CBSE EXAMINATION PAPER-2023

NEET-ZOOLOGY

(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.

Two particles A and B initially at rest, move towards each other under mutual force of attraction. At an instance when the speed of A is v and speed of B is 3v, the speed of centre of mass is

[4 Marks]

(A) zero

(B) 2v

(C) v

(D) 4v

Explanation:

As there is no external force acting on COM i.e., vector F_ext =0 and initial velocity of COM is zero, SESY) therefore it will remain at rest i.e., the speed of centre of mass is zero.

Question 2.

On the basis of electrical conductivity, which one of the following material has the smallest resistivity?

[4 Marks]

(A) Glass

(B) Silicon

(C) Germanium

(D) Silver

Explanation:

Resistivity ρ = 1/σ(conductivity) and σ maximum for silver so silver has the smallest re resistivity.

Question 3.

A charge Q μ C is placed at the centre of a cube. The flux coming out from any one of its faces will be (in SI unit)

[4 Marks]

(A) $(2Q / 3\varepsilon_0) \times 10^{-3}$

(B) $(Q / \varepsilon_0) \times 10^{-6}$

(C) $(Q / 6\varepsilon_0) \times 10^{-3}$

(D) $(Q / 6\varepsilon_0) \times 10^{-6}$

Explanation:

From Gauss's law, total electric flux through a closed surface

$\Phi_{net} = q / \varepsilon_0$

∴ Total electric flux through the cube

$\Phi_c = (Q \times 10^{-6}) / \varepsilon_0$

As charge is placed at the centre of the cube, so flux through each face is same.

$\therefore \Phi = (1 / 6)\ \Phi_c = (1 / 6) \times (Q \times 10^{-6}) / \varepsilon_0$

Question 4.

A uniform electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected in the region such that its velocity is pointed along the direction of fields, then the electron

[4 Marks]

(A) Will turn towards right of direction of motion

(B) Speed will decrease

(C) Will turn towards left of direction of motion

(D) Speed will increase

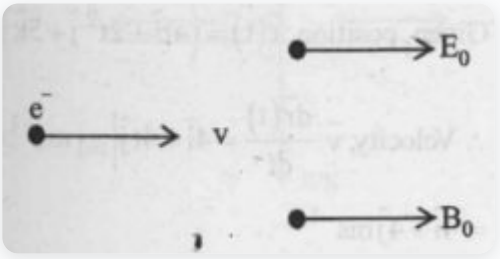
Explanation:

Force due to magnetic field $F_m = qvB \sin\theta$ Here $\theta = 0 \Rightarrow F_m = 0$

Force due to electric field vector $F_e = qE$ vector

Here , vector $F_e = -eE$ vector

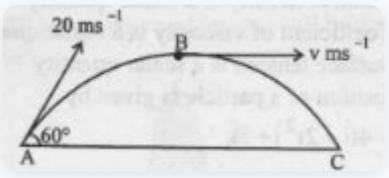
Clearly, force due to electric field is opposite to the direction of motion, so its speed will decrease.



Question 5.

A ball is projected from point A with velocity 20 m s^{-1} at an angle 60° to the horizontal direction. At the highest point B of the path (as shown in figure), the velocity v m s^{-1} of the ball will be

[4 Marks]



(A) Zero

(B) 10

(C) 20

(D) $10\sqrt{3}$

Explanation:

At the highest point (B) of a projectile,

$v = v_0 \cos 60° = 20 \cos 60° = 20 \times (1 / 2) = 10$ m/s

[∵ At B, V_y = 0]

Question 6.

The amount of elastic potential energy per unit volume (in SI unit) of a steel wire of length 100 cm to stretch it by 1 mm is (if Young's modulus of the wire = 2.0×10^{11} N m^{-2})

[4 Marks]

(A) 10^7

(B) 10^5

(C) 10^{11}

(D) 10^{17}

Explanation:

Elastic potential energy per unit volume

= (1 / 2) × Young's modulus × $(\text{Strain})^2$

= $(1 / 2) \times 2 \times 10^{11} \times [1 / 1000]^2$

= $(1 / 2) \times 2 \times 10^{11} \times 10^{-6} = 10^5$ J/m^3

Question 7.

A certain wire A has resistance 81 Ω. The resistance of another wire B of same material and equal length but of diameter thrice the diameter of A will be

[4 Marks]

(A) 729 Ω

(B) 81 Ω

(C) 9 Ω

(D) 243 Ω

Explanation:

∵ Resistance $R = \rho l / A$, where $A = (\pi / 4) d^2$

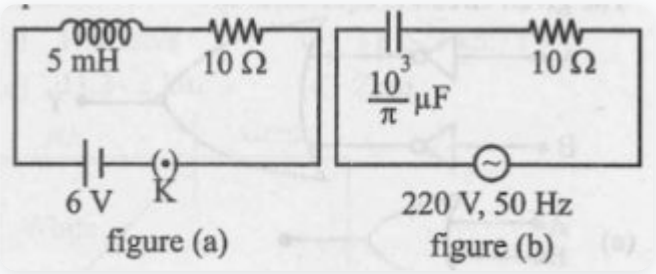
$\therefore 81 = (\rho \times l) / ((\pi / 4) d^2)$, and $R' = (\rho \times l) / ((\pi / 4) \times (3d)^2) = (\rho l) / ((\pi / 4) \times 9d^2)$

$\therefore R' = R / 9 = 81 / 9 = 9\ \Omega$

Question 8.

If Z_1 and Z_2 are the impedances of the given circuits (a) and (b) as shown in figures, then choose the correct option.

[4 Marks]



(A) $Z_1 = Z_2$

(B) $Z_1 > Z_2$

(C) $Z_1 < Z_2$

(D) $Z_1 + Z_2 = 20\ \Omega$

Explanation:

As, D. C. voltage is supplied so impedance $Z_1 = R = 10\ \Omega$

And $Z_2 = \sqrt{[\ R^2 + (X_c)^2\ ]}$

$= \sqrt{[\ (10)^2 + [\ 1 / (2 \times \pi \times 50 \times (10^3 / \pi) \times 10^{-6})\ ]^2\ ]}$

$\Rightarrow Z_2 = \sqrt{[\ (10)^2 + (10)^2\ ]} = 10\sqrt{2}$

$\therefore Z_2 > Z_1$ or $Z_1 < Z_2$

Question 9.

The ground state energy of hydrogen atom is -13.6 eV. The energy needed to ionize hydrogen atom from its second excited state will be

[4 Marks]

(A) 13.6 eV

(B) 6.8 eV

(C) 3.4 eV

(D) 1.51 eV

Explanation:

Total energy of electron in hydrogen atom

$E_\eta = -13.6 / n^2$

In second excited state = $-13.6 / (3)^2 = -1.51$ eV

Therefore 1.51 eV energy required to ionize hydrogen atom from its second excited state.

Question 10.

The mechanical quantity, which has dimensions of reciprocal of mass (M^{-1}) is

[4 Marks]

(A) Torque

(B) Gravitational constant

(C) Coefficient of thermal conductivity

(D) Angular momentum

Explanation:

Gravitational force, $F = GM_1M_2 / r^2$

$\Rightarrow [G] = ([F][r]^2) / ([M_1][M_2]) = ([MLT^{-2}][L^2]) / ([M][M])$

$\Rightarrow [G] = [M^{-1} L^3 T^{-2}]$ Torque $T = F \cdot r = [ML^2 T^{-2}]$ Angular momentum, $L = Mvr = [ML^2 T^{-1}]$

Question 11.

A p-type extrinsic semiconductor is obtained when Germanium is doped with

[4 Marks]

(A) Arsenic

(B) Boron

(C) Antimony

(D) Phosphorous

Explanation:

To make a p–type extrinsic semiconductor, an intrinsic semiconductor is doped with trivalent intrinsic impurity like Gallium, Indium, Boron, Aluminum, etc.

Question 12.

The viscous drag acting on a metal sphere of diameter 1 mm, falling through a fluid of viscosity 0.8 Pa s with a velocity of 2 m s^{-1} is equal to

[4 Marks]

(A) 1.5 × 10^{-3} N

(B) 15 × 10^{-3} N

(C) 30 × 10^{-3} N

(D) 20 × 10^{-3} N

Explanation:

From stoke's law, Viscous drag acting on sphere $F_v = 6\pi\eta rv$

= 6 × (22 / 7) × 0.8 × (10^{-3} / 2) × 2 = 15.08 × 10^{-3} N

= 15 × 10^{-3} N

Question 13.

The maximum power is dissipated for an ac in a/an

[4 Marks]

(A) Inductive circuit

(B) Capacitive circuit

(C) Resistive circuit

(D) LC circuit

Explanation:

Power, P = V_rms I_rms cosϕ In purely resistive circuit voltage and current are in same phase ∴ cosϕ = cos0° = 1 ∴ Power dissipated in maximum.

Question 14.

According to Gauss law of electrostatics, electric flux through a closed surface depends on

[4 Marks]

(A) The quantity of charges enclosed by the surface

(B) The area of the surface

(C) The shape of the surface

(D) The volume enclosed by the surface

Explanation:

According to Gauss' law, total electric flux

$\phi = \oint \square\square \cdot d \square\square = q_enclosed / \varepsilon_0$

∴ Electric flux depends on quantity of charges enclosed by surface.

Question 15.

The variation of susceptibility (χ) with absolute temperature (T) for a paramagnetic material is represented as:

[4 Marks]

(A)



(B)



(C)



(D)



Explanation:

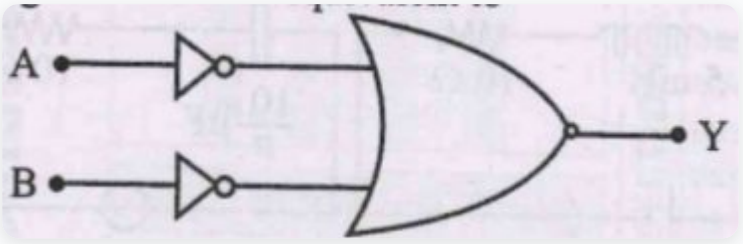
As per Curie law $\chi_m \propto 1 / T$ (Paramagnetic)

Susceptibility χ varies inversely with absolute temperature. Therefore option (c) represents correct χ versus 1 / T graph.

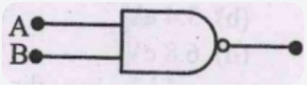
Question 16.

The given circuit is equivalent to

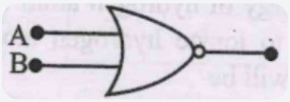
[4 Marks]



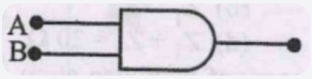
(A)



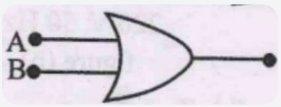
(B)



(C)



(D)



Explanation:

Truth table of given logic circuit is as follows.

Find out put is same as that of and gate out put so given circuit is equivalent to and gate.

A	B	$\overline{A}$	$\overline{B}$	$X = \overline{A} + \overline{B}$	$Y = \overline{X}$
0	0	1	1	1	0
1	1	0	0	0	1
0	1	1	0	1	0
1	0	0	1	1	0

Question 17.

The above figure shows the circuit symbol of a transistor. Select the correct statements given below:

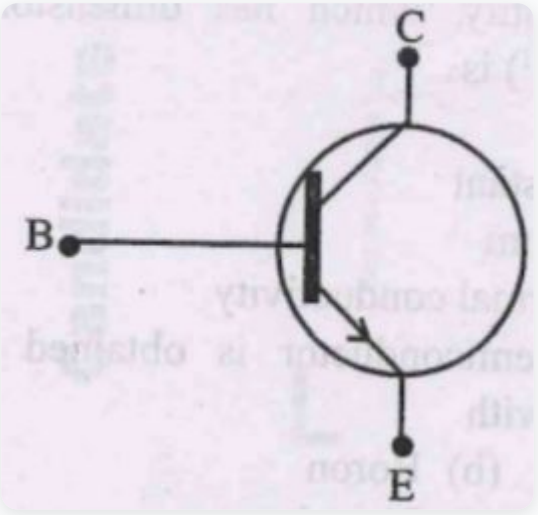
(A) The transistor has two segments of p-type semiconductor separated by a segment of n-type semiconductor.

(B) The emitter is of moderate size and heavily doped.

(C) The central segment is thin and lightly doped.

(D) The emitter base junction is reverse biased in common emitter amplifier circuit.

[4 Marks]



(A) (B) and (C)

(B) (A) and (B)

(C) (A) and (D)

(D) (C) and (D)

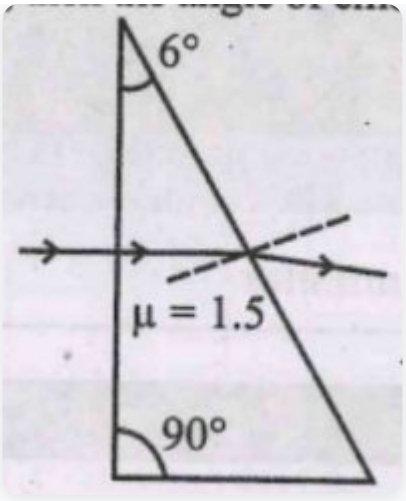
Explanation:

The given transistor represents a n–p–n transistor so statement (A) is incorrect Emitter base junction is forward biased. Emitter is of moderate size and heavily doped and central segment is thin and lightly doped. So, statements (B) and (C) are correct.

Question 18.

A horizontal ray of light is incident on the right-angled prism with prism angle 6°. If the refractive index of the material of the prism is 1.5, then the angle of emergence will be

[4 Marks]



(A) 10°

(B) 9°

(C) 4°

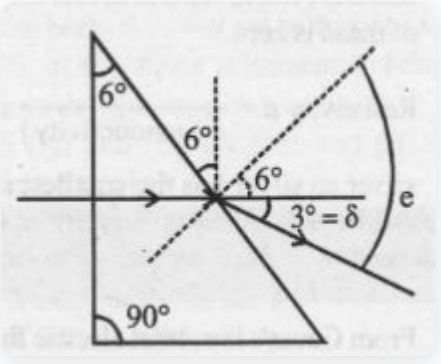
(D) 6°

Explanation:

Deviation produced by a thin prism

δ = (μ - 1)A = (3/2 - 1) 6° = 3°

Angle of emergence, e=6° +3°=9°



Question 19.

A particle moves with a velocity (5î - 3ĵ + 6k̂) ms^{-1} horizontally under the action of constant force (10î + 10ĵ + 20k̂) N. The instantaneous power supplied to the particle is:

[4 Marks]

(A) Zero

(B) 200 W

(C) 100 W

(D) 140 W

Explanation:

Instantaneous power P = □□ ·□□

P = [10î + 10ĵ + 20k̂] · [5î - 3ĵ + 6k̂] W

= [50 - 30 + 120] W = 140 W

Question 20.

The maximum kinetic energy of the emitted photoelectrons in photoelectric effects is independent of:

[4 Marks]

(A) Frequency of incident radiation

(B) Intensity of incident radiation

(C) Wavelength of incident radiation

(D) Work function of material

Explanation:

By Einstein's photoelectric equation $KE_{max} = hf - \phi_0$

or, $KE_{max} = hc / \lambda - hc / \lambda_0$

Clearly KE_{max} is independent of intensity of incident radiation.

Question 21.

The diameter of a spherical bob, when measured with vernier callipers yielded the following values: 3.33 cm, 3.32 cm, 3.34 cm, 3.33 cm and 3.32 cm. The mean diameter to appropriate significant figures is:

[4 Marks]

(A) 3.33 cm

(B) 3.32 cm

(C) 3.328 cm

(D) 3.3 cm

Explanation:

Mean diameter,

đ = [3.33 cm + 3.32 cm + 3.34 cm + 3.33 cm + 3.32 cm] / 5

= 3.328 cm

After rounding off to 2 decimal places, đ = 3.33 cm

Question 22.

Which of the following statement is not true?

[4 Marks]

(A) Pressure is a vector quality

(B) Relative density is a scalar quantity

(C) Coefficient of viscosity is a scalar quantity

(D) Surface tension is a scalar quantity

Explanation:

All pressure, relative density, coefficient of viscosity and surface tension are scalar quantity

Question 23.

The position of a particle is given by □□(t) = 4t î + 2t² ĵ + 5k̂ where t is in seconds and r in metre. Find the magnitude and direction of velocity v(t), at t = 1 s, with respect to x-axis.

