Learne2i most important questions for NEET 2025

Welcome to this curated collection of questions designed to reflect key concepts and high-priority topics from past NEET examinations. While these samples aim to highlight recurring themes, they are not exact replicas—the NEET ensures originality in every paper.

Subject Insights

- **Biology**: Highest predictive accuracy due to the structured nature of biological concepts and their frequent recurrence.
- **Physics**: Moderate consistency in thematic approaches (e.g., mechanics, electromagnetism).
- **Chemistry**: Least predictable trends, given its diverse topics and experimental formats.

Study Smart

- Master core principles, not just questions.
- Practice varied formats to adapt to new problem structures.
- Use this as a guide, not a substitute for comprehensive preparation.

Disclaimer for Predicted Questions in NEET

The following set of questions has been curated as part of an analytical study aimed at identifying patterns and trends in past NEET examinations. These questions are intended to serve as sample questions or representations of important topics that have historically appeared in the exam. It is crucial to understand that while these questions provide valuable insight into the types of problems that may be encountered, they are not exact replicas nor guaranteed predictions of future examination content. Instead, they are designed to highlight key concepts and areas of focus that students should prioritize during their preparation.

Nature of Predictions and Their Limitations The methodology behind this analysis involves identifying similarities among questions from previous years, focusing on recurring themes, concepts, and problem-solving approaches. However, it is essential to note that:

1. **Questions will not be repeated verbatim**: NEET strictly adheres to a policy of non-repetition in its question papers. The questions provided here are not exact duplicates but are conceptually similar to those seen in past exams. Students should use them as a tool for understanding the underlying principles and problem-solving techniques rather than expecting identical questions in the future.
2. **Focus on conceptual understanding**: The similarity analysis primarily emphasizes thematic connections between questions rather than their specific wording or structure. This means that while certain topics may appear repeatedly in different forms, the way they are presented can vary significantly. To succeed, students must develop a deep understanding of the concepts behind these sample questions.
3. **Subject-specific variability in prediction accuracy**: The effectiveness of these predictions varies across subjects:
    - **Biology**: The predictive accuracy for biology is notably higher due to the structured nature of biological concepts and their frequent recurrence. Students can expect a closer alignment between sample questions and exam trends in this subject.
    - **Physics**: Predictions for physics exhibit moderate accuracy. While many physics problems share common themes (e.g., mechanics, electromagnetism), variations in question framing and numerical details can introduce unpredictability.

- **Chemistry**: Chemistry demonstrates the lowest predictive accuracy due to its diverse range of topics, including organic reactions, inorganic properties, and physical chemistry calculations. The subject's variability makes it challenging to identify consistent patterns across years.

Example of Similar Questions For instance, a past NEET question might ask: "What is the function of the Golgi apparatus in a cell?" A similar question in the guess paper could be: "Describe the role of the Golgi apparatus in protein modification and transport."

Recommendations for Students To maximize the utility of these sample questions, students are advised to adopt the following approach:

- **Study the concepts thoroughly**: Treat each question as a gateway to understanding broader concepts rather than an isolated problem. For example, if a question pertains to integration techniques in mathematics or electrostatics principles in physics, focus on mastering those areas comprehensively.
- **Practice applying concepts in varied scenarios**: Since examiners often reframe similar ideas in different ways, students should practice solving problems across multiple formats and difficulty levels within each topic.
- **Do not rely solely on predictions**: While these sample questions provide valuable guidance, they should not replace a complete study plan or comprehensive syllabus coverage. NEET is designed to test a student's grasp of fundamental principles across all topics in the syllabus.
- **Pay attention to weak areas**: Given the variability in prediction accuracy across subjects, students may need to allocate additional time and effort toward subjects like chemistry where trends are less predictable.

Final Note The sample questions provided here are meant to assist students in identifying high-priority topics and honing their problem-solving skills. However, success in NEET requires more than familiarity with past trends; it demands a robust understanding of core concepts, consistent practice, and adaptability to new challenges. Students are encouraged to use these resources responsibly as part of a balanced preparation strategy that includes textbooks, reference materials, coaching guidance, and mock tests.
By focusing on conceptual clarity and disciplined preparation, students can build the confidence and skills necessary to tackle any variation of questions presented in the examination effectively.

Q1. The pair of compounds that can exist together is:

(1) ($FeCl_3$, $SnCl_2$)

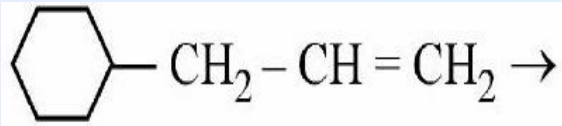
(2) ($HgCl_2$, $SnCl_2$)

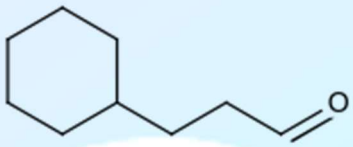
(3) ($FeCl_2$, $SnCl_2$)

(4) ($FeCl_3$, KI)

Ans. [3]

Q2. Identify the correct reagents that would bring about the following transformation. –





(1) (i) H_2O / H^+(ii) CrO_3

(2) (i) BH_3(ii) H_2O_2 / OH^-(iii) PCC

(3) (i) BH_3(ii) H_2O_2 / OH^-(iii) alk. $KMnO_4$(iv) H_3O^

(4) (i) H_2O / H^+(ii) PCC

Answer (2)

Q3. Which one of the following is not a common component of Photochemical Smog?

(1) Ozone

(2) Acrolein

(3) Peroxyacetyl nitrate

(4) Chlorofluorocarbons

Ans. [4]

Q4.Which property of colloids is not dependent on the charge on colloidal particles ?

(1) Coagulation

(2) Electrophoresis

(3) Electro-osmosis

(4) Tyndall effect

Ans. [4]

Q5. Consider the following liquid - vapour equilibrium. Liquid ⇌ Vapour
Which of the following relations is correct ?

(1) $\frac{d\ell nG}{dT^2} = \frac{\Delta H_v}{RT^2}$

(2) $\frac{d\ell nP}{dT} = \frac{-\Delta H_v}{RT}$

(3) $\frac{d\ell nP}{dT^2} = \frac{-\Delta H_v}{T^2}$

(4) $\frac{d\ell nP}{dT} = \frac{\Delta H_v}{RT^2}$

Ans. (4)

Q6. Identify the incorrect statement from the following.

