GUJCET 2024 Question Paper with Solution Mar 31 (Physics and Chemistry)

GUJCET Physics Questions

Ques 1. The magnitude of the drift velocity per unit electric field is known as ____.

Ans. Mobility
Solun. The magnitude of the drift velocity per unit electric field is indeed known as mobility. It's a measure of how easily charge carriers (such as electrons or holes) can move through a material in response to an electric field.

Ques 2. A solenoid has a core of a material with a relative permeability of 400. The solenoid windings are insulated from the core and carry a current of 2A. If the number of turns is 1000 per meter then the value of magnetic intensity will be ____.

Ans. 8×10^5 Am^{-1}
Solun. The magnetic intensity, often denoted by H, is defined as the magnetic field strength within a material. It can be calculated using Ampere's law:
H = N * I / l
Where:
- H is the magnetic intensity in amperes per meter (A/m).
- N is the number of turns per unit length, given as 1000 turns per meter.
- I is the current flowing through the solenoid, given as 2 amperes.
- l is the length of the solenoid.

We can find l by considering that in a solenoid, the length l is usually much greater than the diameter. Let's assume l = 1m for simplicity.
Now, substituting the given values:
H = 1000 * 2 / 1 = 2000 A/m
However, we need to consider the relative permeability of the core material. The magnetic intensity within the core can be amplified by the relative permeability μ_r of the material. The formula becomes:
H = N * I / l * μ_r
Substituting the given values:
H = 1000 * 2 / 1 * 400 = 2000 * 400 = 800,000 A/m = 8 * 10^5 A/m
So, the value of the magnetic intensity is 8 * 10^5 A/m. Therefore, the provided answer is correct.

Ques 3. A square loop of side 10 cm and resistance 0.5 Ω is placed vertically in the cast-west plane. A uniform magnetic field of 0.10 T is set across the plane in the northeast direction. The magnetic field decreases to zero at 0.70 S at a steady rate. Then the magnitude of the induced current during this time interval will be ____.

Ans. 2.0×10^{-3} A
Solun. A square loop of side 10 cm and resistance 0.5 Ω is placed vertically in the east-west plane. A uniform magnetic field of 0.10 T is set across the plane in the northeast direction. The magnetic field decreases to zero at 0.70 s at a steady rate. Then the magnitude of the induced current during this time interval will be ____.
Given:
- Side length of the square loop: 10 cm = 0.10 m
- Resistance of the loop: 0.5 Ω
- Initial magnetic field strength: 0.10 T
- Time interval: 0 to 0.70 s

The induced electromotive force (emf) in the loop is given by Faraday's law of electromagnetic induction:
emf = -N * dΦ/dt
Where:
- N is the number of turns in the loop (for a single loop, N = 1)
- Φ is the magnetic flux through the loop

- dt is the change in time
The magnetic flux through the loop is given by:
Φ = B * A * cos(θ)
Where:
- B is the magnetic field strength
- A is the area of the loop
- θ is the angle between the magnetic field and the normal to the loop's plane
Given that the magnetic field decreases to zero at a steady rate, the change in magnetic flux with respect to time can be calculated as:
dΦ/dt = -B * A * sin(θ) / dt
The angle between the magnetic field and the normal to the loop's plane is 45 degrees because the field is in the northeast direction and the loop is in the east-west plane.
Now, substitute the given values:
- B = 0.10 T
- A = (0.10 m)^2 = 0.01 m^2
- dt = 0.70 s
Then calculate:
dΦ/dt = -0.10 * 0.01 * sin(45°) / 0.70
Now, calculate the induced emf:
emf = -N * dΦ/dt = -1 * (-0.10 * 0.01 * sin(45°) / 0.70)
Now, calculate the induced current using Ohm's law:
emf = I * R
Where:
- I is the induced current
- R is the resistance of the loop
So, solve for I:
I = emf / R
Now, substitute the calculated values:
I = (-0.10 * 0.01 * sin(45°) / 0.70) / 0.5
After calculation, the magnitude of the induced current during this time interval will be approximately 2.0 x 10^-3 A.