[4 Marks]

(A) 4√2 ms⁻¹, 60°

(B) 4√2 ms⁻¹, 45°

(C) 3√2 ms⁻¹, 45°

(D) 3√2 ms⁻¹, 30°

Explanation:

Given, position,□□(t) = (4t î + 2t² ĵ + 5k̂) m

∴ Velocity, □□ = dr□□(t) / dt = 4î + 4t ĵ |_(t=1) m s⁻¹ =

= 4î + 4ĵ m s⁻¹

∴ | □□| = √[4² + 4²] = 4√2 m s⁻¹

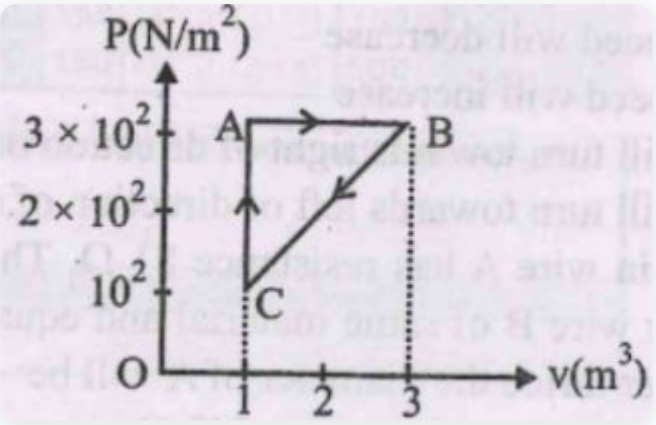
And, tan ϕ = v_y / v_x = 4 / 4 = 1

∴ Direction with respect to X-axis is 45°

Question 24.

For the given cycle, the work done during isobaric process is:

[4 Marks]



(A) 400 J

(B) 600 J

(C) 200 J

(D) Zero

Explanation:

Work done in isobaric i.e., when pressure is constant (AB) process = P ΔV = 3 × 10² [2] J = 600 J

Question 25.

The de Broglie wavelength associated with an electron, accelerated by a potential difference of 81 V is given by:

[4 Marks]

(A) 1.36 nm

(B) 0.136 nm

(C) 136 nm

(D) 13.6 nm

Explanation:

De Broglie wavelength,

$\lambda = 12.27 / \sqrt{V}$ Å $= 12.27 / \sqrt{81}$ Å $= 12.27 / 9$ Å

$\therefore \lambda = 1.36$ Å or 0.136 nm

Question 26.

The 4^{th} overtone of a closed organ pipe is same as that of 3^{rd} overtone of an open pipe. The ratio of the length of the closed pipe to the length of the open pipe is:

[4 Marks]

(A) 9 : 8

(B) 7 : 9

(C) 9 : 7

(D) 8 : 9

Explanation:

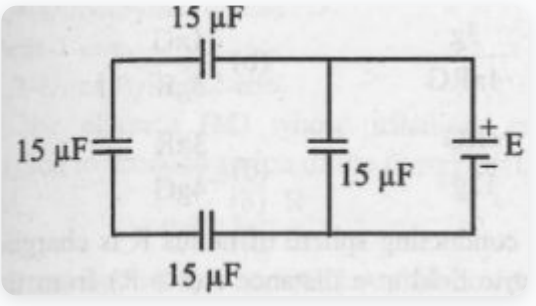
4^{th} overtone for closed organ pipe → 9^{th} harmonic and 3^{rd} overtone for open organ pipe → 4^{th} harmonic

$\therefore 9 \times (V / 4l_c) = 4 \times (V / 2l_o) \Rightarrow l_c / l_o = 9 / 8$

Question 27.

The equivalent capacitance of the arrangement shown in figure is

[4 Marks]



(A) 30 μF

(B) 20 μF

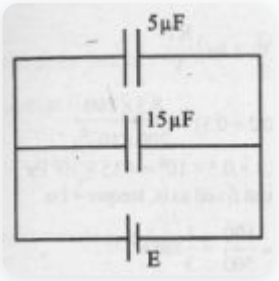
(C) 15 μF

(D) 25 μF

Explanation:

The equivalent circuit of the given circuit is as follows

∴ C_net = 15 + 5 = 20 μF



Question 28.

ε_0 and μ_0 are the electric permittivity and magnetic permeability of free space respectively. If the corresponding quantities of a medium are $2\varepsilon_0$ and $1.5\ \mu_0$ respectively, the refractive index of the medium will nearly be

[4 Marks]

(A) √2

(B) 2

(C) 3

(D) √3

Explanation:

We know Refractive index of the medium, μ_med

= √[μ ε] / √[$\mu_0\ \varepsilon_0$] = √[(1.5)μ_0 (2)ε_0] / √[$\mu_0\ \varepsilon_0$] = √3

Question 29.

Along straight wire of length 2 m and mass 250 g is suspended horizontally in a uniform horizontal magnetic field of 0.7 T. The amount of current flowing through the wire will be (g = 9.8 ms^{-2})

[4 Marks]

(A) 2.75 A

(B) 1.75 A

(C) 2.25 A

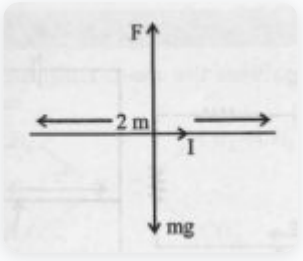
(D) 2.45 A

Explanation:

From FBD of the given diagram, F = mg or, I l B = mg

⇒ I = mg / (l B) = (250 × 10^{-3} × 9.8) / ((2)(0.7)) = 1750 × 10^{-3} A

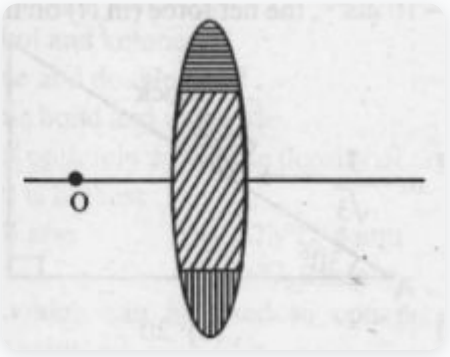
= 1.75 A



Question 30.

A lens is made up of 3 different transparent media as shown in figure. A point object O is placed on its axis beyond 2f. How many real images will be obtained on the other side?

[4 Marks]



(A) No image will be formed

(B) 3

(C) 2

(D) 1

Explanation:

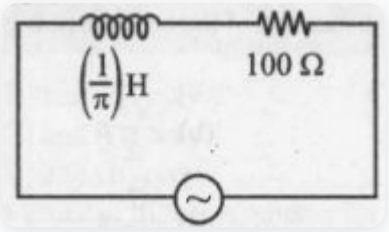
Since object distance u > 2f so all three medium will form individual real images at different points on the other side of lens ∴ Number of real images formed = 3.

Question 31.

An ac source is connected in the given circuit. The value of ϕ will be

V = 220 sin(100πt + ϕ) volt

[4 Marks]



(A) 30°

(B) 45°

(C) 60°

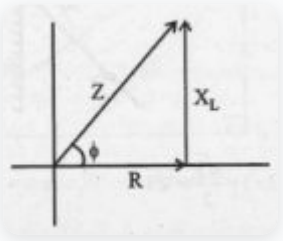
(D) 90°

Explanation:

Inductive reactance, X_L = ωL

X_L = 100 π × (1 / π) = 100 Ω

∴ tan ϕ = X_L / R = 100 / 100 = 1 ∴ ϕ = 45°



Question 32.

A bullet of mass m hits a block of mass M elastically. The transfer of energy is the maximum, when

[4 Marks]

(A) M << m

(B) M >> m

(C) M = 2m

(D) M = m

Explanation:

During elastic collision between two equal masses, the velocity of the two bodies gets interchanged so if one body is at rest, energy transfer will be maximum for M = m

Question 33.

The escape velocity of a body on the earth surface is 11.2 km/s. If the same body is projected upward with velocity 22.4 km/s, the velocity of this body at infinite distance from the centre of the earth will be

[4 Marks]

(A) 11.2 km/s

(B) 11.2√3 km/s

(C) 11.2√2 km/s

(D) Zero

Explanation:

The velocity of the body at infinite distance from the centre of the earth, $V' = \sqrt{[V^2 - V_e^2]}$

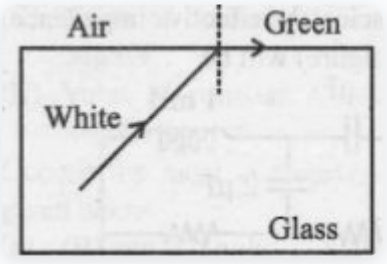
$= \sqrt{[(22.4)^2 - (11.2)^2]}$

$\therefore V' = 11.2\sqrt{3}$ km/s

Question 34.

Which set of colours will come out in air for a situation shown in figure?

[4 Marks]



(A) Orange, Red and Violet

(B) Blue, Green and Yellow

(C) Yellow, Orange and Red

(D) All

Explanation:

From the relation, $\sin i_c = 1 / \mu$ and $\mu \propto 1 / \lambda$

$\sin i_c \propto \lambda$ Therefore, for higher value of λ critical angle will be more, so Yellow, Orange and Red will come out to air. The order of wavelength of different colours V < I < B < G < Y < O < R

Question 35.

The wavelength of Lyman series of hydrogen atom appears in

[4 Marks]

(A) Infrared region

(B) Visible region

(C) Far infrared region

(D) Ultraviolet region

Explanation:

Lyman series of hydrogen atom appears in Ultraviolet region. Balmer series in visible region and Paschen, Bracket and P–fund series in infrared region.

Question 36.

A particle is executing uniform circular motion with velocity □□ and acceleration □□ . Which of the following is true?

[4 Marks]

(A) □□is not a constant; □□ is not a constant

(B) □□ is a constant □□ is not a constant

(C) □□ is a constant; □□ is a constant

(D) □□ is not a constant; □□ is a constant

Explanation:

In uniform circular motion, due to change in direction, velocity □□ and acceleration □□ is not a constant.

Question 37.

A 1 kg object strikes a wall with velocity 1 ms^{-1} at an angle of 60° with the wall and reflects at the same angle. If it remains in contact with wall for 0.1 s, then the force exerted on the wall is

[4 Marks]

(A) 20/3 N

(B) 10√3 N

(C) 30√3 N

(D) Zero

Explanation:

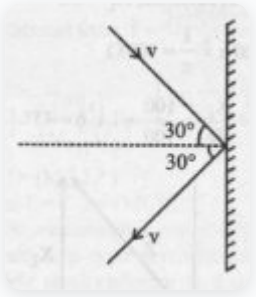
Force is equal to rate of change of momentum

∴ F = Δp / Δt

∴ Δp = 2 mv cos30°

= 2 × 1 × (√3 / 2) = √3

∴ F = Δp / Δt = √3 / 0.1 = 10√3 N



Question 38.

A simple pendulum oscillating in air has a period of √3 s. If it is completely immersed in non-viscous liquid, having density $(1/4)^{th}$ of the material of the bob, the new period will be

[4 Marks]

(A) (2 / √3) s

(B) 2√3 s

(C) (√3 / 2) s

(D) 2 s

Explanation:

Time period of simple pendulum T = 2π √[l / g_eff]

∴ √3 = 2π √[l / g]

After immersed in liquid Mg_eff = Mg - (Mg / ρ_s) · ρ_l

or, Mg_eff = Mg - (Mg / 4)= (3Mg / 4) ⇒ g_eff = 3g / 4

∴ T_1 = 2π √[l / (3g/4)] = (2π √[l/g]) × 2 / √3 = 2T/√3 √3 = 2 s

Question 39.

An object is mounted on a wall. Its image of equal size is to be obtained on a parallel wall with the help of a convex lens placed between these walls. The lens is kept at distance x in front of the second wall. The required focal length of the lens will be

[4 Marks]

(A) x / 2

(B) x / 4

(C) Less than x / 4

(D) More than x / 4 but less than x / 2

Explanation:

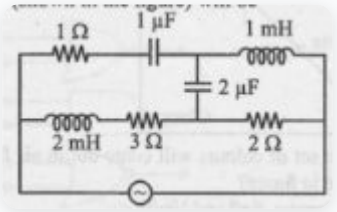
If object is placed at 2f then its image of equal size is to be obtained on a parallel wall with the help of a convex lens placed between the two walls.

$\therefore 2f = x \Rightarrow f = x / 2$

Question 40.

For very high frequencies, the effective impedance of the circuit (shown in the figure) will be

[4 Marks]



(A) 4 Ω

(B) 6 Ω

(C) 1 Ω

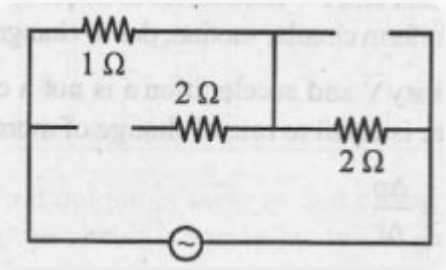
(D) 3 Ω

Explanation:

Inductive reactance, $X_L = \omega L$ and Capacitive reactance, $X_C = 1 / \omega C$ At very high frequency $X_C = 0_1$, $X_L = \infty$

Therefore the effective impedance of the circuit,

$Z = (1 + 2)\ \Omega = 3\ \Omega$



Question 41.

A copper wire of radius 1 mm contains 10^{22} free electrons per cubic metre. The drift velocity for free electrons when 10 A current flows through the wire will be (Given, charge on electron = 1.6×10^{-19} C)

[4 Marks]

(A) $(6.25 / \pi)$ m s^{-1}

(B) $(6.25 \times 10^5 / \pi)$ m s^{-1}

(C) $(6.25 \times 10^4 / \pi)$ m s^{-1}

(D) $(6.25 / \pi) \times 10^3$ m s^{-1}

Explanation:

Drift velocity, $V_d = i / (neA)$

$V_d = 10 / (10^{22} \times 1.6 \times 10^{-19} \times \pi(10^{-3})^2)$

$V_d = 10 / (1.6\pi \times 10^{-3}) = 6.25 / \pi \times 10^3$ m/s

Question 42.

A container of volume 200 cm^3 contains 0.2 mole of hydrogen gas and 0.3 mole of argon gas. The pressure of the system at temperature 200 K (R = 8.3 J K^{-1} mol^{-1}) will be

[4 Marks]

(A) 4.15×10^5 Pa

(B) 6.15×10^5 Pa

(C) 4.15×10^6 Pa

(D) 6.15×10^6 Pa

Explanation:

We know that PV = nRT

$P_net = P_1 + P_2 = (n_1 / V)RT + (n_2 / V)RT$

$= (n_1 + n_2)\ RT / V$

$= (0.2 + 0.3) \times (8.3 \times 200) / (200 \times 10^{-6})$

$= 8.3 \times 0.5 \times 10^6 = 4.15 \times 10^5$ Pa

Question 43.

A constant torque of 100 N m turns a wheel of moment of inertia 300 kg m^2 about an axis passing through its centre. Starting from rest, its angular velocity after 3 s is

[4 Marks]

(A) 10 rad/s

(B) 1 rad/s

(C) 15 rad/s

(D) 5 rad/s

Explanation:

About fixed axis, torque = I α

$\alpha = 100 / 300 = 1 / 3$ rad/s^2

For constant α ⇒ $\omega_i = 0$ $\omega_f = \omega_i + \alpha t$ ∴ At t = 3 s

$\omega_f = 1 / 3 \times 3 = 1$ rad/s

Question 44.

The emf of a cell having internal resistance 1 Ω is balanced against a length of 330 cm on a potentiometer wire. When an external resistance of 2 Ω is connected across the cell, the balancing length will be

[4 Marks]

(A) 330 cm

(B) 220 cm

(C) 332 cm

(D) 115 cm

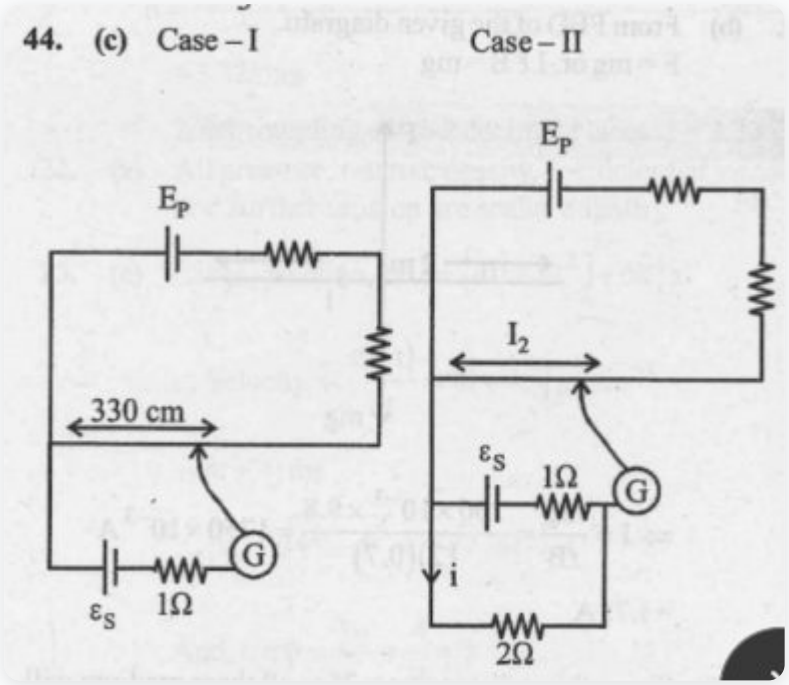
Explanation:

For case – I ⇒ ε_s = ϕ × 330

⇒ ϕ = ε_s / 330 (V / cm) ....(1)

For case – II ⇒ i × 2 = ϕ i_2

⇒ (ε_s / 3) × 2 = (ε_s/ 330) × i_2 [From equation 1] ⇒ i_2 = 220 cm



Question 45.