(1) All the five (5 d) orbitals are different in size when compared to the respective (4 d) orbitals.

(2) All the five (4 d) orbitals have shapes similar to the respective (3 d) orbitals.

(3) In an atom, all the five (3 d) orbitals are equal in energy in free state.

(4) The shapes of (d_x y, d_y z) and (d_z x) orbitals are similar to each other; and (d_x^2-y^2) and (d_z^2) are similar to each other.

Answer (4)

Solution: - In an atom, all the five 3d orbitals are equal in energy in free state i.e., degenerate.

Q7.The reaction of aqueous ($KMnO_4$) with (H_2O_2) in acidic conditions gives:

(1) (Mn^{4+}) and (O_2)

(2) (Mn^{2+}) and (O_2)

(3) (Mn^{2+}) and (O_3)

(4) (Mn^{4+}) and (MnO_2)

Ans. [2]

Solution: When acidic ($KMnO_4$) react with (H_2O_2) purple colour decolourises due to formation of (Mn^+2) acidic ($KMnO_4$+H_2O_2 Mn^+2+O_2) (purple) (colourless)

Q8. The species, having bond angles of 1200 is :

(1) (PH_3)

(2) (ClF_3)

(3) (NCl_3)

(4) (BCl_3)

Ans. (4)

Q9. Which of the following complexes is used to be as an anticancer agent?

(1) mer - ($[Co(NH_3)_3Cl_3]$)

(2) cis - ($[PtCl_2(NH_3)_2]$)

(3) cis (-$K_2[PtCl_2Br_2]$)

(4) (Na_2CoCl_4)

Ans. [2]

Q10. Which of the following reactions will NOT give primary amine as the product?

(1) $CH_3CONH_2 \xrightarrow{Br_2/KOH}$ Product

(3) $CH_3NC \xrightarrow[(ii)\ H_3O^A]{(i)\ LiAl_4}$ Product

(2) $CH_3CN \xrightarrow[(i)\ H_3O^+]{(i)\ LiAl_4}$ Product

(4) $CH_3CONH_2 \xrightarrow[(i)\ H_3O^+]{(i)\ LiAH_4}$ Product

Answer (3)

Q11. The incorrect statement regarding enzymes is

(1) Enzymes are biocatalysts.

(2) Like chemical catalysts enzymes reduce the activation energy of bio processes.

(3) Enzymes are polysaccharides.

(4) Enzymes are very specific for a particular reaction and substrate.

Answer (3)

Solution: Enzymes are complex nitrogenous organic compounds which are produced by living plants and animals. They are protein molecules of high molecular mass. They are not polysaccharides.

Q12. In acidic medium, (H_2O_2) changes ($Cr_2O_7^{-2}$) to (CrO_5) which has two ((-O-O-)) bonds. Oxidation state of Cr in (CrO_5) is:

(1) +5

(2) +3

(3) +6

(4) -10

Ans. [3]

Solution: (CrO_5) molecule contain two ((-O-O-)) bond So oxidation state of Cr in (CrO_5) is +6

Q13. The molar conductivity of 0.007 M acetic acid is 20 $\mathbf{Scm^2\,mol^{-1}}$. What is the dissociation constant of acetic acid? Choose the correct option.

$$\begin{bmatrix}\Lambda^\circ_{H^+} = 350\ S\,cm^2\,mol^{-1} \\ \Lambda^\circ_{CH_3COO^-} = 50\ S\,cm^2\,mol^{-1}\end{bmatrix}$$

(1) $1.75 \times 10^{-4}\ mol\ L^{-1}$
(2) $2.50 \times 10^{-4}\ mol\ L^{-1}$
(3) $1.75 \times 10^{-5}\ mol\ L^{-1}$
(4) $2.50 \times 10^{-5}\ mol\ L^{-1}$

Answer (3)

Sol. $\Lambda_m = 20\ S\,cm^2\,mol^{-1}$

$$\left.\begin{aligned}\Lambda^3_{mCH}COOH &= \\ &\Lambda^\circ_{CH_3COO^-} + \Lambda^\circ_m H^+ \\ &= 50\end{aligned}\right) = 350 = 400\ S\,cm^2\,mol^{-1}.$$

Q14. $64Be^{2+}$ is isoelectronic with which of the following ions?

(1) H^+
(2) Li^+
(3) Na^+
(4) Mg^{2+}

Ans. [2]

Sol. Isoelectonic species have same number of total electron

Be^{+2} and Li^{+}contain two electron

Q15. Which of the following will not be soluble in sodium hydrogen carbonate?

(1) 2, 4, 6 - trinitrophenol

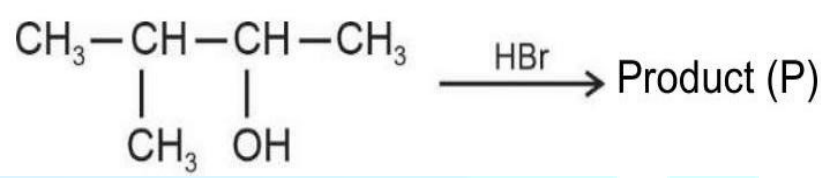
(2) Benzoic acid

(3) o - Nitrophenol

(4) Benzenesulphonic acid

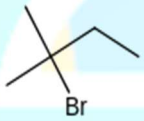
Ans. [3]

Q16. Consider the following reaction and identify the product (P).



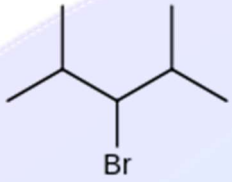
3-Methylbutan-2-ol

(1)

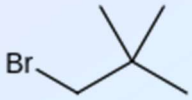


(2)

(3)



(4)



Ans. [1]

Q17. The incorrect statement regarding chirality is

(1) (S_N 1) reaction yields 1:1 mixture of both enantiomers

(2) The product obtained by (S_N 2) reaction of haloalkane having chirality at the reactive site shows inversion of configuration

(3) Enantiomers are superimposable mirror images on each other

(4) A racemic mixture shows zero optical rotation

Answer (3)

Solution: The stereoisomers related to each other as non-superimposable mirror image are called enantiomers.