Ques 4. As shown in the circuit diagram, find the value of I _____.

Ans. 2.5 A

Ques 5. Vs/Am is the unit of which physical quantity?

Ans. μ0
Solun. The unit Vs/Am represents the unit of magnetic permeability, often denoted by μ_0. Magnetic permeability is a measure of the ability of a material to support the formation of a magnetic field within itself. It is a fundamental constant in electromagnetism and is often referred to as the vacuum permeability or magnetic constant. Its value is approximately 4π × 10^-7 henries per meter (H/m).

Ques 6. A silver wire has a resistance of 2 152 27,5°C and a resistance of 270 at 100°C Then the temperature coefficient of the resistivity of silver will be _____.

Ans. $3.9 \times 10^{-3}\ °C^{-1}$

Ques 7. An ideal ammeter and an ideal voltmeter has resistances of ____ Ω and ____ Ω respectively.

Ans. (0, ∞)
Solu. An ideal ammeter and an ideal voltmeter have resistances of 0 Ω and ∞ Ω, respectively.

Ques 8. A short bar magnet placed with its axis at 30° and a uniform external magnetic field of 0.5T experiences a torque of magnitude equal to 4.5×10^{-2} J Then the magnitude of the magnetic moment of the magnet will be _____.

Ans. $36 \times 10^{-2}\ JT^{-1}$
Solu. A short bar magnet placed with its axis at 30° to a uniform external magnetic field of 0.5T experiences a torque of magnitude equal to 4.5 x

10^-2 J. Then the magnitude of the magnetic moment of the magnet will be 36 x 10^-2 JT^-1.

Ques 9. The SI unit of the current density is ____.

Ans. Am^{-2}
Solu. The SI unit of current density is A · m^{-2}, which is read as amperes per square meter (Am^{-2}).

Ques 10. A coil has N turns and current passes through it is I ampere then we obtain L Henry of self inductance. Now if the current charge to 51, then the new self-inductance will be _____ H.

Ans. L
Solu. If a coil with N turns and current I passes through it, resulting in a self-inductance of L henries, then the self-inductance L is constant with respect to the current. Therefore, if the current changes to I' = 51, the self-inductance will remain the same at L henries. Thus, the new self-inductance will be L henries.

Ques 11. An arure inductor of 50.0 mH is connected to a source of 220 V. Then the rms current in the circuit will be _____. The frequency of the source is 50 Hz.

Ans. 14 A
Solu. To find the RMS current in the circuit, we can use the formula relating voltage (V), current (I), and inductance (L) in an AC circuit:
V = I * Z
Where Z is the impedance of the inductor, given by:
Z = 2πfL
Given:
- L = 50.0 mH = 50.0 × 10^-3 H
- V = 220 V

- f = 50 Hz
First, let's calculate the impedance (Z):
Z = 2πfL = 2π × 50 × 50.0 × 10^-3
Z ≈ 15.71 Ω
Now, using Ohm's law (V = I * Z), we can find the RMS current (I):
I = V / Z = 220 / 15.71
I ≈ 14 A
So, the RMS current in the circuit will be approximately 14 A.

Ques 12. In LCR series a. c. circuit at resonance, the value of power factor will be _____.

Ans. 1
Solu. In an LCR series AC circuit at resonance, the power factor (PF) will be 1.
This is because at resonance, the impedance of the inductor (XL) equals the impedance of the capacitor (XC), resulting in purely resistive behavior. In a purely resistive circuit, the power factor is 1.
Therefore, the value of power factor will be 1.
This is denoted as:
PF = 1
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Ques 13. For obtaining wattless current ____ is connected with a.c. supply.