If R is the radius of the earth and g is the acceleration due to gravity on the earth surface. Then the mean density of the earth will be

[4 Marks]

(A) 3g / (4πRG)

(B) 4πG / (3gR)

(C) 3gR / 4gG

(D) πRG / 12g

Explanation:

Acceleration due to gravity on the earth surface

g = GM / R^2 = (G · 4/3 π R^3 ρ) / R^2

g = G · 4/3 πRρ ⇒ ρ = 3g / 4GπR

Question 46.

If a conducting sphere of radius R is charged. Then the electric field at a distance r (r > R) from the centre of the sphere would be, (V = potential on the surface of the sphere)

[4 Marks]

(A) RV / r^2

(B) V / r

(C) rV / R^2

(D) R^2V / r^3

Explanation:

For r > R, Electric Field $E = Kq / r^2$ ....(i)

and potential at surface of sphere $V = Kq / R$

∴ From equation (i)

$V = Er^2 / R \Rightarrow E = RV / r^2$

Question 47.

To produce an instantaneous displacement current of 2 mA in the space between the parallel plates of a capacitor of capacitance 4 μF, the rate of change of applied variable potential difference (dV / dt) must be

[4 Marks]

(A) 200 V/s

(B) 400 V/s

(C) 500 V/s

(D) 800 V/s

Explanation:

Displacement current $i_d = C (dV / dt)$

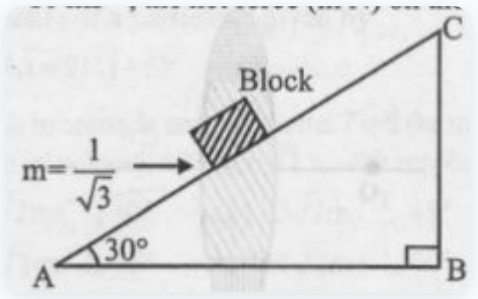
$\Rightarrow 2 \times 10^{-3} = 4 \times 10^{-6} \times (dV / dt)$

$dV / dt = (2 \times 10^{-3}) / (4 \times 10^{-6}) = 500$ V/s

Question 48.

A block of mass 2 kg is placed on an inclined rough surface AC (as shown in figure) of coefficient of friction μ. If g = 10 ms^{-2}, the net force (in N) on the block will be

[4 Marks]



(A) 19

(B) 20

(C) 10√3

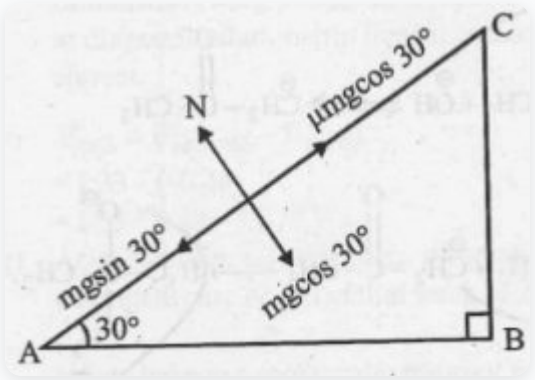
(D) Zero

Explanation:

⇒ $(F_{net})_H = mg \sin 30° - \mu mg \cos 30°$

$= mg / 2 - (1 / \sqrt{3}) mg \cdot (\sqrt{3} / 2)$

$F_{net} = 0$



Question 49.

An emf is generated by an ac generator having 100 turn coil, of loop area 1 m^2. The coil rotates at a speed of one revolution per second and placed in a uniform magnetic field of 0.05 T perpendicular to the axis of rotation of the coil. The maximum value of emf is

[4 Marks]

(A) 31.4 V

(B) 3.14 V

(C) 6.28 V

(D) 62.8 V

Explanation:

Maximum value of emf generated by an ac generator $\varepsilon_0 = NBA_\omega = 100 \times 0.05 \times 1 \times 2\pi = 31.415$ V $\therefore \varepsilon_0 = 31.4$ V

Question 50.

The angular momentum of an electron moving in an orbit of hydrogen atom is 1.5 (h / π). The energy in the same orbit is nearly

[4 Marks]

(A) -1.3 eV

(B) -1.4 eV

(C) -1.5 eV

(D) -1.6 eV

Explanation:

Angular momentum of electron moving in n^{th} orbit from Bohr's postulate

$L = nh / 2\pi$ ....(i)

Given, $L = 1.5 (h / \pi)$ So, $n = 3$ ....(ii)

Now, energy of electron in 3^{rd} orbit

$E = (-13.6 \times z^2) / n^2 = (-13.6 \times 1^2) / 3^2 \approx -1.5$ eV

Question 51.

Which amongst the following compounds will show geometrical isomerism?

[4 Marks]

(A) 2-Methylprop-1-ene

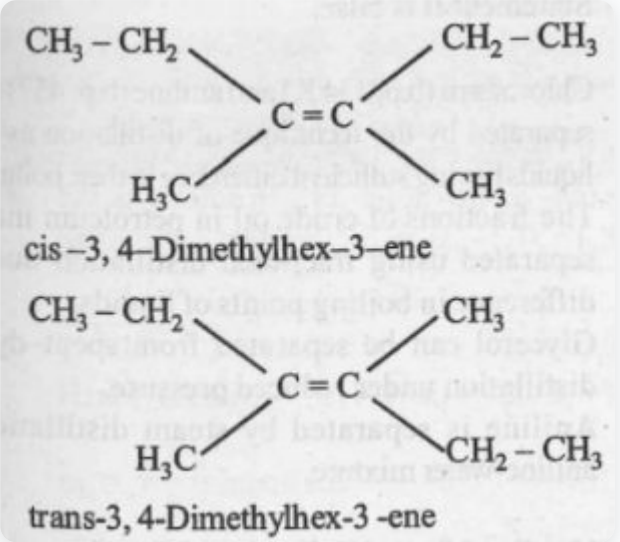
(B) Pent-1-ene

(C) 3,4-Dimethylhex-3-ene

(D) 2,3-Dimethylbut-2-ene

Explanation:

3, 4–Dimethylhex–3–ene will show geometrical isomerism



Question 52.

Select the element (M) whose trihalides cannot be hydrolysed to produce an ion of the form $[M(H_2O)_6]^{3+}$.

[4 Marks]

(A) B

(B) Al

(C) Ga

(D) In

Explanation:

Boron trihalides cannot be hydrolysed to produce an ion of the form $[B(H_2O)_6]^{3+}$ because of absence of d orbitals in boron.

Question 53.

The correct option for the rate law that corresponds to overall first order reaction is

[4 Marks]

(A) Rate = k $[A]^{1/2}$ $[B]^2$

(B) Rate = k $[A]^{-1/2}$ $[B]^{3/2}$

(C) Rate = k $[A]^0$ $[B]^2$

(D) Rate = k [A] [B]

Explanation:

Rate = k $[A]^{-1/2}$ $[B]^{3/2}$

∴ order of reaction = -1/2 + 3/2 = 1

Question 54.

Which one of the following represents all isoelectronic species?

[4 Marks]

(A) Na^+, Mg^{2+}, O^-, F^-

(B) Ca^{2+}, Ar, K^+, Cl^-

(C) Na^+, Cl^-, O^-, NO^+

(D) N_2O, N_2O_4, NO^+, NO

Explanation:

Ca^{2+} = 20 - 2 = 18 e^-

Ar = 18 e^-

K^+ = 19 - 1 = 18 e^-

Cl^- = 17 + 1 = 18 e^-

So, Ca^{2+}, Ar, K^+ and Cl^- are isoelectronic species.

Question 55.

Cheilosis occurs due to deficiency of _____

[4 Marks]

(A) Riboflavin

(B) Pyridoxamine

(C) Thiamine

(D) Nicotinamide

Explanation:

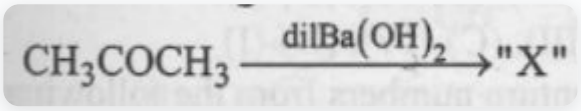
Cheilosis refers to the inflammation and small cracks in one or both corners of the mouth. Cheilosis occurs due to deficiency of vitamin B_2 (Riboflavin)

Question 56.

Consider the given reaction:

The functional groups present in compound "X" are

[4 Marks]



(A) Alcohol and aldehyde

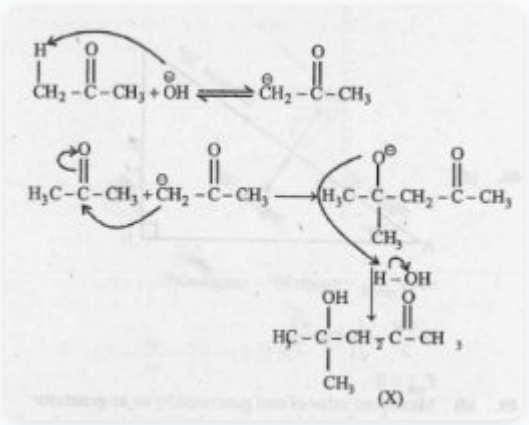
(B) Alcohol and ketone

(C) Ketone and double bond

(D) Double bond and aldehyde

Explanation:

So, the functional group present in compound "X" is alcohol and Ketone.



Question 57.

The correct option in which the density of argon (Atomic mass = 40) is highest

[4 Marks]

(A) 0°C, 2 atm

(B) 273°C, 4 atm

(C) STP

(D) 0°C, 4 atm

Explanation:

PV = nRT

P = (n / V) RT

P = (d / M) RT

PM / RT = d

⇒ d ∝ 1 / T , d ∝ P

So, for maximum density P should be maximum and T should be minimum which is in option 0°C, 4 atm

Question 58.

Reagents which can be used to convert alcohols to carboxylic acids, are

(A) $CrO_3 – H_2SO_4$

(B) $K_2Cr_2O_7 + H_2SO_4$

(C) $KMnO_4 + KOH / H_3O^+$

(D) Cu, 573 K

(E) CrO_3 , $(CH_3CO)_2O$

Choose the most appropriate answer from the options given below.

[4 Marks]

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

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

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

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

Explanation:

PV = nRT

P = (n / V) RT

P = (d / M) RT

PM / RT = d

⇒ d ∝ 1 / T , d ∝ P

So, for maximum density P should be maximum and T should be minimum which is in option (A), (B) and (C) only

Question 59.

The correct order of dipole moments for molecules NH_3, H_2S, CH_4 and HF, is

[4 Marks]

(A) HF > NH_3 > H_2S > CH_4

(B) NH_3 > HF > CH_4 > H_2S

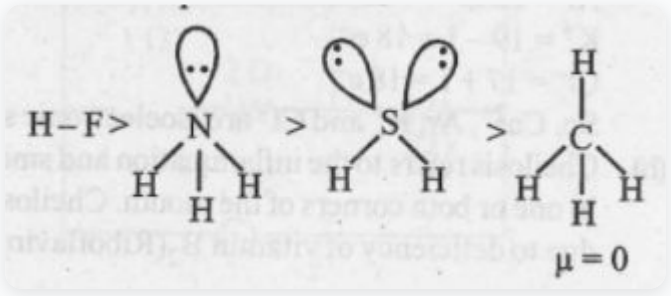
(C) CH_4 > H_2S > NH_3 > HF

(D) H_2S > NH_3 > HF > CH_4

Explanation:

Fluorine is the most electronegative element. H – F bond has maximum and polarity. Order of dipole moment is

H – F > NH_3 > H_2S > CH_4 (μ = 0)



Question 60.

Molar conductance of an electrolyte increases with dilution according to the equation:

$\Lambda_m = \Lambda^\circ_m - A\sqrt{c}$

Which of the following statements are true?

(A) This equation applies to both strong and weak electrolytes.

(B) Value of the constant A depends upon the nature of the solvent.

(C) Value of constant A is same for both $BaCl_2$ and $MgSO_4$.

(D) Value of constant A is same for both $BaCl_2$ and $Mg(OH)_2$.

Choose the most appropriate answer from the options given below.

[4 Marks]

(A) (A) and (B) only

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

(C) (B) and (D) only

(D) (B) and (C) only

Explanation:

$\Lambda_m = \Lambda^\circ_m - A\sqrt{c}$

- For strong electrolytes, Λ_m increases slowly with dilution.
- The value of 'A' depends on the type of electrolyte.
- All electrolytes of particular type have the same value for 'A'
- e.g. $BaCl_2$ and $Mg(OH)_2$ → 2 – 1 electrolytes

Question 61.

Identify 'X' in above reactions.

[4 Marks]

$$R-COOH \xrightarrow[(ii)H_2O/HCl]{(i)\text{"X"}} R-CH_2OH$$

$$R-CH=CH_2 \xrightarrow[(ii)H_2O,NaOH,H_2O_2]{(i)\text{"X"}} R-CH_2-CH_2-OH$$

(A) H_2/Pd

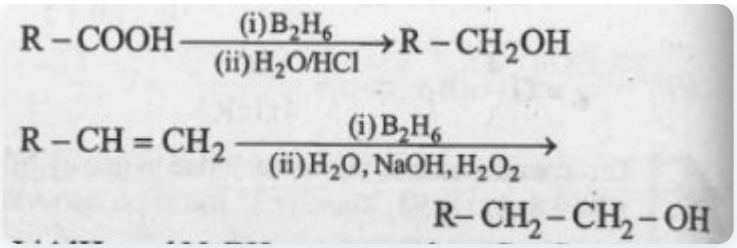
(B) B_2H_6

(C) $LiAlH_4$

(D) $NaBH_4$

Explanation:

- $LiAlH_4$ and $NaBH_4$ cannot reduce C = C
- H_2/Pd reduce alkene to alkane



Question 62.

Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Ionisation enthalpy increases along each series of the transition elements from left to right. However, small variations occur.

Reason (R): There is corresponding increase in nuclear charge which accompanies the filling of electrons in the inner d-orbitals.

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

[4 Marks]

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

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

(C) (A) is not correct but (R) is correct

(D) (A) is correct but (R) is not correct

Explanation:

Due to an increase in nuclear charge which accompanies the filling of the inner d-orbitals, there is an increase in ionisation enthalpy along each series of the transition elements, from left to right. However, many small variations occur.

Question 63.

Which one of the following statements is incorrect related to Molecular Orbital Theory?

[4 Marks]

(A) In the formation of bonding molecular orbital, the two electron waves of the bonding atoms reinforce each other.

(B) The π* antibonding molecular orbital has a node between the nuclei.

(C) A π-bonding molecular orbital has larger electron density above and below the internuclear axis.

(D) Molecular orbitals obtained from 2p_x and 2p_y orbitals are symmetrical around the bond axis.

Explanation:

- According to molecular orbital theory, the sigma (σ) molecular orbitals are symmetrical around the bond-axis while pi (π) molecular orbitals are not symmetrical.
- As z–axis is taken as internuclear axis, $2p_x$ and 2p_y forms π molecular orbitals, hence these are unsymmetrical around the bond-axis

Question 64.

Which amongst the following is used in controlling depression and hypertension?

[4 Marks]

(A) Equanil

(B) Prontosil

(C) Seldane

(D) Valium

Explanation:

Tranquilizers and analgesics are neurologically active drugs. Equanil is used in controlling depression and hypertension.

Question 65.

Given below are two statements:

Statement I: The value of wave function, ψ depends upon the coordinates of the electron in the atom.

Statement II: The probability of finding an electron at a point within an atom is proportional to the orbital wave function.

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

Explanation:

- The wave function is a mathematical function whose value depends coordinates of the electron in an atom and does not carry any physical significance. So, Statement I is true.
- The probability of finding an electron at a point within an atom is proportional to the square of the orbital wave function i.e. $|\psi|^2$ at the point. So, Statement II is false.

Question 66.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

List-I (Mixtures/Sample)	List-II (Technique used for purification)
(A) Glycerol from spent lye	(I) Steam distillation
(B) Chloroform + Aniline	(II) Fractional distillation
(C) Fractions of crude oil	(III) Distillation under reduced pressure
(D) Aniline + Water	(IV) Distillation

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

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

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

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

Explanation:

- Chloroform (b.p. 334 K) and aniline (b.p. 457) are easily separated by the technique of distillation as both the liquids having sufficient difference in their boiling points.
- The fractions of crude oil in petroleum industry is separated using fractional distillation due to less difference in boiling points of liquids.
- Glycerol can be separated from spent–dye using distillation under reduced pressure.
- Aniline is separated by steam distillation from aniline-water mixture.

Question 67.

Which of the following is correctly matched?

[4 Marks]

(A) Acidic oxides ⇒ Mn_2O_7, SO_2, TeO_3

(B) Amphoteric oxides ⇒ BeO, Ga_2O_3, GeO

(C) Basic oxides ⇒ In_2O_3, K_2O, SnO_2

(D) Neutral oxides ⇒ CO, NO_2, N_2O

Explanation:

- Mn_2O_7, SO_2 and TeO_3 are acidic oxides.
- GeO is distinctly acidic in nature.
- NO_2 is acidic in nature.

Question 68.