Q18. Which of the following is a sink for CO ?

(1) Haemoglobin

(2) Micro organisms present in the soil.

(3) Oceans

(4) Plants

Ans. (1)

Q19. Which will make basic buffer?

(1) 50 mL of (0.1 M NaOH+25 ~mL) of 0.1 M (CH_3 COOH)

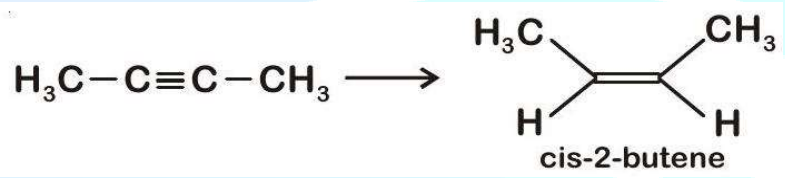
(2) 100 mL of (0.1 M CH_3 COOH+100 ~mL) of 0.1 M NaOH

(3) 100 mL of (0.1 M HCl+200 ~mL) of 0.1 M (NH_4 OH)

(4) 100 mL of (0.1 M HCl+100 ~mL) of 0.1 M NaOH

Answer (3)

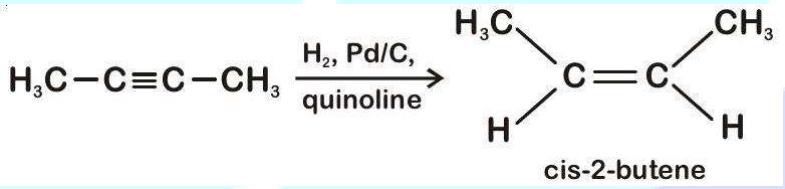
Q20. The most suitable reagent for the following conversion, is :



(1) Na /liquid NH_3
(2) H_2, Pd/C, quinoline
(3) Zn/HCl
(4) $Hg^{2+}/H^+, H_2O$

Answer (2)

Sol.



Q21. Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false ?
(1) The $H-C-H$ bond angle in CH_4, the $H-N-H$ bond angle in NH_3, and the $H-O-H$ bond angle in H_2O ar all greater than $90°$
(2) The $H-O-H$ bond angle in H_2O is larger than the $H-C-H$ bond angle in CH_4.
(3) The $H-O-H$ bond angle in H_2O is smaller than the $H-N-H$ bond angle in NH_3.
(4) The $H-C-H$ bond angle in CH_4 is larger than the $H-N-H$ bond angle in NH_3.

Ans. (2)

Q22. Which of the following reactions is appropriate for converting acetamide to methanamine ?

(1) Carbylamine reaction

(2) Hoffmann hypobromamide reaction

(3) Stephens reaction

(4) Gabriels phthalimide synthesis

Ans. (2)

Q223. An example of a sigma bonded organometallic compound is

(1) Ruthenocene

(2) Grignard's reagent

(3) Ferrocene

(4) Cobaltocene

Ans. (2)

Q224. Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from 0 to VI .

A. Al^{3+}
B. Cu^{2+}
C. Ba^{2+}
D. Co^{2+}
E. Mg^{2+}

Choose the correct answer from the options given below.

(1) B, A, D, C, E
(2) B, C, A, D, E
(3) E, C, D, B, A
(4) E, A, B, C, D

Answer (1)
Sol.

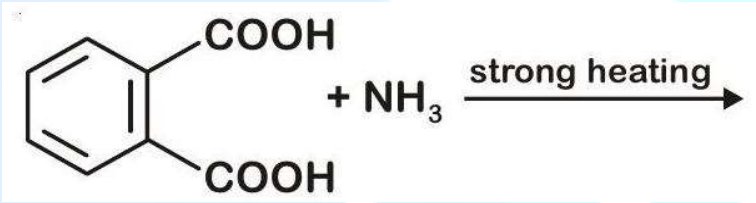
Group	Cations
Group-II	Cu^{2+}
Group-III	Al^{3+}
Group-IV	Co^{2+}

Group-V	Ba^{2+}
Group-VI	Mg^{2+}

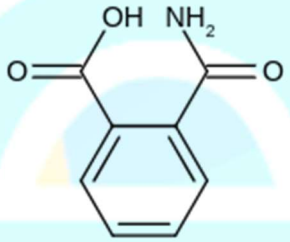
The correct order of group number of ions is $\underset{(B)}{Cu^{2+}} < \underset{(A)}{Al^{3+}} < \underset{(D)}{Co^{2+}} < \underset{(C)}{Ba^{2+}} < \underset{(E)}{Mg^{2+}}$

∴ The correct order is B, A, D, C, E

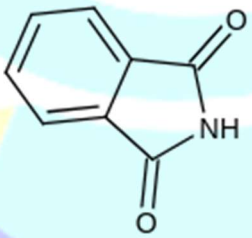
Q225. The major product of the following reaction is:



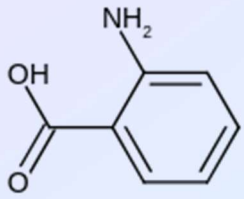
(1)



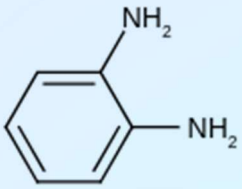
(2)



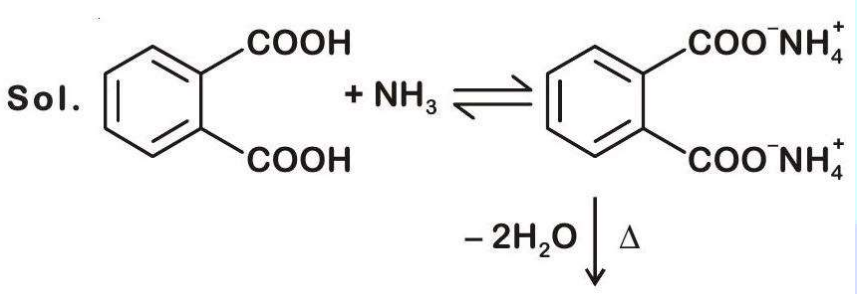
(3)

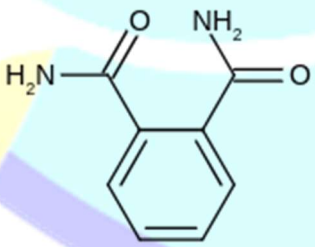

NH2
OH
O

(4)

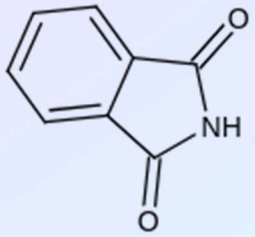

NH2
NH2

Answer (2)


Sol.
COOH
COOH
+ NH3
COO⁻NH4+
COO⁻NH4+
– 2H2O
Δ


O
NH2
H2N
O

$-NH_3 \downarrow$ Strong heating



Phthalimide

Q26. Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$ solution?