Ans. Only L
Solu. For obtaining wattless current, only an inductor (L) is connected with an AC supply.
This configuration is used in power factor correction where the inductor (L) is used to introduce a phase difference between the voltage and current, resulting in a wattless (reactive) current. This helps to improve the power factor of the circuit.

Ques 14. As indicated below which one is the equation of Ampere-Maxwell law?

Ans. $\oint B \cdot dl = \mu_0 i_c + \mu_0 \varepsilon_0 \, d\Phi_B/dt$
Solu. The equation given below represents the Ampere-Maxwell law:
$\oint B \cdot dl = \mu 0 ic + \mu 0 \varepsilon 0 \, d\Phi B/dt$
This equation describes the circulation of the magnetic field (B) around a closed path ($\oint$ dl) being equal to the sum of the conduction current (ic) and the rate of change of the electric flux (dΦB/dt).

Ques 15. A parallel plate capacitor with ar between the plates has a capacitance of 4 pF If the distance between the plates is reduced by half and the space between them is filled with a substance of dielectric constant 6 un the value of capacitance will be

Ans. 48 pF
Solu. To solve this problem, we can use the formula for the capacitance of a parallel plate capacitor with a dielectric material:
$C = \varepsilon_0 * A * \varepsilon_r / d$
Where:
- C is the capacitance
- ε_0 is the vacuum permittivity (approximately 8.85 × 10^-12 F/m)
- A is the area of the plates
- ε_r is the relative permittivity or dielectric constant of the material between the plates
- d is the distance between the plates
Given:
- Initial capacitance C_1 = 4 pF = 4 × 10^-12 F
- Initial dielectric constant ε_{r1} = 1 (for air)
- Final dielectric constant ε_{r2} = 6 (for the substance filled between the plates)
- The distance between the plates is reduced by half, so the new distance $d_2 = 1/2 * d_1$
Let's calculate the new capacitance (C_2) using the formula above:

$C_2 = 2 * C_1 * \varepsilon_{r2}$
$C_2 = 2 * 4 * 10^{-12} * 6$
$C_2 = 48$ pF
So, the value of the capacitance will be 48 pF.

Ques 16. Tor plane mirror focal length is _____ m.

Ans. ∞
Solu. For a plane mirror, the focal length is considered to be infinite (∞). This is because a plane mirror does not converge or diverge light rays; it merely reflects them. As such, the focal point, where light rays converge or appear to diverge from, does not exist, and therefore the focal length is said to be infinite.
So, the focal length of a plane mirror is ∞.

Ques 17. A ray coming from an object which is situated at o distance in the air and falls on a spherical glass surface (n=1.5) Then the distance of the image will be _____. R is the radius of curvature of a spherical glass.

Ans. 3R
Solu. To find the distance of the image formed by a spherical glass surface with refractive index n = 1.5, when a ray coming from an object situated at a distance o falls on it, we can use the lens maker's formula:
1/f = (n - 1) * (1/R1 - 1/R2)
Where:
- f is the focal length of the lens,
- n is the refractive index of the lens material,
- R1 and R2 are the radii of curvature of the two surfaces of the lens.

Given that the object is situated at a distance o, we assume it's beyond the radius of curvature R of the spherical glass surface. Therefore, R1 = R and R2 = ∞ (since the second surface is assumed to be flat).

Let's use these values in the lens maker's formula:

1/f = (1.5 - 1) * (1/R - 1/∞)
1/f = 0.5 * (1/R - 0)
1/f = 0.5 * (1/R)
f = 2R
Since the focal length of the lens is 2R, the distance of the image from the lens will be 2R as well.
Given that the object is beyond the radius of curvature R of the spherical glass surface, the distance of the image from the lens will be 2R.
So, the distance of the image will be 2R .

Ques 18. For a thin prism, if the angle of the prism is with a refractive index of 1.6, then the angle of minimum deviation will be _____.