The density of 1 M solution of a compound 'X' is 1.25 g mL^{-1}. The correct option for the molality of solution is (Molar mass of compound X = 85 g)

[4 Marks]

(A) 1.165 m

(B) 0.858 m

(C) 1.208 m

(D) 0.705 m

Explanation:

Relation between Molality (m), Molarity (M) and density (d) is

m = 1000M / (1000 × d - M × M_solute)

M_solute denotes molar mass of solute.

m = (1000 × 1) / ((1000 × 1.25) - (1 × 85)) = 1000 / (1250 - 85) = 1000 / 1165

m = 0.858 m

Question 69.

Given below are two statements:

Statement I: High density polythene is formed in the presence of catalyst triethylaluminium and titanium tetrachloride.

Statement II: High density polymers are chemically inert.

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

[4 Marks]

(A) Both Statement I and Statement II are true.

(B) Both Statement I and Statement II are false.

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

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

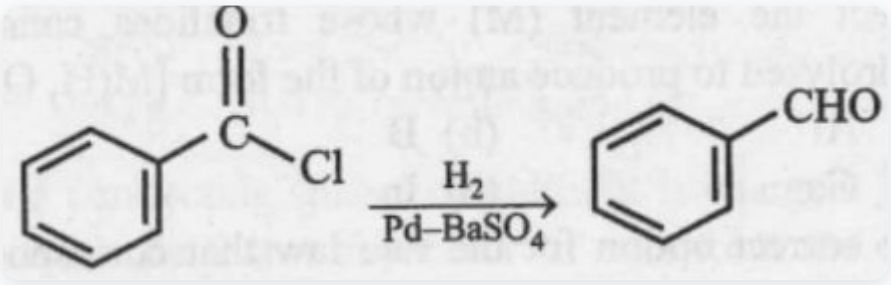
Explanation:

High density polythene is formed by addition polymerisation of ethene in the presence of catalyst triethyl aluminium and titanium tetrachloride (Ziegler Natta Catalyst) ($TiCl_4$ and $Al(C_2H_5)_3$ Cl) So, Statement I is correct. High density polymers are chemically inert. So, Statement II is also correct.

Question 70.

The following conversion is known as

[4 Marks]



(A) Etard reaction

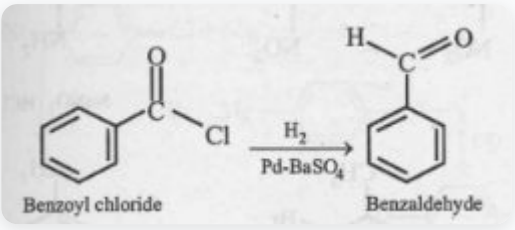
(B) Rosenmund reaction

(C) Gattermann-Koch reaction

(D) Stephen reaction

Explanation:

Hydrogenation of Acyl chloride in the presence of catalyst palladium on barium sulphate to form aldehyde is known as Rosenmund reaction.



Question 71.

Match List – I with List – II.

Choose the correct answer from the options given below:

[4 Marks]

List – I (Hydride)	List – II (Type of hydride)
(A) NaH	(I) Electron precise
(B) PH_3	(II) Saline
(C) GeH_4	(III) Metallic
(D) $LaH_{2.87}$	(IV) Electron rich

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

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

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

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

Explanation:

- **(A) NaH** → Saline or Ionic hydride
- **(B) PH_3** → Electron rich hydride (Elements of group 15-17 form such hydrides)
- **(C) GeH_4** → Electron precise (Elements of group 14 form such hydrides)
- **(D) $LaH_{2.87}$** → Metallic or Non-stoichiometric hydrides

Question 72.

Incorrect set of quantum numbers from the following is

[4 Marks]

(A) n = 5, l = 2, m_l = -2, -1, +1, +2, m_s = +1/2

(B) n = 4, l = 3, m_l = -3, -2, -1, 0, +1, +2, +3, m_s = -1/2

(C) n = 5, l = 3, m_l = -3, -2, -1, 0, +1, +2, +3, m_s = +1/2

(D) n = 4, l = 2, m_l = -2, -1, 0, +1, +2, m_s = -1/2

Explanation:

For any value of l, m_l value will be -l to +l

So for n = 5 and l = 2: m_l = -2, -1, 0, +1, +2 and m_s = +1/2 or -1/2

Hence,

the set n = 5, l = 2, m_l= -2, -1, +1, +2, m_s = +1/2 is incorrect.

Question 73.

Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Lithium and beryllium unlike their other respective group members form compounds with pronounced ionic character.

Reason (R): Lithium and Magnesium have similar properties due to diagonal relationship.

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

[4 Marks]

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

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

(C) (A) is false but (R) is true.

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

Explanation:

Lithium and Beryllium are the first members of their respective groups (i.e. group 1 and 2 respectively). Due to their exceptionally small atomic and ionic sizes they form compounds with covalent character not ionic. Hence, Assertion statement is wrong. Lithium and Magnesium have similar properties due to diagonal relationship hence, reason statement is correct.

Question 74.

The correct value of cell potential in volt for the reaction that occurs when the following two half cells are connected, is

Fe^{2+}_((aq)) + $2e^-$ → Fe(s), E° = -0.44 V

$Cr_2O_7^{2-}$ + $14H^+$ + $6e^-$ → $2Cr^{3+}$ + $7H_2O$, E° = +1.33 V

[4 Marks]

(A) +0.01 V

(B) +0.89 V

(C) +2.65 V

(D) +1.77 V

Explanation:

E°_cell = E°_cathode - E°_anode = 1.33 - (-0.44) = 1.33 + 0.44 = +1.77 V

Question 75.

An acidic buffer is prepared by mixing:

[4 Marks]

(A) Equal volumes of equimolar solutions of weak acid and weak base.

(B) Weak acid and it's salt with strong base.

(C) Strong acid and it's salt with strong base.

(D) Strong acid and it's salt with weak base.

Explanation:

Acidic buffer is a mixture of weak acid and its conjugate base or salt of that weak acid with another strong base in a molar ratio ranging from 1/10 to 10 e.g.,

CH_3COOH + CH_3COONa

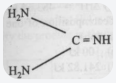
(Weak acid) (Salt of weak acid with strong base NaOH)

Question 76.

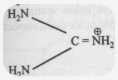
Which amongst the following compounds/species is least basic?

[4 Marks]

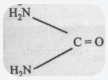
(A)



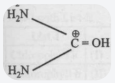
(B)



(C)



(D)



Explanation:

Amides are not basic in nature because of non availability of lone-pair on nitrogen, protonated amide will be even weaker bases.

Question 77.

The correct van der Waals equation for 1 mole of a real gas is

[4 Marks]

(A) $(p + an^2/v^2) (v^2 - nb) = RT$

(B) $(p + an^2/v^2) (V - nb) = nRT$

(C) $(p + V^2/a) (V - b) = RT$

(D) $(p + a/V^2) (V - b) = RT$

Explanation:

van der Waal equation for n mole gas is

$(p + an^2/V^2) (V - nb) = nRT$

For n = 1 mol

$(p + a/V^2) (V - b) = RT$

Question 78.

The E° values for Al^{+}/Al = +0.55 V and Tl^{+}/Tl = -0.34 V, Al^{3+}/Al = -1.66 V and Tl^{3+}/Tl = +1.26 V. Identify the incorrect statement.

[4 Marks]

(A) Tl^{3+} is a good reducing agent than Tl^{+}.

(B) Tl can be easily oxidised to Tl^{+} than Tl^{3+}.

(C) Al^{+} is unstable in solution.

(D) Al is more electropositive than Tl.

Explanation:

(1) Al^{+} is unstable in solution because SRP of Al^{+}/Al is positive hence, it will get reduced in solution.

(2) Tl/Tl^{+} = +0.34 (SOP)

Tl/Tl^{3+} = -1.26 (SOP)

Since, SOP $Tl/Tl^{+} > Tl/Tl^{3+}$

Hence, Tl will get oxidised to Tl^{+} easily than Tl^{3+}

(3) Since Al/Al^{3+} has more SOP than Tl/Tl^{+} it will be more electropositive

(4) Since $Tl^{3+} + 2e^{-} \rightarrow Tl^{+}$; $E = (3 \times 1.26 + 0.34) / 2 = +2.04$ Hence, Tl^{3+} is better oxidising agent not reducing agent.

Question 79.

Given below are two statements:

Statement I: Hydrated chlorides and bromides of Ca, Sr and Ba on heating undergo hydrolysis.

Statement II: Hydrated chlorides and bromides of Be and Mg on heating undergo dehydration.

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

[4 Marks]

(A) Both Statement I and Statement II are false.

(B) Both Statement I and Statement II are true.

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

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

Explanation:

Since hydrated chlorides and bromides of Ca, Sr and Ba are ionic in nature they will get dehydrated on heating and hydrolysis will not take place, while chloride and bromide of Be and Mg has covalent nature hence, they will get hydrolysed.

Question 80.

Which of the following forms a set of a complex and a double salt, respectively?

[4 Marks]

(A) $K_2PtCl_2 \cdot 2NH_3$ and $KAl(SO_4)_2 \cdot 12H_2O$

(B) $NiCl_2 \cdot 6H_2O$ and $NiCl_2(H_2O)_4$

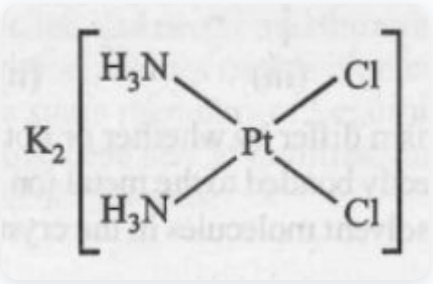
(C) $CuSO_4 \cdot 5H_2O$ and $CuCl_2 \cdot 4NH_3$

(D) $PtCl_2 \cdot 2NH_3$ and $PtCl_4 \cdot 2HCl$

Explanation:

$K_2PtCl_2 \cdot 2NH_3$ is complex compound

$KAl(SO_4)_2 \cdot 12H_2O$ is empirical formula of potash alum which is a double salt $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$



Question 81.

For a reaction $3A \rightarrow 2B$

The average rate of appearance of B is given by $\Delta[B] / \Delta t$ The correct relation between the average rate of appearance of B with the average rate of disappearance of A is given in option

[4 Marks]

(A) $\Delta[A] / \Delta t$

(B) $-2\Delta[A] / 3\Delta t$

(C) $-\Delta[A] / \Delta t$

(D) $-3\Delta[A] / 2\Delta t$

Explanation:

For reaction, $3A \rightarrow 2B$

Average rate of reaction = $- (1 / 3) (\Delta[A] / \Delta t) = (1 / 2) (\Delta[B] / \Delta t)$

So, $\Delta[B] / \Delta t = - (2 / 3) (\Delta[A] / \Delta t)$

Question 82.

For a weak acid HA, the percentage of dissociation is nearly 1% at equilibrium. If the concentration of acid is 0.1 mol L^{-1}, then the correct option for its Ka at the same temperature is

[4 Marks]

(A) 1×10^{-4}

(B) 1×10^{-6}

(C) 1×10^{-5}

(D) 1×10^{-3}

Explanation:

$HA \rightleftharpoons H^+ + A^-$

At t = 0: C - -

At eq.: C - Cα, Cα Cα

$K = ([H^+][A^-]) / [HA] = (C\alpha)(C\alpha) / (C(1 - \alpha)) = C\alpha^2 / (1 - \alpha) = C\alpha^2$

$(\because \alpha$ is very small) $= 0.1 (0.01)^2 = 1 \times 10^{-5}$

Question 83.

Which of the following is a positively charged sol?

[4 Marks]

(A) Silver sol

(B) Sb_2S_3 sol

(C) Methylene blue sol

(D) Congo red sol

Explanation:

- Methylene Blue sol is a positively charged sol.
- Silver sol, Sb_2S_3 sol and congo red sol are negatively charged sol.

Question 84.

Which amongst the following reaction of alkyl halides produces isonitrile as a major products?

(A) R - X + HCN →

(B) R - X + AgCN →

(C) R - X + KCN →

(D) R - X + NaCN —(H_2O / C_2H_5OH) —→

Choose the most appropriate answer from the options given below

[4 Marks]

(A) (B) only

(B) (A) and (B) only

(C) (D) only

(D) (C) and (D) only

Explanation:

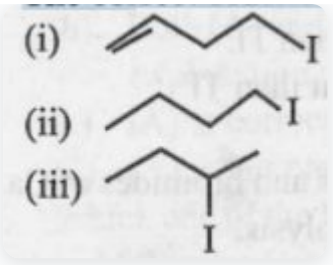
KCN is predominately ionic and provides cyanide ions in solution. Although both carbon and nitrogen atoms are in a position to donate electron pairs, the attack takes place mainly through carbon atom and not through nitrogen atom since C – C bond is more stable than C – N bond. However, AgCN is mainly covalent in nature and nitrogen is free to donate electron pair forming isocyanide as the major product

R – X + AgCN → R – NC + AgX

Question 85.

The correct order for the rate of α–β dehydrohalogenation for the following compounds is _____.

[4 Marks]



(A) (iii) < (ii) < (i)

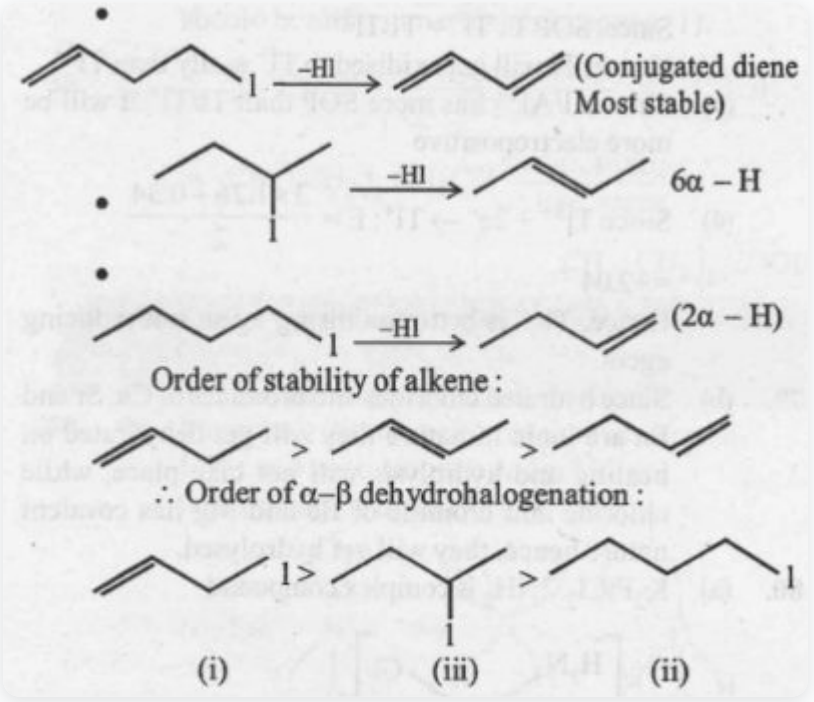
(B) (ii) < (iii) < (i)

(C) (ii) < (i) < (iii)

(D) (i) < (ii) < (iii)

Explanation:

More is the stability of alkene formed, more will be the rate of α–β dehydrohalogenation



Question 86.

Type of isomerism exhibited by compounds $[Cr(H_2O)_6]Cl_3$, $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$, $[Cr(H_2O)_4Cl_2]Cl \cdot 2H_2O$ and the value of coordination number (CN) of central metal ion in all these compounds, respectively is:

[4 Marks]

(A) Solvate isomerism, CN = 6

(B) Ionisation isomerism, CN = 4

(C) Geometrical isomerism, CN = 4

(D) Optical isomerism, CN = 4

Explanation:

Solvate isomerism differ by whether or not a solvent molecule is directly bonded to the metal ion or merely present as free solvent molecules in the crystal lattice.

- $[Cr(H_2O)_6]Cl_3$, $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$ and $[Cr(H_2O)_4Cl_2]Cl \cdot 2H_2O$ show solvate isomerism.
- Co–ordination number of Cr is 6

Question 87.

Given below are two statements:

Statement I: In an organic compound when inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

Statement II: Hyperconjugation is observed in o-xylene. In the light of the above statements, choose the correct answer from the options given below

[4 Marks]

(A) Both Statement I and Statement II are true.

(B) Both Statement I and Statement II are false.

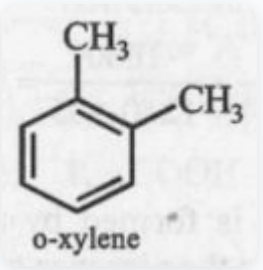
(C) Statement I is true but Statement II is false.

(D) Statement I is false but Statement II is true.

Explanation:

In an organic compound when inductive and electromeric effects operate in opposite directions, the electromeric effect predominates.

In alkylarene, sp^3 hybridized C – H bonds are present the carbon of which is directly bonded to sp^2 carbon atoms so, hyperconjugation effect is observed in o-xylene.



Question 88.

Choose the correct sequence of reagents in the conversion of 4-nitrotoluene to 2-bromotoluene.