(1) The solution turns blue

(2) The solution is decolourized

(3) SO_2 is reduced

(4) Green $Cr_2(SO_4)_3$ is formed

Ans. (4)

Sol. $K_2Cr_2O_7 + SO_2 + H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + H_2O$

green colour

Q27. $Zr(Z = 40)$ and $Hf(Z = 72)$ have similar atomic and ionic radii because of :

(1) Belonging to same group

(2) Diagonal relationship

(3) Lanthanoid contraction

(4) Having similar chemical properties

Answer (3)

Sol. - The cumulative effect of the contraction of the lanthanoid series, known as lanthanoid contraction, causes the radii of the members of the third transition series to be very similar to those of the corresponding members of the second series.

- The almost identical radii of $Zr(160pm)$ and $Hf(159pm)$ is a consequence of the lanthanoid contraction.

Solution: - The cumulative effect of the contraction of the lanthanoid series, known as lanthanoid contraction, causes the radii of the members of the third transition series to be very similar to those of the corresponding members of the second series. The almost identical radii of (Zr(160 pm)) and (Hf(159 pm)) is a consequence of the lanthanoid contraction

Q28. Which of the following series of transitions in the spectrum of hydrogen atom fall in visible region?

(1) Lyman series

(2) Balmer series

(3) Paschen series

(4) Brackett series

Answer (2)

Solution: In H-spectrum, Balmer series transitions fall in visible region.

Q29. The correct statement regarding the comparison of staggered and eclipsed conformation of ethane, is :-

(1) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain

(2) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain

(3) The eclipsed conformation of ethane is more stable than staggered conformation even through the eclipsed conformation has torsional strain

(4) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain.

Ans. (4)

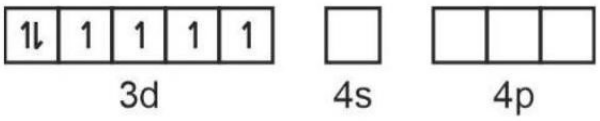
Q30. Given below are two statements :

Statement I: Both $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.
Statement II: $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

Answer (1)

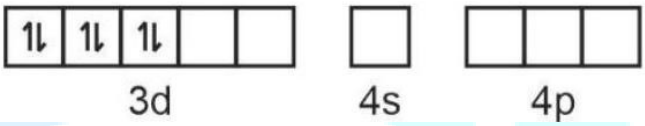
Sol. In $[Co(NH_3)E_6]^{3+}$, Co^{3+} ion is having $3\ d^6$ configuration.

Electronic configuration of Co^{3+} :

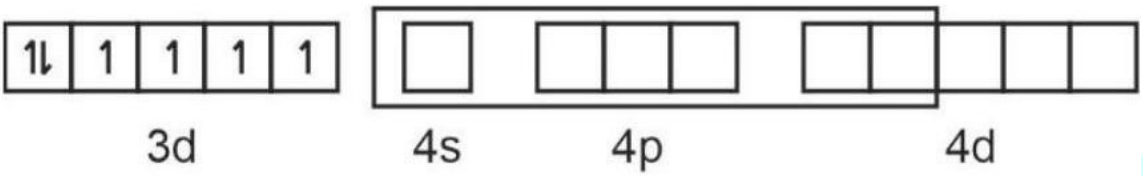


In presence of NH_3 ligand, pairing of electrons takes place and it becomes diamagnetic complex ion.

In presence of NH_3 ligand :



$\therefore$ $[Co(NH_3)_6]^{3+}$ is octahedral with d^2sp^3 hybridisation and it is diamagnetic in nature.
In case of $[CoF_6]^{3-}$, Co is in +3 oxidation state and it is having $3\ d^6$ configuration.
In presence of weak field F^-ligand, pairing does not take place.
In presence of F^-ligands :



$\therefore$ $In[CoF_6]^{3-}$, Co^{3+} is $sp^3\ d^2$ hybridised with four unpaired electrons, so it is paramagnetic in nature.

Q31. When copper is heated with conc. HNO 3 it produces
(1) $Cu(NO_3)_2$ and NO_2
(2) $Cu(NO_3)_2$ and NO
(3) $Cu(NO_3)_2$, NO and NO_2
(4) $Cu(NO_3)_2$ and N_2O

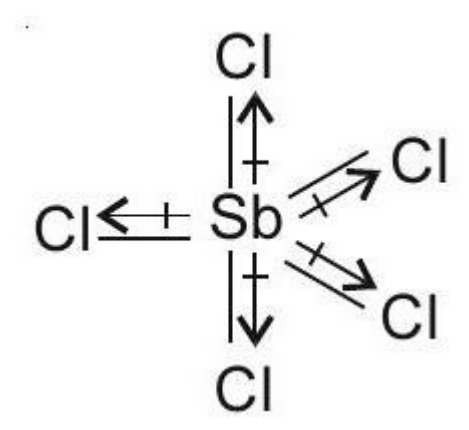
Ans. (1)
Sol. $Cu + 4HNO_3$ (conc.) $\rightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$

Q32. Which of the following molecules is non-polar in nature?
(1) $POCl_3$
(2) CH_2O

(3) $SbCl_5$
(4) NO_2

Answer (3)

Sol. $SbCl_5$:



Net vector summation of bond moments will be zero so $SbCl_5$ is a non-polar molecule.

Q33. Name the gas that can readily decolourise acidified ($KMnO_4$) solution:

(1) (CO_2)

(2) (SO_2)

(3) (NO_2)

(4) (P_2O_5)

Ans. (2)

Q34. Which of the following reactions is appropriate for converting acetamide to methanamine ?

