

**SOLVED
PAPER**

**NEET (UG)
07th May 2023**

**Code
F3**

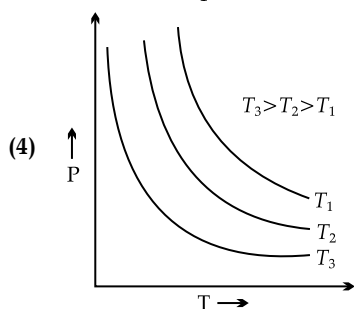
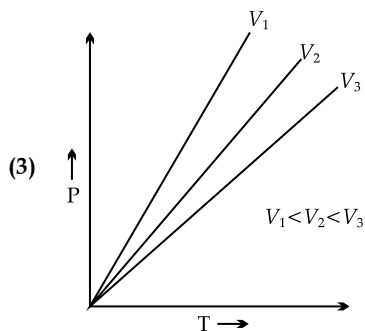
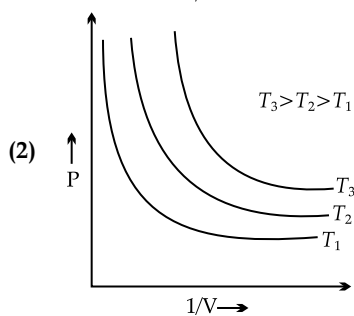
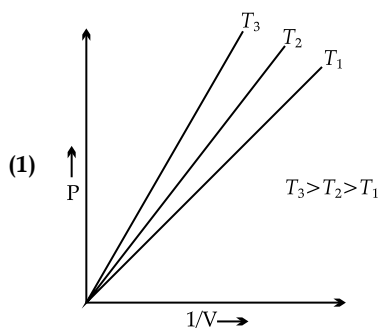
Important Instructions :

- The test is of **3 hours 20 minutes** duration and Test Booklet contains **200** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** Questions in each subject are divided into two **Section (A and B)** as per details given below:
 - Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos- 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.
 - Section B** shall consist of **15 (Fifteen)** Questions in each subject (Question Nos- 36 to 50, 86 to 100, 136 to 150 and 80 to 200). In Section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.
Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.
- Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, one mark will be deducted from the total scores. **The maximum marks are 720.**
- Use **Blue/Black Ball Point Pen only** for writing particulars on this page/markings responses on Answer Sheet.
- Use of Electronic/Manual Calculator is prohibited.
- No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
- The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
- Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

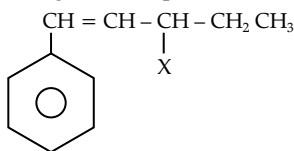
CHEMISTRY

Section A

- Q. 51. The element expected to form largest ion to achieve the nearest noble gas configuration is
- (1) F (2) N
(3) Na (4) O
- Q. 52. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of
- (1) NaSCN
(2) $[\text{Fe}(\text{CN})_5 \text{NOS}]^{4-}$
(3) $[\text{Fe}(\text{SCN})]^{2+}$
(4) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3 \cdot x\text{H}_2\text{O}$
- Q. 53. The relation between n_m , (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l), is
- (1) $l = 2n_m + 1$ (2) $n_m = 2l^2 + 1$
(4) $n_m = l + 2$ (4) $l = \frac{n_m - 1}{2}$
- Q. 54. Which one is an example of heterogenous catalysis?
- (1) Hydrolysis of sugar catalysed by H^+ ions.
(2) Decomposition of ozone in presence of nitrogen monoxide.
(3) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.
(4) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen.
- Q. 55. Which amongst the following options is **correct** graphical representation of Boyle's Law?



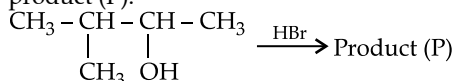
Q. 56. The given compound



is an example of _____.

- (1) aryl halide (2) allylic halide
(3) vinylic halide (4) benzylic halide

Q. 57. Consider the following reaction and identify the product (P).



3 - Methylbutan - 2 - ol

- (1) $\text{CH}_3\text{CH} = \text{CH} - \text{CH}_3$
(2) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \underset{\text{Br}}{\text{CH}} - \text{CH}_3$
(3) $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_2 - \text{Br}$
(4) $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{Br}}{\text{C}}} - \text{CH}_2 - \text{CH}_3$

Q. 58. 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.

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

Q. 59. The conductivity of centimolar solution of KCl at 25°C is $0.0210 \text{ ohm}^{-1} \text{ cm}^{-1}$ and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is

- (1) 3.28 cm^{-1} (2) 1.26 cm^{-1}
(3) 3.34 cm^{-1} (4) 1.34 cm^{-1}

Q. 60. The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are

- (1) 12, 3, 0 (2) 11, 3, 1
(3) 12, 2, 1 (4) 11, 2, 0

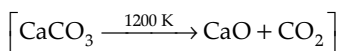
Q. 61. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**:
Assertion A: Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

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

Q. 62. The **right** option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is (Atomic mass of Ca = 40)



- (1) 1.76 g (2) 2.64 g
(3) 1.32 g (4) 1.12 g

Q. 63. Intermolecular forces are forces of attraction and

repulsion between interacting particles that will include

- A. dipole-dipole forces.
- B. dipole-induced dipole forces.
- C. hydrogen bonding.
- D. covalent bonding.
- E. dispersion forces.