[4 Marks]

(A) $NaNO_2/HCl$; Sn/HCl; Br_2; H_2O/H_3PO_2

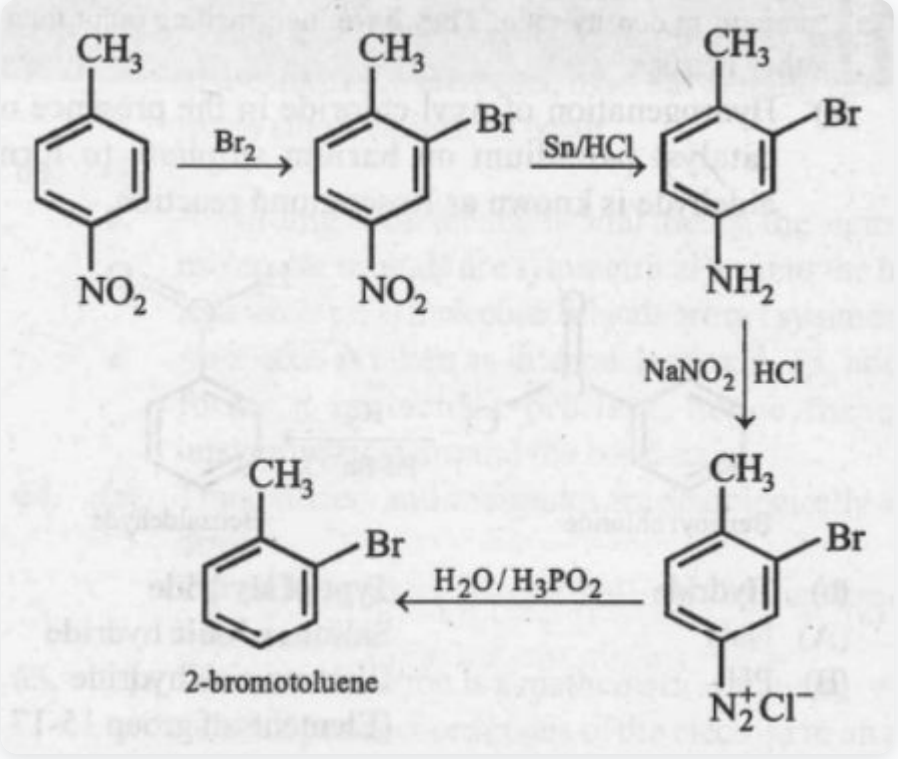
(B) Sn/HCl; $NaNO_2/HCl$; Br_2; H_2O/H_3PO_2

(C) Sn/HCl; Br_2; $NaNO_2/HCl$; H_2O/H_3PO_2

(D) Br_2; Sn/HCl; $NaNO_2/HCl$; H_2O/H_3PO_2

Explanation:

I



Question 89.

How are edge length 'a' of the unit cell and radius 'r' of the sphere related to each other in ccp structure? (Choose correct option for your answer.)

[4 Marks]

(A) a = 2 / √2r

(B) a = 4r / √3

(C) a = 2r

(D) a = r / 2√2

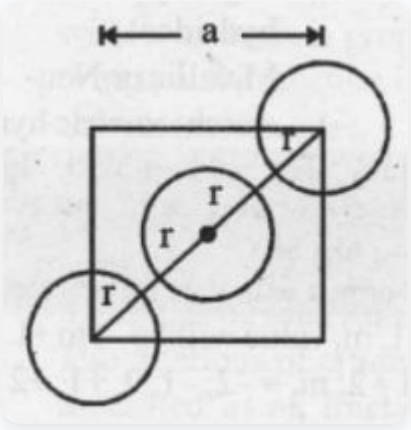
Explanation:

For a ccp structure,

$4r = a\sqrt{2}$

$\therefore a = 4r / \sqrt{2}$

$a = 2\sqrt{2}r$



Question 90.

Which statement is not true about photochemical smog?

[4 Marks]

(A) Plants like Pinus, Juniparus can help in reducing the photochemical smog.

(B) Photochemical smog is harmful to humans but has no effect on plants.

(C) Common components of photochemical smog are ozone, nitric oxide, acrolein, formaldehyde and peroxyacetyl nitrate.

(D) Photochemical smog occurs in warm, dry and sunny climate.

Explanation:

Photochemical smog is harmful to humans as well as plants so option (c) is incorrect.

Photochemical smog occurs in warm, dry and sunny climate.

Question 91.

How many number of tetrahedral voids are formed in 5 mol of a compound having cubic close packed structure? (Choose the correct option)

[4 Marks]

(A) 3.011×10^{24}

(B) 6.022×10^{24}

(C) 3.011×10^{25}

(D) 1.550×10^{24}

Explanation:

As in a ccp unit cell having 'N' number of atoms there are '2N' number of tetrahedral voids, so number of tetrahedral voids formed in a 5 mol of a compound having ccp structure is $5 \times 2 \times 6.022 \times 10^{23} = 6.022 \times 10^{24}$ voids.

Question 92.

The correct option for a redox couple is

[4 Marks]

(A) Cathode and anode together

(B) Both the reduced and oxidized forms involve same element

(C) Both are oxidised forms involving same element

(D) Both are reduced forms involving same element

Explanation:

A redox couple is defined as having together the oxidised and reduced forms of a substance taking part in an oxidation or reduction half reaction.

Question 93.

Consider the following reaction:

$2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$ $\Delta rH° = -483.64$ kJ.

What is the enthalpy change for decomposition of one mole of water? (Choose the right option).

[4 Marks]

(A) 100 kJ

(B) 18 kJ

(C) 120.9 kJ

(D) 241.82 kJ

Explanation:

$2H_2O(g) \rightarrow 2H_2(g) + O_2(g)$

$\Delta H° = 483.64$ kJ

For decomposition of 2 moles of H_2O, enthalpy change = 483.64 kJ For decomposition of 1 mole of H_2O, enthalpy change = 483.64 / 2 kJ = 241.82 kJ

Question 94.

The correct sequence given below containing neutral, acidic, basic and amphoteric oxide each, respectively, is

[4 Marks]

(A) ZnO, NO, CaO, CO_2

(B) NO, ZnO, CO_2, CaO

(C) NO, CO_2, CaO, ZnO

(D) NO, CO_2, ZnO, CaO

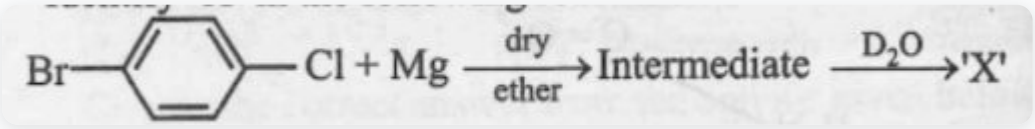
Explanation:

Oxides	Chemical Nature
NO	Neutral
CO_2	Acidic
CaO	Basic
ZnO	Amphoteric

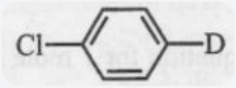
Question 95.

Identify 'X' in the following reaction.

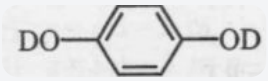
[4 Marks]



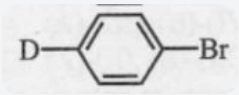
(A)



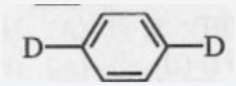
(B)



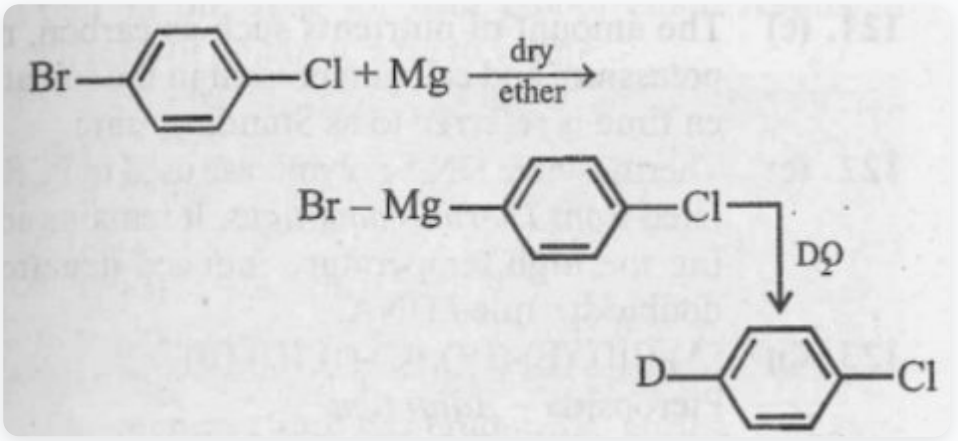
(C)



(D)



Explanation:



Question 96.

Read the following statements and choose the set of correct statements:

(A) Chrome steel is used for cutting tools and crushing machines.

(B) The fine dust of aluminium is used in paints and lacquers.

(C) Copper is used for reduction of alcohol.

(D) Zinc dust is used as a reducing agent in the manufacture of paints.

(E) Iron is used for galvanising zinc.

Choose the most appropriate answer from the options given below:

[4 Marks]

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

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

(C) (A) and (D) only

(D) (D) and (E) only

Explanation:

Chrome steel is used for cutting tools and crushing machines while fine dust of aluminium is used in paints and lacquers. Zinc dust is a reducing agent for manufacture of dye–stuffs and paints. So, statements A, B and D are correct. Copper is used for oxidation of primary and secondary alcohols into aldehydes and ketones respectively at high temperature. So, statement (C) is incorrect. For galvanisation of iron, zinc is used to prevent iron from corrosion so, statement (E) is also incorrect. Hence, correct statements are (A), (B) and (D) only.

Question 97.

Which amongst the following aqueous solutions of electrolytes will have minimum elevation in boiling point? Choose the correct option.

[4 Marks]

(A) 1 M NaCl

(B) 0.1 M $MgSO_4$

(C) 0.1 M KCl

(D) 0.05 M NaCl

Explanation:

Lesser is the number of particles, lower is the elevation in boiling point

Solution	Moles of particles in 1 L solution
0.1 M $MgSO_4$	0.2
1 M NaCl	2
0.05 M NaCl	0.1
0.1 M KCl	0.2

Question 98.

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : Ionisation enthalpies of early actinoids are lower than for early lanthanoids.

Reason (R) : Electrons are entering 5f orbitals in actinoids which experience greater shielding from nuclear charge.

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

[4 Marks]

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

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

(C) (A) is false but (R) is true.

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

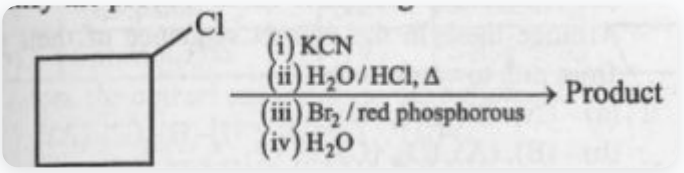
Explanation:

Ionisation enthalpies of early actinoids are lower than early lanthanoids. This is because 5f orbitals will penetrate less into the inner core of electrons. The 5f electrons, will be more effectively shielded from the nuclear charge than the 4f electrons of corresponding lanthanoids.

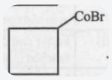
Question 99.

Identify the product in the following reaction.

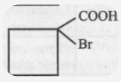
[4 Marks]



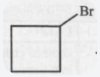
(A)



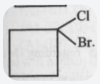
(B)



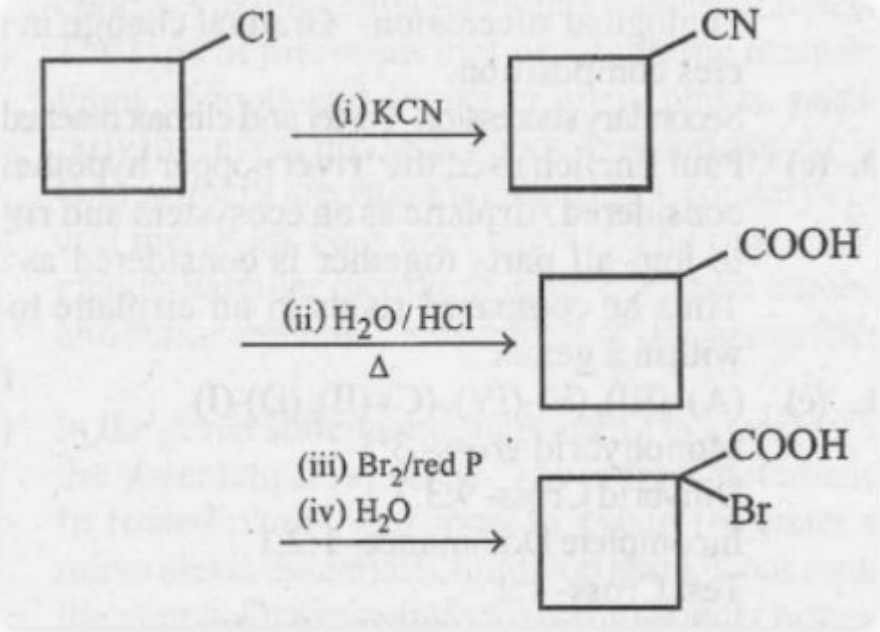
(C)



(D)



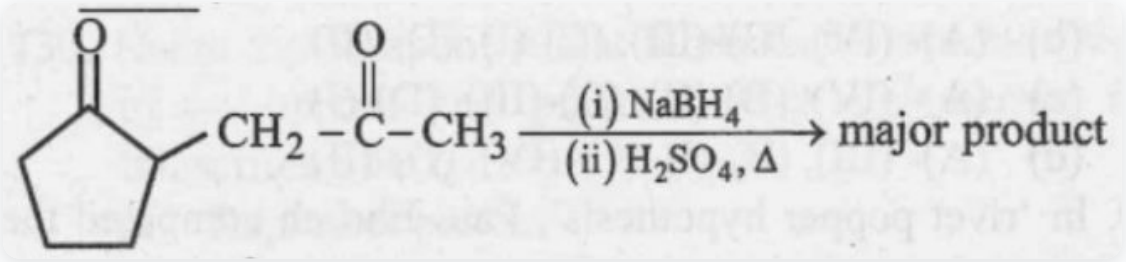
Explanation:



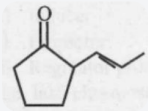
Question 100.

The major product formed in the following conversion is

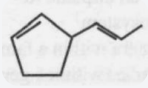
[4 Marks]



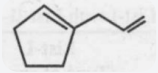
(A)



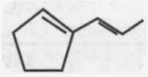
(B)



(C)

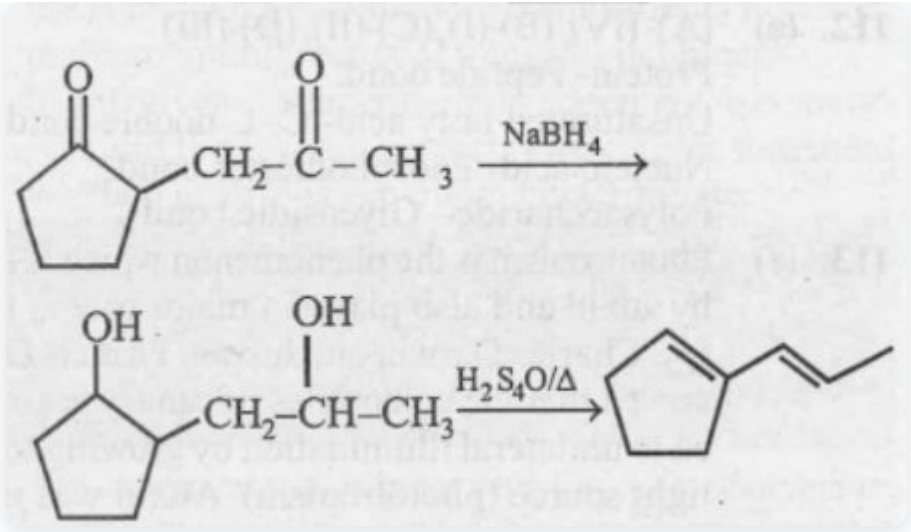


(D)



Explanation:

Major product formed will be a conjugated alkene.



Question 101.

Doubling of the number of chromosomes can be achieved by disrupting mitotic cell division soon after

[4 Marks]

(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

Explanation:

At anaphase the doubling of chromosomes takes place. During this phase the separation of sister chromatids occurs, since mitotic apparatus is disrupted soon after metaphase therefore option (b) is correct.

Question 102.

Match List-I with List-II

Choose the correct answer from the options given below:

[4 Marks]

	List-I		List-II
(A)	Chlorophyll a	(I)	Yellow to yellow orange
(B)	Chlorophyll b	(II)	Yellow green
(C)	Xanthophyll	(III)	Blue green
(D)	Carotenoid	(IV)	Yellow

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

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

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

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

Explanation:

(A)-(III), (B)-(II), (C)-(IV), (D)-(I) Chlorophyll a - Blue green

Chlorophyll b - Yellow green

Xanthophyll - Yellow

Carotenoid - Yellow to yellow orange.