(1) Carbylamine reaction

(2) Hoffmann hypobromamide reaction

(3) Stephens reaction

(4) Gabriels phthalimide synthesis

Ans. (2)

Q35. (BF_3) is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are :

(1) (sp^3) and 4

(2) (sp^3) and 6

(3) (sp^2) and 6

(4) (sp^2) and 8

Answer (3)

Solution: Number of electrons around boron atom is 6 . Hybridization of is (sp^2). Shape is trigonal planar.

Q36. When $0.1\ \text{mol}\ MnO_4^{2-}$ is oxidized the quantity of electricity required to completely oxidize MnO_4^{2-} to MnO_4^{-} is:

(1) 96500 C

(2) $2 \times 96500C$

(3) 9650 C

(4) 96.50 C

Ans. [3]

Sol.

$$MnO_4^{-2} \rightarrow MnO_4^{-1}$$

Oxidation no. $+6\ \ +7$

$\therefore$ change in oxidation number no $= 1$

$$\begin{aligned} \text{So equivalent} &= \text{mole} \times \text{v.f} \\ &= 0.1 \times 1 \\ &= 0.1 \\ \therefore\ \text{Charge} &= 0.1 \times F \\ &= 0.1 \times 96500 \\ &= 9650C \end{aligned}$$

Q37. At 298 K , the standard electrode potentials of Cu^{2+}/Cu, Zn^{2+}/Zn, Fe^{2+}/Fe and Ag^{+}/Ag are 0.34 V , -0.76 V, -0.44 V and 0.80 V , respectively.

On the basis of standard electrode potential, predict which of the following reaction cannot occur?

(1) $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

(2) $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

(3) $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$
(4) $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

Answer (4)

Sol. For a reaction to be spontaneous, E^0_{cell} must be positive.

- For, $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$

$$\begin{aligned} E^\circ_{cell} &= E^0_{cathode} - E^\circ_{anode} \\ &= -0.44\ V - (-0.76\ V) \\ &= 0.32\ V \end{aligned}$$

- For, $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

$$\begin{aligned} E^0_{cell} &= 0.34\ V - 0.80\ V \\ &= -0.46\ V \end{aligned}$$

- For, $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

$$\begin{aligned} E^0_{cell} &= 0.34\ V - (-0.76\ V) \\ &= 1.1\ V \end{aligned}$$

- For, $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

$$\begin{aligned} E^0_{cell} &= 0.80\ V - (-0.44\ V) \\ &= 1.24\ V \end{aligned}$$

Q38 . Match List I with List II.

List I

(Compound)
A. NH_3
B. BrF_5
C. XeF_4
D. SF_6

List II

(Shape/geometry)
I. Trigonal Pyramidal
II. Square Planar
III. Octahedral
IV. Square Pyramidal

Choose the correct answer from the options given below:
(1) A-I, B-IV, C-II, D-III
(2) A-II, B-IV, C-III, D-I
(3) A-III, B-IV, C-I, D-II
(4) A-II, B-III, C-IV, D-I

Answer (1)
Sol. $\mathrm{NH_3} \Rightarrow sp^3$ hybridised with 1 lone pair.
Structure will be Trigonal Pyramidal.
$BrF_5 \Rightarrow sp^3d^2$ hybridised with 1 lone pair.
Structure will be Square Pyramidal.
$\mathrm{XeF_4} \Rightarrow sp^3d^2$ with two lone pairs.
Structure will be Square Planar.
$\mathrm{SF_6} \Rightarrow sp^3d^2$ with no lone pair.
Structure will be Octahedral.
A-I, B-IV, C-II, D-III

Q39. A 20 litre container at 400 K contains $\mathrm{CO_2(g)}$ at pressure 0.4 atm and an excess of SrO neglect the volume of solid SrO). The volume of the container is now decreased by moving the movable piston fitted in the container. The maximum volume of the container, when pressure of $\mathrm{CO_2}$ attains its maximum value, will be :
(Given that: $\mathrm{SrCO_3(s) \rightleftharpoons SrO(s) + CO_2(g), Kp = 1.6\ atm}$)
(1) 5 litre
(2) 10 litre
(3) 4 litre
(4) 2 litre

Ans. (1)

Q40. Select the correct statements from the following

A. Atoms of all elements are composed of two fundamental particles.

B. The mass of the electron is (9.10939 10^-31 ~kg).

C. All the isotopes of a given element show same chemical properties:

D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory, regarded the atom as an ultimate particles of matter

Choose the correct answer from the options given below

(1) A, B and C only

(2) C, D and E only

(3) A and E only

(4) B, C and E only

Answer (4)

Q41. Given below are two statements :

Statement I : A unit formed by the attachment of a base to $1'$ position of sugar is known as nucleoside.
Statement II : When nucleoside is linked to phosphorous acid at $5'$-position of sugar moiety, we get nucleotide.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

Answer (3)

Q42. For a given reaction $\Delta H = 35.5\ \text{kJ mol}^{-1}$ and $\Delta S = 83.6\ \text{J K}^{-1}\ \text{mol}^{-1}$. The reaction is spontaneous at : (Assume that ΔH and ΔS do not vary with temperature)
(1) $T < 425\ K$
(2) $T > 425\ K$
(3) All temperatures
(4) T > 298 K

Ans. (2)

Q43. Match List-I with List-II

List-I

(a) Li
(b) Na
(c) KOH
(d) Cs

List-II

(i) absorbent for carbon dioxide
(ii) electrochemical cells
(iii) coolant in fast breeder reactors
(iv) photoelectric cell

Choose the correct answer from the options given below :
(1) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)
(2) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
(3) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii)
(4) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

Answer (4)

Q44. Given below are two statements : one is labelled as Assertion and the other is labelled as Reason R:

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reason (R) : The deep blue solution is due to the formation of amide. In the light of the above statements, choose the correct answer from the options given below :

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

(2) Both and (R) are true but (R) is NOT the correct explanation of

(3) is true but (R) is false

(4) is false but (R) is true

Answer (3)

Q45. The equilibrium constants of the following are:

$$\begin{aligned} N_2 + 3H_2 &\rightleftharpoons 2NH_3 \rightleftharpoons \quad K_1 \\ N_2 + O_2 &\rightleftharpoons 2NO \qquad\quad K_2 \\ H_2 + 1/2O_2 &\longrightarrow H_2O \qquad K_3 \end{aligned}$$

The equilibrium constant (K) of the reaction :
$2NH_3 + \frac{5}{2}O_2 \overset{K}{\rightleftharpoons} 2NO + 3H_2O$, will be :
(1) $K_1K_3^3/K_2$
(2) $K_2K_3^3/K_1$
(3) $K_2\ K_3/K_1$
(4) $K_2^3K_3/K_1$

Ans. (2)

Q46. Taking stability as the factor, which one of the following represents correct relationship?

