G : 25 ; C : 25

Question 176.

Match List - I with List - II

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Metamerism	(i)	Coelenterata
(B)	Canal system	(ii)	Ctenophora
(C)	Comb plates	(iii)	Annelida
(D)	Cnidoblasts	(iv)	Porifera

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

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

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

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

Question 177.

Which enzyme is responsible for the conversion of inactive fibrinogen to fibrins?

[4 Marks]

(A) Epinephrine

(B) Thrombin

(C) Renin

(D) Thrombokinase

Question 178.

Which of the following is not an objective of Biofortification in crops?

[4 Marks]

(A) Improve micronutrient and mineral content

(B) Improve protein content

(C) Improve resistance to diseases

(D) Improve vitamin content

Question 179.

Dobson units are used to measure thickness of:

[4 Marks]

(A) Troposphere

(B) CFCs

(C) Ozone

(D) Stratosphere

Question 180.

Which of the following statements is incorrect?

[4 Marks]

(A) In the Electron Transport Chain (ETC), one molecule of NADH + H^+ gives rise to 2 ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules.

(B) During aerobic respiration, the role of oxygen is limited to the terminal stage.

(C) Oxidation-reduction reactions produce a proton gradient in respiration.

(D) ATP is synthesized through Complex V.

Question 181.

Which one of the following is an example of Hormone releasing IUD?

[4 Marks]

(A) Cu 7

(B) Multiload 375

(C) CuT

(D) LNG 20

Question 182.

The centriole undergoes duplication during:

[4 Marks]

(A) Metaphase

(B) Prophase

(C) S-phase

(D) G_2 phase

Question 183.

Which of the following RNAs is not required for the synthesis of protein?

[4 Marks]

(A) mRNA

(B) siRNA

(C) rRNA

(D) tRNA

Question 184.

In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased?

[4 Marks]

(A) 25%

(B) 100%

(C) 75%

(D) 50%

Question 185.

Select the favourable conditions required for theformation of oxyhaemoglobin at the alveoli.

[4 Marks]

(A) High pO_2, high pCO_2, less H^+, higher temperature

(B) Low pO_2, low pCO_2, more H^+, higher temperature

(C) Low pO_2, high pCO_2, more H^+, higher temperature

(D) High pO_2, low pCO_2, less H^+, lower temperature

Question 186.

Match List-I with List - II

Choose the correct answer from the options given below.

[4 Marks]

	List - I		List - II
(A)	Allen's Rule	(i)	Kangaroo rat
(B)	Physiological adaptation	(ii)	Desert lizard
(C)	Behavioural adaptation	(iii)	Marine fish at depth
(D)	Biochemical adaptation	(iv)	Polar seal

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

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

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

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

Question 187.

Match List-I with List - II

Choose the correct answer from the options given below.

[4 Marks]

	List - I		List - II
(A)	Adaptive radiation	(i)	Selection of resistant varieties due to excessive use of herbicides and pesticides
(B)	Convergent evolution	(ii)	Bones of forelimbs in Man and Whale
(C)	Divergent evolution	(iii)	Wings of Butterfly and Bird
(D)	Evolution by anthropogenic action	(iv)	Darwin Finches

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

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

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

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

Question 188.

Which of these is not an important component of initiation of parturition in humans?

[4 Marks]

(A) Release of Oxytocin

(B) Synthesis of prostaglandins

(C) Increase in estrogen and progesterone ratio

(D) Release of Prolactin

Question 189.

Which one of the following statements about Histones is wrong?

[4 Marks]

(A) The pH of histones is slightly acidic

(B) Histones are rich in amino acids - Lysine and Arginine

(C) Histones are organized to form a unit of 8 molecules

(D) Histones carry positive charge in the side chain

Question 190.

During muscular contraction which of the following events occur?
(A) 'H' zone disappears
(B) 'A' band widens
(C) 'I' band reduces in width
(D) Myosine hydrolyzes ATP, releasing the ADP and Pi.
(E) Z-lines attached to actin are pulled inwards.