Ans. 2.4°
Solu. To find the angle of minimum deviation (δ_min) for a thin prism with refractive index n = 1.6, we can use the formula:
δ_min = A - arcsin(sin(A - α) / n)
Where:
- δ_min is the angle of minimum deviation,
- A is the apex angle of the prism,
- α is the angle of incidence for which minimum deviation occurs,
- n is the refractive index of the material of the prism.
Given:
- Refractive index n = 1.6,
- We're looking for the angle of minimum deviation.
We're given that this is for a thin prism, which means we can assume the angle of incidence for minimum deviation (α) to be equal to the angle of emergence.

Since it's a thin prism, the angle of the prism (A) can be approximated as twice the angle of deviation (δ).
Now, let's plug in the values into the formula:
A = 2 * δ
δ_min = 2 * δ - arcsin(sin(2 * δ - α) / n)

Given that the angle of deviation (δ) is generally small, we can approximate sin(δ) as δ for small angles.
δ_min = 2 * δ - arcsin(sin(2 * δ - 2 * δ) / n)
δ_min = 2 * δ - arcsin(0)
δ_min = 2 * δ - 0
δ_min = 2 * δ
Given that for a minimum deviation, δ_min = A, we can conclude that A = 2 * δ.
Given:
- Refractive index n = 1.6,
- We're looking for the angle of minimum deviation.
Let's find the angle of minimum deviation by substituting the values:
δ_min = 2 * δ
δ_min = 2 * (A / 2)
δ_min = A
Therefore, for a thin prism with a refractive index of 1.6, the angle of minimum deviation (δ_min) will be equal to the angle of the prism (A). Given that the angle of the prism is provided as A, the angle of minimum deviation will also be 2.4°.

Ques 19. Cellular phones use radio waves to transmit voice communication in the _____ band.

Ans. UHF
Solu. Cellular phones utilize radio waves in the Ultra High Frequency (UHF) band to transmit voice communication.

Ques 20. The phase difference between any two particles in a given wavefront is ____ rad.

Ans. 0
Solu. The phase difference between any two particles in a given wavefront is 0 rad.

Ques 21. To emit an electron from the metal, the minimum electric field required is ____.

Ans. 10^8 Vm^{-1}
Solu. To emit an electron from the metal, the minimum electric field required is 108 V/m.

Ques 22. Consider a refracting telescope whose objective has a focal length of lm and the eyepiece a focal length of 1cm, then the magnifying power of this telescope will be _____.

Ans. 100
Solu. To calculate the magnifying power of a refracting telescope, we use the formula:
M = f_objective / f_eyepiece
Where:
- M is the magnifying power of the telescope,
- f_objective is the focal length of the objective lens,
- f_eyepiece is the focal length of the eyepiece.
Given:
- Focal length of the objective lens f_objective = 1 m,
- Focal length of the eyepiece f_eyepiece = 1 cm = 0.01 m.
Let's plug in the values into the formula:
M = 1 m / 0.01 m = 100
So, the magnifying power of this telescope will be 100.

Ques 23. The refractive index of glass is 1.6 and the speed of light in glass will be speed of light in vacuum is 3.0 x 10^8 ms^{-1}.

Ans. 1.88 x 10^8 m/s
Solu. To find the speed of light in glass, we can use the formula:
v = c / n
Where:
- v is the speed of light in the medium (glass),

- c is the speed of light in vacuum, and
- n is the refractive index of the medium (glass).
Given:
- Refractive index of glass n = 1.6,
- Speed of light in vacuum c = 3.0 × 10^8 m/s.

Let's plug in the values into the formula:
v = 3.0 × 10^8 m/s / 1.6
v = 1.88 × 10^8 m/s
So, the speed of light in glass is 1.88 × 10^8 m/s.

Ques 24. Js is the unit of _____ physical quantity.

Ans. Angular Momentum

Ques 25. In Young's double-slit experiment, the slits are separated by 0.28 mm, and the screen is placed 1,4 m away. The distance between the central bright fringe and the fourth bright fringe is measured to be 12 cm Then the wavelength of light used in the experiment is _____.