(1) $T\ell Cl_3 > T\ell Cl$

(2) $InI_3 > InI$

(3) $AICl > AICl_3$

(4) $T\ell I > T_\ell I_3$

Answer (4)

Q47. Which of the following statements are NOT correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make saturated fats from oils.

D. The H-H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any elements.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below:

(1) B, C, D, E only

(2) B, D only

(3) D, E only

(4) A, B, C only

Answer (3)

Q48. Which one is an example of heterogenous catalysis?

(1) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen

(2) Hydrolysis of sugar catalysed by (H^+)ions

(3) Decomposition of ozone in presence of nitrogen monoxide

(4) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron

Answer (4)

Q49. If molality of the dilute solution is doubled, the value of molal depression constant ((K_f)) will be :

(1) doubled

(2) halved

(3) tripled

(4) unchanged

Ans. (4)

Q50. Match List-I with List-II.

List - I
(Products formed)

(a) Cyanohydrin
(b) Acetal
(c) Schiff's base
(d) Oxime

List - II
(Reaction of carbonyl compound with)
(i) NH_2OH
(ii) RNH_2
(iii) alcohol
(iv) HCN

Choose the correct answer from the options given below
(1) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
(2) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
(3) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)
(4) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

Answer (4)

Q51. Given below are two statements : Statement I: The nutrient deficient water bodies lead to eutrophication Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies. In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true

(2) Both Statement I and Statement II are false

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

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

Answer (4)

Q52. A gas is allowed to expand in a well insulated container against a constant external pressure of 2.5 atm from an initial volume of 2.50 L to a final volume of 4.50 L . The change in internal energy (U) of the gas in joules will be:

(1) 1136.25 J

(2) -500 J

(3) -505 J

(4) +505 J

Ans. (3)

Q53. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : A reaction can have zero activation energy.

Reasons R : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy. In the light of the above statements, choose the correct answer from the options given below :

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

(2) Both and (R) are true and (R) is NOT the correct explanation of

(3) is true but (R) is false

(4) is false but (R) is true Answer (2)

Answer: Option 2

Q54. Match List-I with List-II.
List - I
List - II
(Hydrides)
(Nature)
(a) MgH_2
(i) Electron precise
(b) GeH_4
(ii) Electron deficient
(c) B_2H_6

(iii) Electron rich
(d) HF
(iv) Ionic

Choose the correct answer from the options given below
(1)(a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
(2) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)
(3)(a) - (i), (b) - (ii), (c) - (iv), (d) - (iii)
(4) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

Answer (1)

Q55. Match List-I with List-II.

List-I
(Ores)
(a) Haematite
(b) Magnetite
(c) Calamine
(d) Kaolinite

List-II

(Composition)
(i) Fe_3O_4
(ii) $ZnCO_3$
(iii) Fe_2O_3
(iv) $[Al_2(OH)_4Si_2O_5]$

Choose the correct answer from the options given below:
(1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(2) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

Answer (2)

Sol. (Ores) (Composition)
(a) Haematite → Fe_2O_3
(b) Magnetite → Fe_3O_4
(c) Calamine → $ZnCO_3$
(d) Kaolinite → $[Al_2(OH)_4Si_2O_5]$

Q56. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion A : Helium is used to dilute oxygen in diving apparatus.

Reason R: Helium has high solubility in (O_2). In the light of the above statements, choose the correct answer from the options given below

(1) Both (A) and (R) are true and (R) correct explanation of

(2) Both (A) and (R) are true and (R) is NOT the correct explanation of

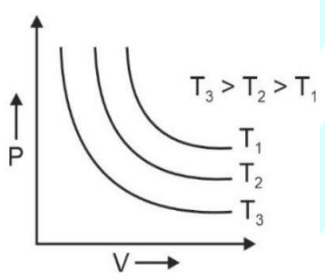
(3) (A) is true but (R) is false

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

Answer (2)

Q57. Which amongst the following options are correct graphical representation of Boyle's law?

(1)



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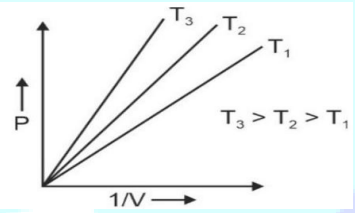

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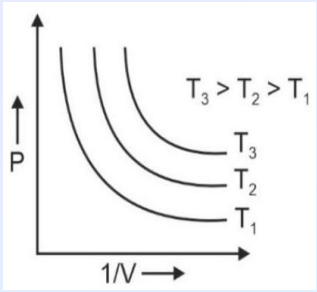

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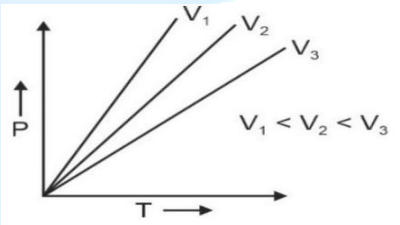


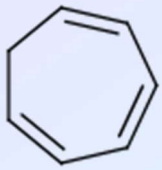
Answer (2)

Q58. Which compound amongst the following is not an aromatic compound?

(1)

(2)

(3) Ø
(4)



Answer (4)

Sol. - Planar, cyclic, conjugated species containing $(4n+2)\pi$ electrons will be aromatic in nature (n is an integer)

Q59. Given below are two statements

Statement I: Primary aliphatic amines react with (HNO_2) to give unstable diazonium salts.
Statement II: Primary aromatic amines react with (HNO_2) to form diazonium salts which are stable even above 300 K . In the light of the above statements, choose the most appropriate answer from the options given below

(1) Both Statement I and Statement II are correct.

(2) Both Statement I and Statement II are incorrect.