Question 103.

Which classes of algae possess pigment fucoxanthin and pigment phycoerythrin, respectively?

[4 Marks]

(A) Rhodophyceae and Phaeophyceae

(B) Chlorophyceae and Rhodophyceae

(C) Phaeophyceae and Chlorophyceae

(D) Phaeophyceae and Rhodophyceae

Explanation:

Phaeophyceae and Rhodophyceae classes of algae possess pigment fucoxanthin and pigment phycoerythrin, respectively.

Question 104.

Ligation of foreign DNA at which of the following site will result in loss of tetracycline resistance of pBR322?

[4 Marks]

(A) EcoR I

(B) BamH I

(C) Pst I

(D) Pvu I

Explanation:

Ligation of foreign DNA at BamH I site will result in loss of tetracycline resistance of pBR322.

Question 105.

Plants offer rewards to animals in the form of pollen and nectar and the animals facilitate the pollination process. This is an example of :

[4 Marks]

(A) Commensalism

(B) Mutualism

(C) Competition

(D) Amensalism

Explanation:

Mutualism is a type of interaction in which both the organisms are benefitted from each other. Since plants offer rewards to animals in the form of pollen and nectar and the animals facilitate the pollination process so this is an example of mutualism.

Question 106.

In which of the following sets of families, the pollen grains are viable for months?

[4 Marks]

(A) Rosaceae, Liliaceae and Poaceae

(B) Leguminosae, Solanaceae and Rosaceae

(C) Brassicaceae, Liliaceae and Poaceae

(D) Solanaceae, Poaceae and Liliaceae

Explanation:

In some members of Leguminosae, Solanaceae and Rosaceae sets of families, the pollen grains are viable for months.

Question 107.

The species of plants that plays a vital role in controlling the relative abundance of other species in a community is called _____.

[4 Marks]

(A) Exotic species

(B) Keystone species

(C) Alien species

(D) Endemic species

Explanation:

Such type of species of the plants that plays a vital role in controlling the relative abundance of other species in a community is known as Keystone species. They play important role in the maintenance of the species and function of an ecosystem.

Question 108.

The dissolution of synaptonemal complex occurs during

[4 Marks]

(A) Diakinesis

(B) Leptotene

(C) Pachytene

(D) Diplotene

Explanation:

Diplotene is a fourth stage of the prophase of meiosis. During this stage of the chromosome synapsis dissolves. However, chiasmata remain attached.

Question 109.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

	List-I		List-II
(A)	Hydrarch succession	(I)	Gradual change in the species composition
(B)	Xerarch succession	(II)	Faster and climax reached quickly
(C)	Ecological succession	(III)	Lichens to mesic conditions
(D)	Secondary succession	(IV)	Phytoplankton to mesic conditions

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

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

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

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

Explanation:

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

Hydrarch succession → Phytoplankton to mesic conditions.

Xerarch succession → Lichens to mesic conditions.

Ecological succession → Gradual change in the species composition.

Secondary succession → Faster and climax reached quickly.

Question 110.

In river poper hypothesis, Paul Ehrlich compared the rivets in an airplane to

[4 Marks]

(A) Ecosystem

(B) Genera within a family

(C) Species within a genus

(D) Genetic diversity

Explanation:

Paul Ehrlich used the "rivet popper hypothesis" and considered Airplane as ecosystem and rivets used to join all parts together is considered as species. Thus he compared rivets in an airplane to species within a genus.

Question 111.

Match List-I with List-II.

Choose the correct answers from the options given below:

[4 Marks]

	List-I (Type of cross)		List-II (Phenotypic ratio)
(A)	Monohybrid Cross	(I)	1 : 1
(B)	Dihybrid Cross	(II)	1 : 2 : 1
(C)	Incomplete dominance	(III)	3 : 1
(D)	Test Cross	(IV)	9 : 3 : 3 : 1

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

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

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

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

Explanation:

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

Monohybrid cross →3: 1

Dihybrid cross → 9 : 3 : 3 : 1

Incomplete dominance → 1 : 2 : 1

Test cross → 1 : 1

Question 112.

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 bond
(C)	Nucleic acid	(III)	Glycosidic bonds
(D)	Polysaccharide	(IV)	Peptide bonds

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

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

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

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

Explanation:

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

Protein → Peptide bond.

Unsaturated fatty acid → C = C double bonds.

Nucleic acid → Phosphodiester bond.

Polysaccharide → Glycosidic bonds.

Question 113.

The phenomenon which is influenced by auxin and also played a major role in its discovery:

[4 Marks]

(A) Root initiation

(B) Phototropism

(C) Gravitropism

(D) Apical Dominance

Explanation:

Phototropism is the phenomenon which is influenced by auxin and also played a major role in its discovery. Charles Darwin and his son Francis Darwin observed that the coleoptiles of canary grass responded to unilateral illumination by growing towards the light source (phototropism). Auxin was isolated by F.W. Went from tips of coleoptiles of oat seedlings.

Question 114.

In Calotropis, aestivation is:

[4 Marks]

(A) Valvate

(B) Vexillary

(C) Twisted

(D) Imbricate

Explanation:

When sepals or petals in a whorl just touch one another at the margin, without overlapping, said to be valvate such as in *Calotropis*.

Question 115.

Given below are two statements:

Statement I: RuBisCO is the most abundant enzyme in the world.

Statement II: Photorespiration does not occur in C_4 plants.

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

[4 Marks]

(A) Both Statement I and Statement II are correct

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

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

(D) Both Statement I and Statement II are incorrect

Explanation:

Both statements are correct.

RuBisCO is the most abundant enzyme in the world. Photorespiration does not occur in C_4 plants. It takes place in C_3 plants.

Question 116.

Consider the following tissues in the stellar region of a stem showing secondary growth.

(A) Primary xylem

(B) Secondary xylem

(C) Primary phloem

(D) Secondary phloem

Arrange these in the correct sequence of their position from pith towards cortex.

[4 Marks]

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

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

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

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

Explanation:

The correct sequence of tissues in the stellar region of the stem that show secondary growth from pith towards cortex is:

Primary xylem → Secondary xylem → Secondary phloem → Primary phloem.

Question 117.

Identify the correct statements regarding Mass flow hypothesis.

(A) Mass flow is faster than diffusion.

(B) Mass flow is the result of pressure difference between the end points.

(C) Different substances involved in mass flow move at different paces.

(D) Mass flow can result through either a positive or a negative hydrostatic pressure gradient.

Choose the correct answer from the options given below:

[4 Marks]

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

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

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

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

Explanation:

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

According to the Mass flow hypothesis, the statements A, B and D are correct while statement C is incorrect.

Mass flow is the movement of substances in bulk or en masse from one point to another as a result of pressure differences between the two points. It is a characteristic of mass flow that substances, whether in solution or in suspension, are swept along at the same pace, as in flowing river. Bulk flow can be achieved either through a positive hydrostatic pressure gradient (e.g., a garden hose) or a negative hydrostatic pressure gradient (e.g., suction through a straw).

Question 118.

Fatty acids are connected with the respiratory pathway through:

[4 Marks]

(A) Pyruvic acid

(B) Dihydroxy acetone phosphate

(C) α-Ketoglutaric acid

(D) Acetyl CoA

Explanation:

Fatty acids are connected with the respiratory pathway through Acetyl CoA.

Question 119.

Inulin is a polymer of:

[4 Marks]

(A) Amino acids

(B) Glucose

(C) Fructose

(D) Galactose

Explanation:

Inulin is a polymer of fructose.

Question 120.

A heterozygous pea plant with violet flowers was crossed with a homozygous pea plant with white flowers.

Violet is dominant over white. Which one of the Following represents the expected combinations among 40 progenies formed?

[4 Marks]

(A) 30 produced violet and 10 produced white flowers

(B) 20 produced violet and 20 produced white flowers

(C) All 40 produced white flowers

(D) All 40 produced violet flowers

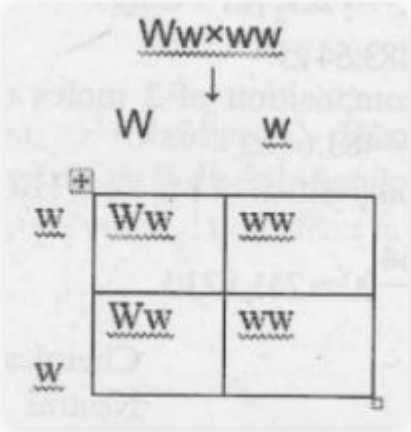
Explanation:

Genotype of heterozygous violet flowers is Ww.

Genotype of homozygous white flower is ww.

According to the cross, the white and violet flowers will be produced in equal proportion that is (20 : 20) out of 40 progenies.

The expected ratio of violet and white flower plant is 1 : 1.



Question 121.

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

[4 Marks]

(A) Humus

(B) Detritus

(C) Standing state

(D) Standing crop

Explanation:

The amount of nutrients such as carbon, nitrogen, potassium and calcium present in the soil at any given time is referred to as Standing state.

Question 122.

Thermostable DNA polymerase used in PCR was isolated from:

[4 Marks]

(A) Bacillus thuringiensis

(B) Agrobacterium tumefaciens

(C) Thermus aquaticus

(D) Escherichia coli

Explanation:

Thermostable DNA polymerase used in PCR was isolated from *Thermus aquaticus*. It remains active during the high temperature induced denaturation of double stranded DNA.

Question 123.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

	List-I		List-II
(A)	Pteropsida	(I)	Psilotum
(B)	Lycopsida	(II)	Equisetum
(C)	Psilopsida	(III)	Adiantum
(D)	Sphenopsida	(IV)	Selaginella

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

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

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

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

Explanation:

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

Pteropsida → *Adiantum*

Lycopsida → *Selaginella*

Psilopsida → *Psilotum*

Sphenopsida → *Equisetum*

Question 124.

What will happen if fresh water lake gets contaminated by addition of polluted water with high BOD?

[4 Marks]

(A) Amount of dissolved oxygen in the lake will decrease

(B) The lake will remain unaffected

(C) Number of submerged aquatic plants in the lake will increase

(D) Number of aquatic animals in the lake will increase

Explanation:

When addition of polluted water with high BOD take place in fresh water lake then the lake gets contaminated and amount of dissolved oxygen in the lake will decrease.

Question 125.

Nitrates and phosphates flowing from agricultural farms into water bodies are a significant cause of:

[4 Marks]

(A) Mineralisation

(B) Stratification

(C) Eutrophication

(D) Humification

Explanation:

Eutrophication is the natural aging of a lake by nutrient enrichment of its water. In a young lake the water is cold and clear, supporting little life. With time, streams draining into the lake introduce nutrients such as nitrogen and phosphorus, which encourage the growth of aquatic organisms and finally converting into land. Thus nitrates and phosphates flowing from agricultural farms into water bodies are a significant cause of Eutrophication.

Question 126.

Transfer of pollen grains from anther to stigma of another flower of same plant is known as:

[4 Marks]

(A) Autogamy

(B) Cleistogamy

(C) Geitonogamy

(D) Xenogamy

Explanation:

Transfer of pollen grain from anther to stigma of another flower of same plant is known as Geitonogamy.

Question 127.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

	List-I		List-II
(A)	Auxin	(I)	Promotes female flower formation in cucumber
(B)	Gibberellin	(II)	Overcoming apical dominance
(C)	Cytokinin	(III)	Increase in the length of grape stalks
(D)	Ethylene	(IV)	Promotes flowering in pineapple

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

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

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

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

Explanation:

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

Auxin → Promotes flowering in pineapple.

Gibberellin → Increase in the length of grape stalks.

Cytokinin → Overcoming apical dominance.

Ethylene → Promotes female flower formation in cucumber.

Question 128.

How many times decarboxylation occurs during each TCA cycle?

[4 Marks]

(A) Once

(B) Twice

(C) Many

(D) Thrice

Explanation:

The TCA cycle starts with the condensation of acetyl group with oxaloacetic acid (OAA) and water to yield citric acid. The reaction is catalysed by the enzyme citrate synthase and a molecule of CoA is released.

Citrate is then isomerised to isocitrate. During this cycle two successive steps of decarboxylation takes place that leads to the formation of α-ketoglutaric acid and then succinyl-CoA. During this cycle, first decarboxylation occurs when isocitrate is converted into α-ketoglutarate and second decarboxylation occurs when α-ketoglutarate is converted into succinyl CoA.

Question 129.

For chemical defence against herbivores, *Calotropis* has:

[4 Marks]

(A) Distasteful quinine

(B) Toxic ricin

(C) Cardiac glycosides

(D) Strychnine

Explanation:

The *Calotropis* is a type of weed that grows in abandoned fields. The plant produces highly poisonous cardiac glycosides that is why never any cattle or goats browsing on this plant.

Calotropis, commonly called milkweed, produces very toxic chemicals called cardiac glycosides that affect the heart. Hence, cattle avoid browsing this plant.

Question 130.

Name the component that binds to the operator region of an operon and prevents RNA polymerase from transcribing the operon.

[4 Marks]

(A) Repressor protein

(B) Inducer

(C) Promoter

(D) Regulator protein

Explanation:

Repressor protein is the component that binds to the operator region of an operon and prevents RNA polymerase from transcribing the operon.

Question 131.

The last chromosome sequenced in Human Genome Project was :

[4 Marks]

(A) Chromosome 22

(B) Chromosome 14

(C) Chromosome 6

(D) Chromosome 1

Explanation:

The last chromosome sequenced in Human Genome Project was Chromosome 1. The sequence of chromosome 1 was completed only in May 2006. This was the last of the 24 human chromosomes - 22 autosomes and X and Y - to be sequenced.

Question 132.

In which disorder change of single base pair in the gene for beta globin chain results in change of glutamic acid to valine?

[4 Marks]

(A) Haemophilia

(B) Phenylketonuria

(C) Sickle cell anaemia

(D) Thalassemia

Explanation:

In sickle cell anaemia disorder change of single base pair in the gene for beta globin chain results in change of glutamic acid to valine.

Question 133.

The transverse section of a plant part showed polyarch, radial and exarch xylem, with endodermis and pericycle. The plant part is identified as :

[4 Marks]

(A) Dicot stem

(B) Monocot stem

(C) Monocot root

(D) Dicot root

Explanation:

The monocot root has epidermis, cortex, endodermis, pericycle, vascular bundles and pith. There are usually more than six (polyarch) xylem bundles in the monocot root. Pith is large and well developed.

Question 134.

In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as _____, _____ and _____ respectively.

[4 Marks]

(A) Standard, Wings and Keel

(B) Keel, Wings and Standard

(C) Vexillum, Keel and Standard

(D) Keel, Standard and Carina

Explanation:

In pea and bean flowers, there are five petals, the largest (standard) overlaps the two lateral petals (wings) which in turn overlap the two smallest anterior petals (keel).

Question 135.

During symport two different molecules move across the membrane

[4 Marks]

(A) in same direction with the help of same carrier

(B) in opposite direction with the help of same carrier

(C) in same direction with the help of different carriers located at different sites in the same cell

(D) in same direction with the help of different carriers located at a common site

Explanation:

During symport two different molecules move across the membrane in same direction with the help of same carrier.

Question 136.

Which of the following mineral ion is not remobilized in plants?

[4 Marks]

(A) Nitrogen

(B) Potassium

(C) Phosphorus

(D) Calcium

Explanation:

The deficiency symptoms tend to appear first in the young tissues whenever the elements are relatively immobile and are not transported out of the mature organs, for example, element like

sulphur and calcium are a part of the structural component of the cell and hence are not easily released.

Question 137.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-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)-(I), (B)-(II), (C)-(III), (D)-(IV)

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

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

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

Explanation:

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

Nitrococcus - Conversion of ammonia to nitrate.

Rhizobium - Conversion of atmospheric nitrogen to ammonia.

Thiobacillus - Denitrification.

Nitrobacter - Conversion of nitrite to nitrate.

Question 138.

In angiosperms the correct sequence of events in formation of female gametophyte in the ovule is

(A) 3 successive free nuclear divisions in functional megaspores.

(B) Degeneration of 3 megaspores.

(C) Meiotic division in megaspore mother cell.

(D) Migration of 3 nuclei towards each pole.

(E) Formation of wall resulting in seven celled embryo sac.

Choose the correct answer from the options given below.

[4 Marks]

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

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

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

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

Explanation:

During the formation of the female gametophyte, first of all the megaspore mother cell (MMC) undergoes meiotic division. In the next step, in a majority of flowering plants, one of the megaspores is functional while the other three degenerate. Then the nucleus of the functional megaspore divides mitotically to form two nuclei which move to the opposite poles, forming the 2-nucleate embryo sac. Two more sequential mitotic nuclear divisions result in the formation of the 4-nucleate and later the 8-nucleate stages of the embryo sac. After the 8-nucleate stage, cell walls are laid down leading to the organisation of the typical female gametophyte or embryo sac. So the correct sequence is the statements of (C), (B), (A), (D), (E).