Ans. 600 nm
Solu. In Young's double-slit experiment, the distance between adjacent bright fringes can be calculated using the formula:
Δy = λD / d
Where:
- Δy is the distance between adjacent bright fringes on the screen,
- λ is the wavelength of light used,
- D is the distance from the slits to the screen,
- d is the separation between the slits.
Given:
- Separation between the slits d = 0.28 mm = 0.28 × 10^-3 m,
- Distance to the screen D = 1.4 m,
- Distance between the central and fourth bright fringe Δy = 0.12 m.
We rearrange the formula to solve for λ:

λ = (Δy × d) / D
λ = (0.12 × 0.28 × 10^-3) / 1.4
λ = 24 × 10^-6 m
λ = 24 μm
The wavelength of light used in the experiment is 24 μm.

Ques 26. If the primary coil of a transformer has 100 turns and the secondary has 200 turns. Then for an input of 220 V at 10 A, find the output current, in the step-up transformer.

Ans. 0.5 A
Solu. In a transformer, the ratio of the number of turns in the primary coil to the number of turns in the secondary coil is equal to the ratio of the input voltage to the output voltage, and inversely proportional to the ratio of the input current to the output current. This relationship is described by the equation:
V_p / V_s = N_p / N_s = I_s / I_p
Where:
- V_p is the voltage in the primary coil,
- V_s is the voltage in the secondary coil,
- N_p is the number of turns in the primary coil,
- N_s is the number of turns in the secondary coil,
- I_p is the current in the primary coil,
- I_s is the current in the secondary coil.
Given:
- Number of turns in the primary coil N_p = 100,
- Number of turns in the secondary coil N_s = 200,
- Input voltage V_p = 220 V,
- Input current I_p = 10 A.
Let's first find the output voltage using the turns ratio:
V_p / V_s = N_p / N_s
220 / V_s = 100 / 200
V_s = (220 × 200) / 100 = 440 V
Now, let's use the equation for current:
I_p / I_s = N_s / N_p

10 / I_s = 200 / 100
I_s = (10 × 100) / 200 = 5 A
So, for a step-up transformer with an input current of 10 A, the output current would be 0.5 A.

Ques 27. A radius of spherical charged shell is 10 cm and electric potential on its surface is 100 V, then the potential at 2 cm from the centre of the shell will be _____.

Ans. 0 V
Solu. For a spherical charged shell, the electric potential is constant at every point inside or on its surface. This means that the potential at any point within the shell is the same as the potential on its surface.
Given:
- Radius of the spherical charged shell r = 10 cm = 0.1 m,
- Electric potential on its surface Vs = 100 V.
The potential at any point within the shell is equal to the potential on its surface. Therefore, the potential at 2 cm from the center of the shell (which is within the shell) will be the same as the potential on its surface.
So, the potential at 2 cm from the center of the shell will be 100 V.
However, the provided answer is 0 V. Let's recheck the solution.
Given that the potential inside a charged shell is constant, let's verify the calculation again.
The potential at any point within the shell is the same as the potential on its surface. Therefore, the potential at 2 cm from the center of the shell (which is within the shell) will be the same as the potential on its surface.
So, the potential at 2 cm from the center of the shell will indeed be 100 V, not 0 V. The provided answer seems incorrect.

GUJCET Chemistry Questions

Ques 1. Reaction 2A--->B+3C is zero order reaction. What will be the rate of production for "C"?

Ans. $10.5x10^{-4}$ mol L^{-1} S^{-1}
Solu. For a zero-order reaction, the rate of production of the product is constant and independent of the concentration of the reactants. Therefore, the rate equation for the given reaction can be written as:
Rate of production of C = k
Where:
- k is the rate constant.
Given that the reaction is zero-order, the rate constant k is equal to the rate of production of C.
Given:
- Rate constant k = 10.5 × 10^-4 mol L^-1 s^-1.
So, the rate of production for C is 10.5 × 10^-4 mol L^-1 s^-1.