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

(4) Statement I is incorrect but Statement II is correct.

Answer (3)

Q60. Given below are two statements: one is labelled as Assertion(A) and the other is labelled as Reason (R).

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

Reason (R): I-Cl bond is weaker than I-I bond. In the light of the above statements, choose the most appropriate answer from the options given below:

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

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

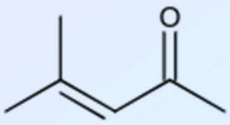
(3) (A) is correct but (R) is not correct

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

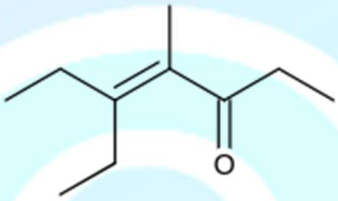
Answer (1)

Q61. Which one of the following is not formed when acetone reacts with 2-pentanone in the presence of dilute NaOH followed by heating?

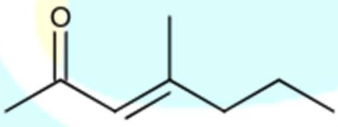
(1)



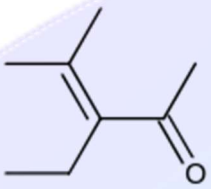
(2)



(3)



(4)



Answer (2)

Q62. Given below are two statements :

Statement I: The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.

Statement II : The boiling points of aldehydes and ketones are lower than the alcohols of similar molecular masses due to the absence of H -bonding. In the light of the above statements, choose the most appropriate answer from the given below

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are incorrect

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

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

Answer (1)

Solution: - The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses due to weak molecular association in aldehydes and ketones arising out of the dipole - dipole interaction. . Alcohols involved intermolecular hydrogen bonding, because of which the boiling point of aldehydes and ketones are lower than the alcohols of similar molecular masses.

Q63. Given below are two statements

Statement I: The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group.

Statement II: (o)-nitrophenol, (m)-nitrophenol and (p)-nitrophenol will have same acidic strength as they have one nitro group attached to the phenolic ring. In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both Statement I and Statement II are correct.

(2) Both Statement I and Statement II are incorrect.

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

(4) Statement I is incorrect but Statement II is correct.

Answer (3)

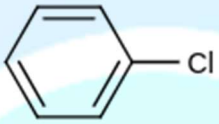
Solution: Nitro group has electron withdrawing tendency. It can withdraw electrons both by -1 effect and -R effect. Thus the acidic strength of monosubstituted nitrophenol is higher than phenol. Nitro group present at (o) - and (p)-positions will have strong -R effect while nitro group present at (m) position will influence only -1 effect hence acidity or (o / p) isomer will be more meta isomer.

Q64. Which of the following sequence of reactions is suitable to synthesize chlorobenzene?

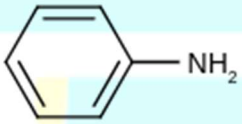
(1) Benzene, Cl_2, anhydrous $FeCl_3$

(2) Phenol, $NaNO_2, HCl, CuCl$

(3)



(4)



HCl, Heating

Answer (1)

Solution: Benzene reacts with chlorine in presence of anhydrous $FeCl_3$ to give chlorobenzene

Q65. Given below are two statements:

Statement I: In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. ($HCl+ZnCl_2$), known as Lucas Reagent.

Statement II: Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent. In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are incorrect

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

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

Answer (3)

Solution: Primary, secondary and tertiary alcohols can be differentiated by their reaction with ((HCl+) anhy ($ZnCl_2$)) Lucas reagent (3^) alcohol ($ZnCl_2$+HCl) Immediate turbidity at room temperature (2^) alcohol ($ZnCl_2$+HCl) Turbidity after 5 minutes at room temperature (1^) alcohol ($ZnCl_2$+HCl) Do not gives turbidity at room temperature

Q66. The element (Z=114) has beeen discovered recently. It will belong to which of the following family/ group and electronic configuration?

(1) Halogen family, ([R n] 5 f^14 6 d^10 7 s^2 7 p^5)

(2) Carbon family, ([R n] 5 f^14 6 d^10 7 s^2 7 p^2)

(3) Oxygen family, ([R n] 5 f^14 6 d^10 7 s^2 7 p^4)

(4) Nitrogen family, ([R n] 5 f^14 6 d^10 7 s^2 7 p^6)

Ans. (2)

Q67. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

(1) 750 mg
(2) 250 mg
(3) Zero mg
(4) 200 mg

Answer (2)

Sol. $M = \frac{W \times 1000}{M_2 \times V(\text{in mL})}$

$$W = \frac{M \times M_2 \times V(\text{in mL})}{1000} = \frac{0.75 \times 36.5 \times 25}{1000}$$
$$= 0.684 \text{ g}(\text{ Mass of HCl})$$

$$\underset{36.5\text{ g}}{\text{HCl}} + \underset{40\text{ g}}{\text{NaOH}} \longrightarrow \text{HCl} + \text{NaOH}$$

36.5 g HCl reacts with $\text{NaOH} = 40\text{ g}$

0.684 g HCl reacts with $\text{NaOH} = \frac{40}{36.5} \times 0.684 \simeq 0.750\text{ g}$

Amount of NaOH left $= 1\text{ g} - 0.750\text{ g} = 0.250\text{ g} = 250\text{mg}$

Q68. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are :

(1) 8,4

(2) 6,12

(3) 2,1

(4) 12,6

Answer (4)

Solution: - Number of octahedral and tetrahedral voids formed by N closed packed atoms are N and 2 N respectively. Each hexagonal unit cell contains 6 atoms therefore, number of tetrahedral and octahedral voids are 12 and 6 respectively.

Q69. Conjugate base for Brönsted acids H_2O and HF are :

(1) OH^- and H_2F^+, respectively

(2) H_3O^+ and F^-, respectively

(3) OH^- and F^-, respectively

(4) H_3O^+ and H_2F^+, respectively

Answer (3)

Q274. Match List I with List II.