Question 139.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Kanamycin	(I)	Delivers genes into animal cells
(B)	*ClaI*	(II)	Selectable marker
(C)	Disarmed retro-viruses	(III)	Restriction site
(D)	Kanamycin Rgene	(IV)	Antibiotic resistance

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

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

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

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

Explanation:

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

Kanamycin - Selectable marker

ClaI - Restriction site

Disarmed retroviruses - Deliver genes into animal cell. Kanamycin Rgene. - Antibiotic resistance.

Question 140.

Which of the following statements is true?

[4 Marks]

(A) Most algal genera are diplontic

(B) Seed bearing plants follow haplontic pattern

(C) All pteridophytes exhibit haplo-diplontic pattern

(D) Most bryophytes do not have haplo-diplontic life cycle

Explanation:

Pteridophytes are the first terrestrial plants to possess vascular tissues - xylem and phloem. All pteridophytes exhibit haplo-diplontic pattern of lifecycle.

Question 141.

Consider the following plant tissues:

(A) Axillary buds

(B) Fascicular vascular cambium

(C) Interfascicular cambium

(D) Cork cambium

(E) Intercalary meristem

Identify the lateral meristems among the above.

[4 Marks]

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

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

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

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

Explanation:

The type of meristem that occurs in the mature regions of roots and shoots of many plants, particularly those that produce woody axis and appear later than primary meristem is called the secondary or lateral meristem. They are cylindrical meristems. Fascicular vascular cambium, interfascicular cambium and cork-cambium are examples of lateral meristems.

Question 142.

A certain plant homozygous for yellow seeds and red flowers was crossed with a plant homozygous for green seeds and white flowers. The F_1 plants had yellow seeds and pink flowers. The F_1 plants were selfed to get F_2 progeny. Assuming independent assortment of the two characters, how many phenotypic categories are expected for these characters in the F_2 generation?

[4 Marks]

(A) 4

(B) 6

(C) 9

(D) 16

Explanation:

6 is correct answer.

Question 143.

Given below are two statements :

Statement I: The process of translocation through phloem is unidirectional but through xylem, it is bidirectional.

Statement II: The most readily mobilized elements are phosphorus, sulphur, nitrogen and potassium.

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

[4 Marks]

(A) Both Statement I and Statement II are correct

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

(C) Both Statement I and Statement II are incorrect

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

Explanation:

In the given statements, statement I is incorrect and the statement II is correct. The correct statement is- In rooted plants, transport in xylem (of water and minerals) is essentially unidirectional, from roots to the stems. Organic and mineral nutrients however, undergo multidirectional transport in phloem.

Question 144.

Which of the following statements is not correct?

[4 Marks]

(A) Cells in the meristematic phase of growth exhibit abundant plasmodesmatal connections.

(B) Phase of cell elongation of plant cells is characterized by increased vacuolation.

(C) Plant growth is generally determinate.

(D) Plant growth is measurable.

Explanation:

In the given statements, only statement 1 is incorrect and the rest are correct. The correct statement is- Plant growth is generally indeterminate.

Question 145.

Which of the following statement is incorrect about Agrobacterium tumifaciens?

[4 Marks]

(A) It is used to deliver gene of interest in both prokaryotic as well as eukaryotic host cells.

(B) It transforms normal plant cells into tumorous cells.

(C) 'Ti' plasmid from Agrobacterium tumifaciens used for gene transfer is not pathogenic to plant cells.

(D) It delivers 'T-DNA' into plant cell.

Explanation:

The statement that is incorrect about Agrobacterium tumifaciens is statement

. The correct statement is that Agrobacterium tumifaciens is used to deliver gene of interest into a variety of plant i.e., in eukaryotic host cells and not in any prokaryotic cell. All other given statements are correct about Agrobacterium tumifaciens.

Question 146.

Given below are two statements :

Statement I : The process of copying genetic information from one strand of the DNA into RNA is termed as transcription.

Statement II : A transcription unit in DNA is defined primarily by the three regions in the DNA, i.e., a promotor, the structural gene and a terminator.

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

Explanation:

Both the statements are correct. The process of copying genetic information from one strand of the DNA into RNA is termed as transcription. A transcription unit in DNA is defined primarily by the three regions in the DNA: (i) A Promoter (ii) The Structural gene (iii) A Terminator

Question 147.

Which scientist conducted an experiment with ^{32}P and ^{35}S labelled phages for demonstrating that DNA is the genetic material?

[4 Marks]

(A) F. Griffith

(B) O.T. Avery, C.M. MacLeod and M. McCarty

(C) James D. Watson and F.H.C. Crick

(D) A.D. Hershey and M.J. Chase

Explanation:

Hershey and Chase used 32P and 35S labelled phages for their experiment to discover whether it was protein or DNA from the viruses that entered the bacteria. They grew some viruses on a medium that contained radioactive phosphorus and some others on medium that contained radioactive sulfur. Viruses grown in the presence of radioactive phosphorus contained radioactive DNA but not radioactive protein because DNA contains phosphorus but protein does not. Similarly, viruses grown on radioactive sulfur contained radioactive protein but not radioactive DNA because DNA does not contain sulfur.

Question 148.

Which out of the following statements is incorrect?

[4 Marks]

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

(B) Stroma lamellae lack PS II and NADP reductase

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

(D) Both ATP and NADPH + H^+ are synthesised during non-cyclic photophosphorylation.

Explanation:

In the given statements Cyclic photophosphorylation involves both PS I and PS II is only correct.

The correct statement is- In cyclic photophosphorylation only PS I is functional. In this system the electron is circulated within the photosystem and the phosphorylation occurs due to cyclic flow of electrons. This process takes place in the stroma lamellae.

Question 149.

During which stages of mitosis and meiosis, respectively does the centromere of each chromosome split?

[4 Marks]

(A) Telophase, Anaphase I

(B) Anaphase, Anaphase II

(C) Metaphase, Metaphase II

(D) Prophase, Telophase I

Explanation:

During anaphase stage of mitosis and anaphase II stage of meiosis the centromere of each chromosome splits and moves towards the opposite poles.

Question 150.

Match the following.

Select the correct option :

[4 Marks]

	Type of flower		Example
(A)	Zygomorphic	(I)	Mustard
(B)	Hypogynous	(II)	Plum
(C)	Perigynous	(III)	*Cassia*
(D)	Epigynous	(IV)	Cucumber

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

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

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

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

Explanation:

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

Zygomorphic - Cassia

Hypogynous - Mustard

Perigynous - Plum

Epigynous - Cucumber

Question 151.

Which of the following statements are correct with respect to the hormone and its function?

(A) Thyrocalcitonin (TCT) regulates the blood calcium level.

(B) In males, FSH and androgens regulate spermatogenesis.

(C) Hyperthyroidism can lead to goitre.

(D) Glucocorticoids are secreted in Adrenal Medulla.

(E) Parathyroid hormone is regulated by circulating levels of sodium ions.

Choose the most appropriate answer from the options given below :

[4 Marks]

(A) (B) and (C) only

(B) (A) and (D) only

(C) (C) and (E) only

(D) (A) and (B) only

Explanation:

In the given statements, only statements (A) and (B) are correct about the hormone and its functions. Statements (C), (D) and (E) are incorrect. The correct statements are- Goitre is a form of hypothyroidism. Glucocorticoids are secreted in Adrenal Cortex. The parathyroid glands secrete a peptide hormone called parathyroid hormone (PTH). The secretion of PTH is regulated by the circulating levels of calcium ions.

Question 152.

'X' and 'Y' are the components of Binomial nomenclature. This naming system was proposed by 'Z' :

[4 Marks]

(A) X - Specific epithet, Y - Generic name, Z - Carolus Linnaeus

(B) X - Generic name, Y - Specific epithet, Z - R.H. Whittaker

(C) X - Generic name, Y - Specific epithet, Z - Carolus Linnaeus

(D) X - Specific epithet, Y - Generic name, Z - R.H. Whittaker

Explanation:

Binomial nomenclature has two components - the Generic name and the specific epithet. This naming system was given by Carolus Linnaeus. Thus, X - Generic name, Y - Specific epithet, Z - Carolus Linnaeus.

Question 153.

Select the sequence of steps in Respiration.

(A) Diffusion of gases (O_2 and CO_2) across alveolar membrane.

(B) Diffusion of O_2 and CO_2 between blood and tissues.

(C) Transport of gases by the blood.

(D) Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.

(E) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2.

Choose the correct answer from the options given below:

[4 Marks]

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

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

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

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

Explanation:

The sequences of respiration are:- (D) Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out → (A) Diffusion of gases (O_2 and CO_2) across alveolar membrane → (C) Transport of gases by the blood → (B) Diffusion of O_2 and CO_2 between blood and tissues→ (E) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2.

Question 154.

Which of the following is/are cause(s) of biodiversity losses?

[4 Marks]

(A) Over-exploitation only

(B) Habitat loss and fragmentation only

(C) Over-exploitation, habitat loss and fragmentation

(D) Climate change only

Explanation:

The accelerated rates of species extinctions that the world is facing now are largely due to human activities. The four major causes of loss of biodiversity are- Habitat loss and fragmentation Over-exploitation Alien species invasions Co-extinctions

Question 155.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

List-I	List-II
(A) Terpenoides	(I) Codeine
(B) Lectins	(II) Diterpenes
(C) Alkaloids	(III) Ricin
(D) Toxins	(IV) Concanavalin A

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

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

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

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

Explanation:

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

Terpenoides→ Diterpenes

Lectins → Concanavalin A

Alkaloids → Codeine

Toxins→ Ricin

Question 156.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

List-I	List-II
(A) Palm bones	(I) Phalanges
(B) Wrist bones	(II) Metacarpals
(C) Ankle bones	(III) Carpals
(D) Digit bones	(IV) Tarsals

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

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

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

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

Explanation:

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

Palm bones → Metacarpals

Wrist bones → Carpals

Ankle bones → Tarsals

Digit bones → Phalanges

Question 157.

Which of the following sexually transmitted infections are completely curable?

[4 Marks]

(A) Genital herpes and Genital warts

(B) HIV infection and Trichomoniasis

(C) Hepatitis-B and Genital herpes

(D) Syphilis and Trichomoniasis

Explanation:

Gonorrhoea, syphilis, genital herpes, chlamydiasis, genital warts, trichomoniasis, hepatitis-B and HIV infection are sexually transmitted infections. Except for hepatitis-B, genital herpes and HIV infections, other diseases are completely curable if detected early and treated properly.

Question 158.

Which of the following can act as molecular scissors?

[4 Marks]

(A) RNA polymerase

(B) DNA polymerase

(C) Restriction enzymes

(D) DNA ligase

Explanation:

Restriction enzyme is a type of enzyme that is used to cut the DNA molecule near a specific sequence of bases. So it is also called as molecular scissors.

Question 159.

Select correct sequence of substages of Prophase-I of meiotic division:

(A) Zygotene

(B) Pachytene

(C) Diakinesis

(D) Leptotene

(E) Diplotene

Choose the correct answer from the options given below:

[4 Marks]

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

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

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

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

Explanation:

Prophase I of the first meiotic division is typically longer and more complex. It has been further subdivided into the following five phases based on chromosomal behaviour, i.e., Leptotene, Zygotene, Pachytene, Diplotene and Diakinesis. So the correct sequence of substages of Prophase-I of meiotic division is (D), (A), (B), (E), (C).

Question 160.

Given below are two statements:

Statement I: RNA being unstable, mutate at a faster rate.

Statement II: RNA can directly code for synthesis of proteins, hence can easily express the characters.

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

[4 Marks]

(A) Both Statement I and Statement II are false

(B) Both Statement I and Statement II are true

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

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

Explanation:

Both the statements are correct. RNA being unstable, mutate at a faster rate. Consequently, viruses having RNA genome and having shorter life span mutate and evolve faster. RNA can directly code for the synthesis of proteins, hence can easily express the characters.

Question 161.

Given below are two statements:

Statement I : Goblet cells are unicellular glands.

Statement II : Earwax is the secretion of exocrine gland.

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Statement I is true but Statement II is false

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

(D) Both Statement I and Statement II are false

Explanation:

Both the statements are correct.

Goblet cells are unicellular glands.

Earwax is the secretion of exocrine gland.

Question 162.

If there are 250 snails in a pond, and within a year their number increases to 2500 by reproduction. What should be their birth rate per snail per year?

[4 Marks]

(A) 25

(B) 15

(C) 10

(D) 9

Explanation:

In the question initial population = 250, final population = 2500 and time = 1 year are given.

So change in population = Final population − Initial population

= 2500 − 250 = 2250

So birth rate = 2250/250 × 1 = 9.

Question 163.

Given below are two statements regarding oogenesis.

Statement I : The primary follicles get surrounded by more layers of granulosa cells, a theca and shows fluid filled cavity antrum. Now it is called secondary follicle.

Statement II : Graafian follicle ruptures to release the secondary oocyte from the ovary by the process called ovulation.

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

[4 Marks]

(A) Both Statement I and Statement II are false

(B) Both Statement I and Statement II are true

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

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

Explanation:

Statement II is correct and Statement I is incorrect.

Each primary oocyte gets surrounded by a layer of granulosa cells and is called the primary follicle. The primary follicle gets surrounded by more layers of granulosa cells and a new theca layer and are called secondary follicles. The secondary follicle soon transforms into a tertiary follicle which is characterised by a fluid filled cavity called antrum.

Question 164.

House fly belongs to _____ family.

[4 Marks]

(A) Calliphoridae

(B) Cyprinidae

(C) Hominidae

(D) Muscidae

Explanation:

House fly belongs to the family of Muscidae.

Housefly belongs to the family Muscidae, class Insecta and phylum Arthropoda.

Question 165.

Diacetyl morphine is also called as:

[4 Marks]

(A) Crack

(B) Smack

(C) Amphetamine

(D) Barbiturate

Explanation:

Smack is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine.

Question 166.

Which of the following statements are correct?

(A) Reproductive health refers to total well-being in all aspects of reproduction.

(B) Amniocentesis is legally banned for sex determination in India.

(C) "Saheli" - a new oral contraceptive for females was developed in collaboration with ICMR (New Delhi).

(D) Amniocentesis is used to determine genetic disorders and survivability of foetus.

Choose the most appropriate answer from the options given below:

[4 Marks]

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

(B) (A) and (C) only

(C) (B) and (C) only

(D) (D) and (C) only

Explanation:

In the given statements, statements (A), (B) and (D) only are correct while statement (C) is incorrect.

Question 167.

Which one of the following is the quiescent stage of cell cycle?

[4 Marks]

(A) G_1

(B) G_2

(C) G_0

(D) M

Explanation:

Certain cells do not divide further etc. G_1 phase to enter an inactive stage called quiescent stage (G_0) of the cell cycle. Cells in this stage remain metabolically active but no longer proliferate unless called on to do so depending on the requirement of the organism.

Question 168.

Match List-I with List-II.

Choose the correct answer from the options given below:

[4 Marks]

	List-I (ECG)		List-II (Electrical activity of heart)
(A)	P-wave	(I)	Depolarisation of ventricles
(B)	QRS complex	(II)	End of systole
(C)	T wave	(III)	Depolarisation of atria
(D)	End of T wave	(IV)	Repolarisation of ventricles

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

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

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

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

Explanation:

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

P-wave → Depolarisation of atria.

QRS complex → Depolarisation of ventricles.

T-wave → Repolarisation of ventricles.

End of T-wave → End of systole.

Question 169.

Which of the following is not a secondary metabolite?

[4 Marks]

(A) Anthocyanin

(B) Curcumin

(C) Morphine

(D) Lecithin

Explanation:

Alkaloids such as morphine, cannabinoids, rubber, essential oils, antibiotics, coloured pigments, scents, gums, spices. These are called secondary metabolites. Lecithin is not a secondary metabolite. It is a phospholipid that is found in cell membrane.

Question 170.

Given below are two statements:

Statement I : Intra Cytoplasmic Sperm Injection (ICSI) is another specialised procedure of in-vivo fertilisation.

Statement II : Infertility cases due to inability of the male partner to inseminate female can be corrected by artificial insemination (AI).

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Statement is incorrect but Statement II is true

(C) Both Statement I and Statement I are false

(D) Statement 1is correct but Statement II is false

Explanation:

Statement I is incorrect but Statement II is true.

The correct statement is that Intra Cytoplasmic Sperm Injection (ICSI) is the another specialised procedure of *in-vitro* fertilization to correct infertility cases due to the inability of the male partner to inseminate the female or due to very low sperm counts in the ejaculates, could be corrected by artificial insemination.

Question 171.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List - I	List - II
(A) Eosinophils	(I) 6 - 8%
(B) Lymphocytes	(II) 2 - 3%
(C) Neutrophils	(III) 20 - 25%
(D) Monocytes	(IV) 60 - 65%

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

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

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

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

Explanation:

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

Eosinophils → 2-3%

Lymphocytes → 20-25%

Neutrophils → 60-65%

Monocytes → 6-8%

Question 172.

Select incorrect statement, regarding chemical structure of insulin.

[4 Marks]

(A) C-peptide is not present in mature insulin molecule.

(B) Polypeptide chains A and B are linked by disulphide bridges.

(C) Mature insulin molecule consists of three polypeptide chains - A, B and C.