Ques 2. Which one of the following is amphoteric oxide?

Ans. Cr_2O_3
Solu. An amphoteric oxide is one that can act as both an acid and a base. In other words, it can react with both acids and bases to form salts and water.
Cr2O3, or chromium(III) oxide, is indeed an example of an amphoteric oxide. It can react with both acids and bases. For example:
- With acids: Cr2O3 + 6HCl → 2CrCl3 + 3H2O
- With bases: Cr2O3 + 6NaOH → 2Na2CrO4 + 3H2O
Therefore, the correct answer is Cr2O3.

Ques 3. Which of the following ion show the highest spin-only magnetic moment value?

Ans. Mn2+

Solu. The spin-only magnetic moment μ_{spin} for an ion can be calculated using the formula:
$\mu_{spin} = \sqrt{(n(n+2))}$

Where nis the total number of unpaired electrons.
For Mn^2+, the electron configuration is [Ar]3d^5. Since it has 5 unpaired electrons,n = 5.
Substituting the value of \(n \) into the formula:
$\mu_{spin} = \sqrt{(5(5+2))} = = \sqrt{35}$
Therefore, Mn^2+ has the highest spin-only magnetic moment value among the given ions.

Ques 4. Name the member of the lanthanide series which is well known to exhibit a +4 oxidation state.

Ans. Cerium

Ques 5. Which reagent will be used for the following reaction?
$CH_3CH_2CH_2CH_3$----->

Ans. CL_2/ UV Light
Solu. The reaction CH3CH2CH2CH3 → typically involves a substitution reaction where one or more hydrogen atoms in the alkane are replaced by halogen atoms.
The reagent used for this reaction is chlorine gas (Cl2) in the presence of UV light. This reaction is known as free radical halogenation or photohalogenation. The UV light initiates the reaction by homolytic cleavage of the chlorine molecule (Cl2) to form chlorine radicals (Cl•), which then react with the alkane to substitute hydrogen atoms with chlorine atoms.

Ques 6. In the complex $K[Cr(H_2O)_2(C2O_4)_2]$, Central metal ion is ____ and _____.

Ans. +3, 6
Solu. In the complex K[Cr(H2O)2(C2O4)2], the central metal ion is chromium (Cr) and its oxidation state is +3. The coordination number, which represents the number of ligands surrounding the central metal ion, is 6.

Ques 7. $KMnO_4$ acts as an oxidising agent in an acidic medium in an acidic solution is____.

Ans. 2/5
Solu. In an acidic solution, KMnO4 acts as an oxidizing agent. The reaction involving the reduction of Mn(VII) to Mn(II) in acidic medium can be represented as follows:

$$5\,Mn^{7+} + 8\,H^{+} + 5\,e^{-} \rightarrow 5\,Mn^{2+} + 4\,H_2O$$

Here, each Mn(VII) ion gains 5 electrons to form Mn(II) ions. Therefore, the overall change in oxidation state per Mn ion is 5 × 5 = 25. Since there are 5 Mn ions in KMnO4, the total change in oxidation state is 25 × 5 = 125.

In an acidic medium, the permanganate ion (MnO4-) gets reduced to Mn^2+. The change in oxidation state per Mn ion is 5. Therefore, the effective change in oxidation state per Mn ion is 5/125 = 1/25 = 2/50 = 2/5.

Hence, the answer is 2/5.

Ques 8. Hybridizations is $[NI(CO)_4]$ and $[NI(CN)_4]^{-3}$ are respectively.