List I (Complex)

A. $[Co(NH_3)_5(NO_2)]Cl_2$

B. $[Co(NH_3)_5(SO_4)]Br$

C. $[Co(NH_3)_6][Cr(CN)_6]$

D. $[Co(H_2O)_6]Cl_3$

List II (Type of isomerism)

I. Solvate isomerism

II. Linkage isomerism

III. Ionization isomerism
IV. Coordination isomerism

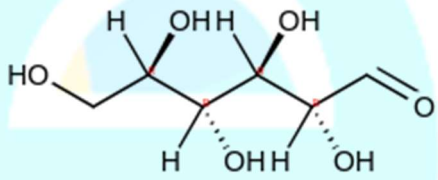
Choose the correct answer from the options given below:
(1) A-II, B-III, C-IV, D-I
(2) A-I, B-III, C-IV, D-II
(3) A-I, B-IV, C-III, D-II
(4) A-II, B-IV, C-III, D-I

Answer (1)

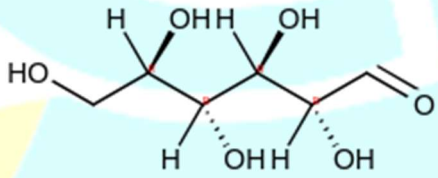
Q70. In a protein molecule various aminoacids are linked together by :
(1) α-glycosidic bond
(2) β-glycosidic bond
(3) peptide bond
(4) dative bond

Ans. (3)

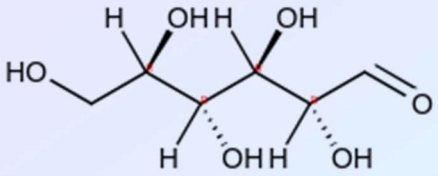
Q71. $78\mathbf{D}(+)$ glucose reacts with hydroxyl amine and yields an oxime. The structure of the oxime would be :
(1)



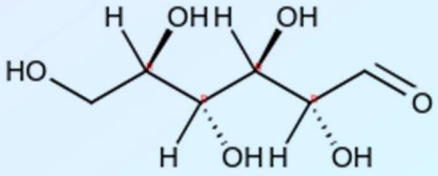
(2)



(3)



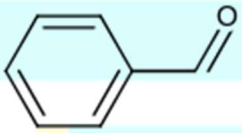
(4)



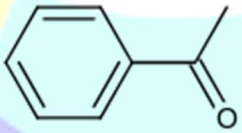
Ans. [4]

Q72. Which one is most reactive towards Nucleophilic addition reaction?

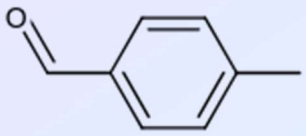
(1)



(2)



(3)



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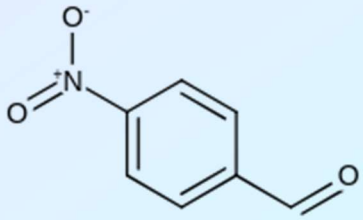
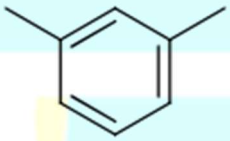
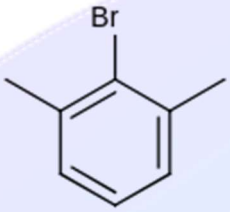


Ans. [4]

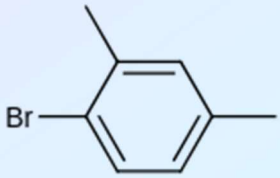
Q73. What products are formed when the following compound is treated with Br_2 in the presence of $FeBr_3$?



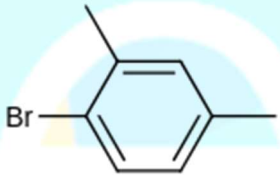
(1)



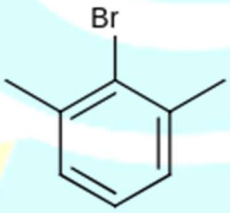
and

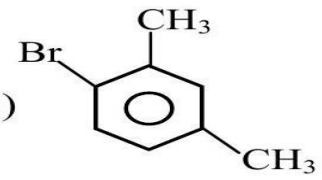
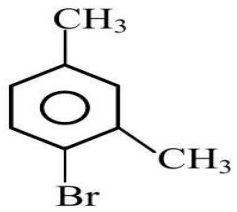


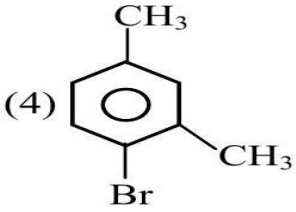
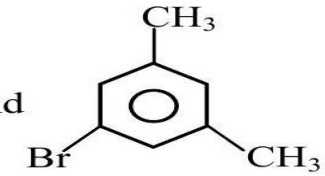
(2)



and

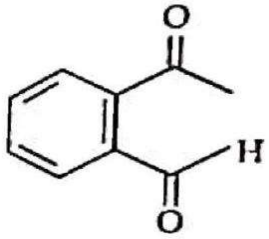


(3)  and 

(4)  and 

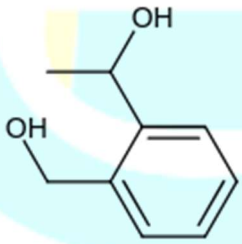
Ans. [3]

Q74. Identify the major product obtained in the following reaction:

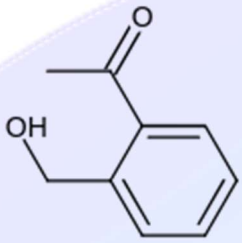
 $+2\left[Ag(NH_3)_2\right]^+ +$

$3^-OH \xrightarrow{\Delta}$ major product

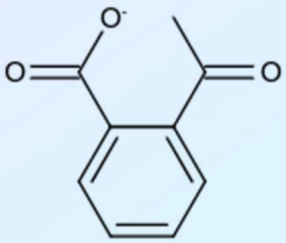
(1)



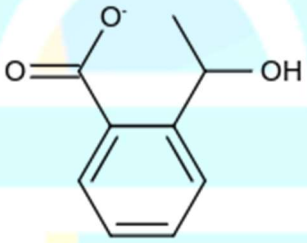
(2)



(3)



(4)



Answer (3)

Q75. Amongst the following the total number of species NOT having eight electrons around central atom in its outermost shell, is (NH_3, $AlCl_3$, $BeCl_2$, CCl_4, PCl_5) :

(1) 3

(2) 2

(3) 4

(4) 1

Answer (1)