(D) Insulin is synthesized as prohormone which contains extra stretch of C-peptide.

Explanation:

In the given question only statement (c) is incorrect about chemical structure of insulin. The correct statement is that the mature insulin does not contain C-peptide chain which is removed during maturation of pro-insulin into insulin. Thus it has only two polypeptide chains that are only A and B chains.

Question 173.

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : Ascending limb of loop of Henle is impermeable to water and allows transport of electrolytes actively or passively.

Reason (R) : Dilution of filtrate takes place due to efflux of electrolytes in the medullary fluid.

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

[4 Marks]

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

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

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

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

Explanation:

In the given question, both assertion and reason are true but reason is not the correct explanation of assertion. Ascending limb of loop of Henle is impermeable to water and allows transport of electrolytes actively or passively. Dilution of filtrate takes place due to efflux of electrolytes in the medullary fluid.

Question 174.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List - I	List - II
(A) Typhoid	(I) Protozoan
(B) Elephantiasis	(II) Salmonella
(C) Ringworm	(III)Aschelminthes
(D) Malaria	(IV) Microsporum

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

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

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

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

Explanation:

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

Typhoid → *Salmonella*

Elephantiasis → *Aschelminthes*

Ringworm → *Microsporum*

Malaria → Protozoan

Question 175.

The Cockroach is :

[4 Marks]

(A) Ureotelic only

(B) Ureotelic and Uricotelic

(C) Uricotelic only

(D) Ammonotelic only

Explanation:

Insects such as cockroaches excrete nitrogenous wastes as uric acid and thus are called *uricotelic*.

Question 176.

Brainstem of human brain consists of:

[4 Marks]

(A) Amygdala, Hippocampus and Corpus Callosum

(B) Mid-brain, Pons and Medulla Oblongata

(C) Thalamus, Hypothalamus and Corpora quadrigemina

(D) Forebrain, Cerebellum and Pons

Explanation:

There are three major regions that make up the brain stem; mid brain, pons and medulla oblongata. Brain stem forms the connections between the brain and spinal cord.

Question 177.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Non-medicated IUDs	(i)	Multiload 375
(B)	Copper releasing IUDs	(ii)	Rubber barrier
(C)	Hormone releasing IUDs	(iii)	Lippes loop
(D)	Vaults	(iv)	LNG- 20

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

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

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

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

Explanation:

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

Non-medicated IUDs → Lippes loop

Copper releasing IUDs → Multiload 375

Hormone releasing IUDs → LNG-20

Vaults → Rubber barrier

Question 178.

Which one of the following acts as an inducer for lac operon?

[4 Marks]

(A) Galactose

(B) Glucose

(C) Sucrose

(D) Lactose

Explanation:

Lactose is the substrate for the enzyme beta-galactosidase and it regulates switching on and off of the operon. So it is termed as inducer.

Question 179.

Identify the fossil of man who showed the following characteristics.

(A) Brain capacity of 1400 cc

(B) Used hides to protect their body

(C) Buried their dead bodies

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

[4 Marks]

(A) Homo habilis

(B) Australopithecus

(C) Homo erectus

(D) Neanderthal man

Explanation:

The given characteristics are characteristics of the Neanderthal man that has a brain size of 1400cc, lived in near east and central Asia between 1,00,000-40,000 years back. They used hides to protect their body and buried their dead.

Question 180.

Arrange the sequence of different hormones for their role during gametogenesis.

(A) Gonadotropin LH stimulates synthesis and secretion of Androgen

(B) Gonadotropin releasing hormone from hypothalamus

(C) Androgen stimulates spermatogenesis

(D) Gonadotropin FSH helps in the process of spermiogenesis

(E) Gonadotropins from anterior pituitary gland

Choose the correct answer from the options given below:

[4 Marks]

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

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

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

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

Explanation:

The correct sequence of different hormones for their role during gametogenesis is:-(B) Gonadotropin releasing hormone from hypothalamus → (E) Gonadotrophin from anterior pituitary gland → (A) Gonadotropin LH stimulates synthesis and secretion of Androgen → (C) Androgen stimulates spermatogenesis → (D) Gonadotropin FSH helps in the process of spermiogenesis.

Question 181.

Given below are two statements:

Statement I : In bacteria, the mesosomes are formed by the extensions of plasma membrane.

Statement II: The mesosomes, in bacteria, help in DNA replication and cell wall formation.

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

[4 Marks]

(A) Both Statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect

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

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

Explanation:

Both Statement I and Statement II are correct. In bacteria, the mesosomes are formed by the extensions of plasma membrane. The mesosomes, in bacteria, help in DNA replication and cell wall formation.

Question 182.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Deforestation	(I)	Responsible for heating of Earth's surface and atmosphere
(B)	Reforestation	(II)	Conversion of forested areas to non-forested areas
(C)	Green-house effect	(III)	Natural ageing of lake by nutrient enrichment of its water
(D)	Eutrophication	(IV)	Process of restoring a forest that once existed but was removed

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

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

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

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

Explanation:

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

Deforestation → Conversion of forested areas to non-forested areas.

Reforestation → Process of restoring a forest that once existed but was removed.

Green-house effect → Responsible for heating earth's surface and atmosphere.

Eutrophication → Natural ageing of lake by nutrient enrichment of its water.

Question 183.

Select the correct statements about sickle cell anaemia.

(A) There is a change in gene for beta globin.

(B) In the beta globin, there is valine in the place of Lysine.

(C) It is an example of point mutation.

(D) In the normal gene U is replaced by A.

Choose the correct answer from the options given below:

[4 Marks]

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

(B) (A) and (C) only

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

(D) (B) and (D) only

Explanation:

In the given statements about sickle cell anaemia only statement (A) and (C) are correct. Sickle cell anaemia occurs due to change in a single base pair of DNA. This is an example of point mutation. The defect is caused by the substitution of Glutamic acid (Glu) by Valine (Val) at the sixth position of the beta globin chain of the haemoglobin molecule. The substitution of amino acid in the globin protein results due to the single base substitution at the sixth codon of the beta globin gene from GAG to GUG.

Question 184.

Given below are two statements:

Statement I : The nose contains mucus-coated receptors which are specialised for receiving the sense of smell and are called olfactory receptors.

Statement II : Wall of the eye ball has three layers. The external layer is called choroid (dense connective tissue), middle layer is sclera (thin pigmented layer) and internal layer is retina (ganglion cells, bipolar cells and photoreceptor cells).

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

Explanation:

Statement I is true but Statement II is false. The adult human eye ball is nearly a spherical structure. The wall of the eye ball is composed of three layers. The external layer is composed of a dense connective tissue and is called the sclera. The anterior portion of this layer is called the cornea. The middle layer is known as choroid.

Question 185.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Contractile vacuole	(I)	*Asterias*
(B)	Water vascular system	(II)	*Amoeba*
(C)	Canal system	(III)	*Spongilla*
(D)	Flame cells	(IV)	*Taenia*

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

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

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

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

Explanation:

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

Contractile vacuole → Amoeba

Water vascular system → Asterias

Canal system → Spongilla

Flame cells → Taenia

Question 186.

Arrange the events of Renin - Angiotensin mechanism in correct sequence.

(A) Activation of JG cells and release of renin.

(B) Angiotensin II activates release of aldosterone.

(C) Fall in glomerular blood pressure.

(D) Reabsorption of Na^+ and water from distal convoluted tubule.

(E) Angiotensinogen is converted to Angiotensin I and then to Angiotensin II.

Choose the correct answer from the options given below :

[4 Marks]

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

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

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

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

Explanation:

The correct sequence of the events of Renin-Angiotensin mechanism is:-(C) Fall in glomerular blood pressure' !(A) Activation of J.G cells and release of renin' !(E) Angiotensinogen is converted to Angiotensin I and then to Angiotensin II ' !(B) Angiotensin II activates release of aldosterone ! (D) Reabsorption of Na+ and water from distal convoluted tubule.

Question 187.

Select the correct statements :

(A) Platyhelminthes are triploblastic pseudocoelomate and bilaterally symmetrical organisms.

(B) Ctenophores reproduce only sexually and fertilization is external.

(C) In tapeworm, fertilization is internal but sexes are not separate.

(D) Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.

(E) In sponges, fertilization is external and development is direct.

Choose the correct answer from the options given below:

[4 Marks]

(A) (A) and (E) only

(B) (B) and (D) only

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

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

Explanation:

Only statement (B), (C) and (D) are correct. Ctenophores reproduce only sexually and fertilization is external. In tapeworm, fertilization is internal but sexes are not separate. Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.

Question 188.

Select the correct sequential steps regarding absorption of fatty acids and glycerol, in intestine.

(A) Micelles are reformed into small protein coated fat globules called chylomicrons.

(B) Micelles move into intestinal mucosa.

(C) Fatty acids and glycerol are incorporated into small droplets called micelles.

(D) Lacteals release the absorbed substances into blood stream.

(E) Chylomicrons are transported into lacteals.

Choose the correct answer from the options given below

[4 Marks]

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

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

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

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

Explanation:

The correct sequential steps regarding absorption of fatty acids and glycerol, in intestine is:-(C) Fatty acid and glycerol are incorporated into small droplets called micelles !(B) Micelles move into intestinal mucosa !(A) Micelles are reformed into small protein coated fat globules called chylomicrons !(E) Chylomicrons are transported into lacteals !(D) Lacteals release the absorbed substances into blood stream.

Question 189.

Given below are two statements :

Statement I : In cockroach, the forewings are transparent and prothoracic in origin.

Statement II : In cockroach, the hind wings are opaque, leathery and mesothoracic in origin.

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

[4 Marks]

(A) Both Statement I and Statement II are true

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

(C) Both Statement I and Statement II are false

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

Explanation:

Both Statement I and Statement II are false. The correct statatements are:- In cockroach forewings (mesothoracic) called tegmina are opaque dark and leathery and cover the hind wings when at rest. The hind wings are transparent, membranous and are used in flight.

Question 190.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Cytokine barriers	(I)	Mucus coating of respiratory tract
(B)	Cellular barriers	(II)	Interferons
(C)	Physiological barriers	(III)	Neutrophils and Macrophages
(D)	Physical barriers	(IV)	Tears and Saliva

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

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

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

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

Explanation:

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

Cytokine barriers ! Interferons

Cellular barriers ! Neutrophils and macrophages Physiological barriers ! Tears and saliva

Physical barriers ! Mucus coating of respiratory tract

Question 191.

With reference to Hershey and Chase experiments. Select the correct statements.

(A) Viruses grown in the presence of radioactive phosphorus contained radioactive DNA.

(B) Viruses grown on radioactive sulphur contained radioactive proteins.

(C) Viruses grown on radioactive phosphorus contained radioactive protein.

(D) Viruses grown on radioactive sulphur contained radioactive DNA.

(E) Viruses grown on radioactive protein contained radioactive DNA.

Choose the most appropriate answer from the options given below :

[4 Marks]

(A) (A) and (C) only

(B) (B) and (D) only

(C) (D) and (E) only

(D) (A) and (B) only

Explanation:

According to Hershey and Chase experiment only statement (A) and (B) are corrects. Hershey and Chase grew some viruses on a medium that contained radioactive phosphorus and some others on medium that contained radioactive sulfur. Viruses grown in the presence of radioactive phosphorus contained radioactive DNA but not radioactive protein because DNA contains phosphorus but protein does not. Similarly, viruses grown on radioactive sulfur contained radioactive protein but not radioactive DNA because DNA does not contain sulphur.

Question 192.

The salient features of genetic code are :

(A) The code is palindromic

(B) UGA act as initiator codon

(C) The code is unambiguous and specific

(D) The code is nearly universal

Choose the most appropriate answer from the options given below :

[4 Marks]

(A) (B) and (C) only

(B) (A) and (B) only

(C) (B) and (C) only

(D) (A) and (D) only

Explanation:

Only statements (C) and (D) are correct about genetic code. The characteristics of genetic code are:- The codon is triplet. Some amino acids are coded by more than one codon, so the code is degenerate. The codon is read in mRNA in a contiguous fashion. The code is nearly universal. AUG has dual functions. It codes for Methionine (met), and it also act as initiator codon. UAA, UAG, UGA are stop terminator codons.

Question 193.

Select the correct statements regarding dissolved Oxygen and Biochemical oxygen demand.

(A) BOD is inversely related to dissolved oxygen.

(B) Low dissolved oxygen and high BOD lead to loss of aquatic life.

(C) High BOD leads to high dissolved oxygen.

(D) Both BOD and dissolved oxygen are indicator of health of a water body.

(E) Both BOD and dissolved oxygen are affected by amount of organic matter in the water body.

Choose the most appropriate answer from the options given below :

[4 Marks]

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

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

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

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

Explanation:

The correct statements regarding dissolved Oxygen and biochemical oxygen demand are statements (A), (B), (D), and (E) only. BOD is inversely related to dissolved oxygen. Low dissolved oxygen and high BOD lead to loss of aquatic life. High BOD leads to high dissolved oxygen. Both BOD and dissolved oxygen are indicator of health of a water body. Both BOD and dissolved oxygen are affected by amount of organic matter in the water body.

Question 194.

Select the incorrect statement with respect to Multiple Ovulation Embryo Transfer (MOET) Technology.

[4 Marks]

(A) Cow is administered with hormones to induce super-ovulation.

(B) Super-ovulating cow is either mated with elite bull or is artificially inseminated.

(C) It is used to increase herd size in a short time.

(D) Fertilised eggs at 4 to 6 cells - stages are recovered non-surgically from super-ovulating cow and transferred to surrogate mother.

Explanation:

In Multiple Ovulation Embryo Transfer (MOET) Technology, the fertilised eggs at 8–32 cells stages, are recovered non-surgically and transferred to surrogate mothers.

Question 195.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

	List-I		List-II
(A)	Gene therapy	(I)	Separation of DNA fragments
(B)	RNA interference	(II)	Diagnostic test for AIDS
(C)	ELISA	(III)	Cellular defence
(D)	Gel electrophoresis	(IV)	Allows correction of a gene defect

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

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

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

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

Explanation:

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

Gene therapy ! Allows correction of a gene defect.

RNA interferance → Cellular defence.

ELISA ! Diagnostic test for AIDS.

Gel Electrophoresis ! Separation of DNA fragments.

Question 196.

Given below are two statements:

Statement I : Parathyroid hormone acts on bones and stimulates the process of bone resorption.

Statement II : Parathyroid hormone along with Thyrocalcitonin plays a significant role in carbohydrate metabolism.

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

[4 Marks]

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

Explanation:

Statement I is correct but Statement II is false. The correct statement is :- Parathyroid hormone(PTH) along with TCT plays a significant role in calcium balance in the body.

Question 197.

Select the correct statement/s with respect to mechanism of sex determination in Grasshopper.

(A) It is an example of female heterogamety.

(B) Male produces two different types of gametes either with or without X chromosome.

(C) Total number of chromosomes (autosomes and sex chromosomes) is same in both males and females.

(D) All eggs bear an additional X chromosome besides the autosomes.

Choose the correct answer from the options given below:

[4 Marks]

(A) (A) only

(B) (A) and (C) only

(C) (B) and (D) only

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

Explanation:

The correct statements with respect to mechanism of sex determination in Grasshopper are only statements (B) and (D). Male Grasshopper produces two different types of gametes either with or without X chromosome. All eggs bear an additional X chromosome besides the autosomes.

Question 198.

Match List-I with List-II.

Choose the correct answer from the options given below.

[4 Marks]

List-I	List-II
(A) Columnar epithelium	(I) Ducts of glands
(B) Ciliated epithelium	(II) Inner lining of stomach and intestine
(C) Squamous epithelium	(III) Inner lining of bronchioles
(D) Cuboidal epithelium	(IV) Endothelium

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

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

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

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

Explanation:

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

Columnar epithelium → Inner lining of stomach and intestine.

Ciliated epithelium → Inner lining of bronchioles Squamous epithelium → Endothelium

Cuboidal epithelium → Ducts of glands.

Question 199.

Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

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 answer from the options given below :

[4 Marks]

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

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

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

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

Explanation:

Both assertion and reason are true and reason is the correct explanation of assertion. Some organisms possess adaptations that are physiological which allow them to respond quickly to a stressful situation. When a person goes to high altitude experiences altitude sickness. Its symptoms include nausea, fatigue and heart palpitations. This is because in the low atmospheric pressure of high altitudes, the body does not get enough oxygen.

Question 200.

Which of the following statements are correct with respect to Golgi apparatus?

(A) It is the important site of formation of glycoprotein and glycolipids.

(B) It produces cellular energy in the form of ATP.

(C) It modifies the protein synthesized by ribosomes on ER.

(D) It facilitates the transport of ions.

(E) It provides mechanical support.

Choose the most appropriate answer from the options given below :

[4 Marks]

(A) (A) and (D) only

(B) (D) and (E) only

(C) (B) and (C) only

(D) (A) and (C) only

Explanation:

Only statements (A) and (C) are correct about Golgi apparatus. Golgi apparatus is the important site of formation of glycoprotein and glycolipids. It modifies the protein synthesized by ribosomes on ER.