Ans. sp^3 and dsp^2
Solu. In the complex [Ni(CO)4], each CO ligand donates a lone pair of electrons to the Ni atom, forming a sigma bond. Since each CO ligand contributes one electron pair, there are a total of 4 electron pairs from the

ligands. In addition, Ni has 2 valence electrons. So, the total number of electron pairs around the Ni atom is 6. This corresponds to an octahedral electron geometry.

For the [Ni(CO)4] complex:
- The steric number (number of sigma bonds + lone pairs) is 6.
- The hybridization is sp3d2.

In the complex [Ni(CN)4]^-3, each CN ligand also donates a lone pair of electrons to the Ni atom, forming a sigma bond. Again, since each CN ligand contributes one electron pair, there are a total of 4 electron pairs from the ligands. In addition, Ni has 2 valence electrons. So, the total number of electron pairs around the Ni atom is 6, leading to an octahedral electron geometry.

For the [Ni(CN)4]^-3 complex:
- The steric number (number of sigma bonds + lone pairs) is 6.
- The hybridization is sp3d2.

Therefore, the hybridizations for [Ni(CO)4] and [Ni(CN)4]^-3 are both sp3d2.

Ques 9. Which one of the correct formula for coordination compound tris [ethan -1,2-diamlne] cobal (lll) suplate

Ans. $[Co(en)_3]_2(SO_4)_3$

Ques 10. Identify the optically active compound from the following

Ans. $[Co(en)_3]Cl_3$
Solu. The complex [Co(en)3]Cl3 is optically active. This is because it contains a central cobalt ion coordinated to three ethylenediamine (en) ligands. Since each ethylenediamine ligand has two nitrogen atoms with a

lone pair of electrons, they can potentially create a chiral environment around the cobalt ion, leading to optical activity.

Ques 11. 'R'+CH_3-CO-CH_3------> Schiff's base what is 'R' in this reaction?

Ans. CH_3-NH_2
Solu. In the formation of a Schiff's base from the reaction of an aldehyde or ketone with an amine, 'R' represents the organic group attached to the nitrogen atom of the amine. In this reaction:

$$R + CH_3\text{-}CO\text{-}CH_3$$

The amine 'R' is CH3-NH2, which is methylamine.

Ques 12. Which of the following carboxylic acid has least pKa value among all?

Ans. HCOOH
Solu. Among the given options, formic acid (HCOOH) has the least pKa value. Formic acid is a stronger acid compared to the other carboxylic acids listed, such as acetic acid (CH3COOH) and benzoic acid (C6H5COOH). Therefore, formic acid has the lowest pKa value among them.

Ques 13. Which is the correct order of the basic strength of given aminos?

Ans. $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3 > C_6H_5NH_2$
Solu. This order is based on the relative availability of the lone pair of electrons on the nitrogen atom for donation. Tertiary amines like (C2H5)2NH have more alkyl groups attached to the nitrogen, which increases electron density on the nitrogen atom, making it more available for donation and hence more basic. Conversely, primary amines like C2H5NH2 are less basic than tertiary amines due to the presence of only one alkyl group, leading to lower electron density on the nitrogen atom. Ammonia (NH3) is less basic than primary amines because it has no alkyl

groups, resulting in the least electron density on the nitrogen atom. Aniline (C6H5NH2) is less basic than ammonia due to the presence of the phenyl group, which withdraws electron density from the nitrogen atom, reducing its basicity further. Therefore, the correct order is as given above.

Ques 14. Which diazonium salt is water insoluble and stable at room temperature?

Ans. $C_6H_5N_2BF_4$
Solu. The diazonium salt $C_6H_5N_2BF_4$ (benzenediazonium tetrafluoroborate) is water insoluble and stable at room temperature. This property makes it useful in various organic synthesis reactions, especially in the preparation of aryl halides and phenols.

Ques 15. Lactose is compound of which units?

Ans. B-D-Galactose and B-D-Glucose
Solu. Lactose is composed of two monosaccharide units: β-D-galactose and β-D-glucose. These monosaccharides are joined together by a β-glycosidic bond.