Choose the correct answer from the options given below:

[4 Marks]

(A) (B), (C), (D), (E) only

(B) (A), (B), (C), (D) only

(C) (B), (D), (E), (A) only

(D) (A), (C), (D), (E) only

Question 191.

Match List-I with List - II

Choose the correct answer from the options given below.

[4 Marks]

	List -I		List -II
(A)	Scapula	(i)	Cartilaginous joints
(B)	Cranium	(ii)	Flat bone
(C)	Sternum	(iii)	Fibrous joints
(D)	Vertebral column	(iv)	Triangular flat bone

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

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

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

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

Question 192.

Assertion (A): A person goes to high altitude and experiences altitude sickness with symptoms like breathing difficulty and heart palpitations.
Reason (R): Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.

In the light of the above statements, choose the correct options from the options given below

[4 Marks]

(A) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(B) (A) is true but (R) is false

(C) Both (A) and (R) are true and (R) is the correct explanation of (A)

(D) (A) is false but (R) is true

Question 193.

The Adenosine deaminase deficiency results into

[4 Marks]

(A) Parkinson's disease

(B) Digestive disorder

(C) Dysfunction of Immune system

(D) Addison's disease

Question 194.

Which of the following is not a step in Multiple Ovulation Embryo Transfer Technology (MOET)?

[4 Marks]

(A) Fertilized eggs are transferred to surrogate mothers at 8-32 cell stage

(B) Cow yields about 6-8 eggs at a time

(C) Cow is administered hormone having LH like activity for super ovulation

(D) Cow is fertilized by artificial insemination

Question 195.

Match List-I with List - II

Choose the correct answer from the options given below.

[4 Marks]

	List -I		List -II
(A)	Filariasis	(i)	*Haemophilus influenzae*
(B)	Amoebiasis	(ii)	*Trichophyton*
(C)	Pneumonia	(iii)	*Wuchereria bancrofti*
(D)	Ringworm	(iv)	*Entamoeba histolytica*

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

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

(C) A - (iii), B - (iiv), C - (iv), D - (ii)

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

Question 196.

Following are the statements with reference to 'lipids'
(A) Lipids having only single bonds are called unsaturated fatty acids
(B) Lecithin is a phospholipid.
(C) Trihydroxy propane is glycerol.
(D) Palmitic acid has 20 carbon atoms including carboxyl carbon.

Choose the correct answer from the options given below.

[4 Marks]

(A) (B) and (C) only

(B) (A) and (B) only

(C) (C) and (D) only

(D) (B) and (C) only

Question 197.

Following are the statements about prostomium of earthworm.
(A) It serves as a covering for mouth.
(B) It helps to open cracks in the soil into which it can crawl.
(C) It is one of the sensory structures.
(D) It is the first body segment.

Choose the correct answer from the options given below.

[4 Marks]

(A) (B) and (C) are correct

(B) (A), (B) and (C) are correct

(C) (A), (B) and (D) are correct

(D) (A), (B), (C) and (D) are correct

Question 198.

Which of the following secretes the hormone, relaxin, during the later phase of pregnancy?

[4 Marks]

(A) Foetus

(B) Corpus luteum

(C) Uterus

(D) Graafian follicle

Question 199.

Statement I: The codon 'AUG' codes for methionine and phenylalanine.
Statement II: 'AAA' and 'AAG' both codons code for the amino acid lysine.

In the light of the above statements, choose the correctanswer from the options given below.

[4 Marks]

(A) Statement I is correct but Statement II is false

(B) Both Statement I and Statement II are false

(C) Both Statement I and Statement II are true

(D) Statement I is incorrect but Statement II is true

Question 200.

Identify the types of cell junctions that help to stop the leakage of the substances across a tissue and facilitation of communication with neighbouring cells via rapid transfer of ions and molecules.

[4 Marks]

(A) Tight junctions and Gap junctions, respectively

(B) Adhering junctions and Tight junctions, respectively

(C) Gap junctions and Adhering junctions, respectively

(D) Adhering junctions and Gap junctions, respectively