Choose the **most appropriate** answer from the options given below :

- (1) A, B, C, D are correct.
- (2) A, B, C, E are correct.
- (3) A, C, D, E are correct.
- (4) B, C, D, E are correct.

- Q. 64. For a certain reaction, the rate = $k [A]^2 [B]$, when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would
- (1) increase by a factor of six.
 - (2) increase by a factor of nine.
 - (3) increase by a factor of three.
 - (4) decrease by a factor of nine.

- Q. 65. Taking stability as the factor, which one of the following represents **correct** relationship?

- (1) $\text{InI}_3 > \text{InI}$
- (2) $\text{AlCl} > \text{AlCl}_3$
- (3) $\text{TlI} > \text{TlI}_3$
- (4) $\text{TlCl}_3 > \text{TlCl}$

- Q. 66. 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 element.
- E. Hydrogen reduces oxides of metals that are more active than iron.

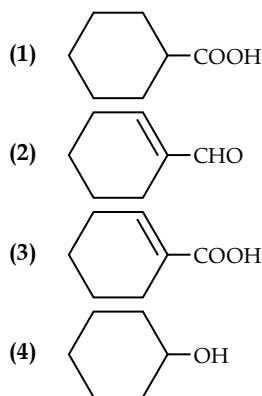
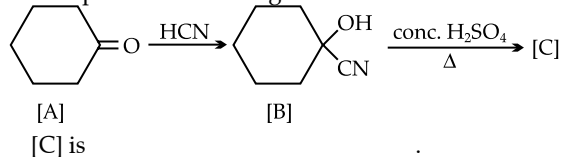
Choose the **most appropriate** answer from the options given below:

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

- Q. 67. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is

- (1) 32
- (2) 30
- (3) 18
- (4) 16

- Q. 68. Complete the following reaction:



- Q. 69. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**:
Assertion A: In equation $\Delta_r G = -nFE_{\text{cell}}$, value of $\Delta_r G$ depends on n .

Reason R: E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.

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

- Q. 70. Amongst the following, the total number of species NOT having eight electrons around central atom in its outer most shell, is

$\text{NH}_3, \text{AlCl}_3, \text{BeCl}_2, \text{CCl}_4, \text{PCl}_5$:

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

- Q. 71. The **correct** order of energies of molecular orbitals of N_2 molecule, is:

- (1) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$
- (2) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y)$
- (3) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma 2p_z < \sigma^* 2p_z$
- (4) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < \sigma 2p_z < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

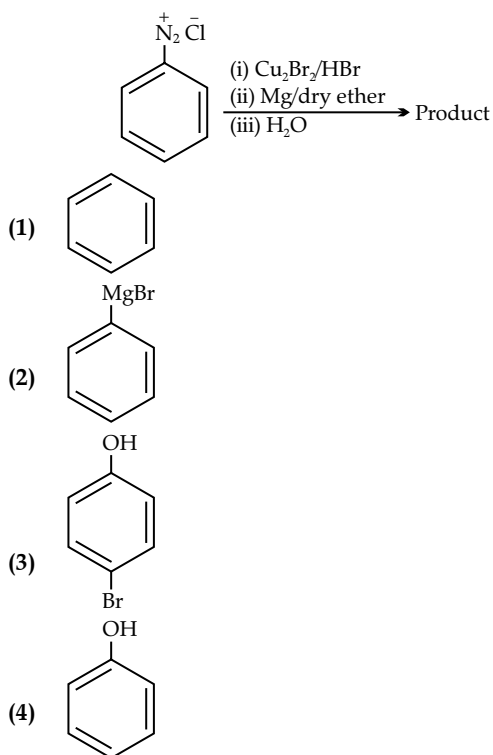
- Q. 72. A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy 1/3 of tetrahedral voids. If the formula of the compound is A_xB_y , then the value of $x + y$ is in option

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

- Q. 73. The stability of Cu^{2+} is more than Cu^+ salts in aqueous solution due to

- (1) enthalpy of atomization.
- (2) hydration energy.
- (3) second ionisation enthalpy.
- (4) first ionisation enthalpy.

Q. 74. Identify the product in the following reaction



Q. 75. 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 false.
- (2) Statement I is true but Statement II is false.
- (3) Statement I is false but Statement II is true.
- (4) Both Statement I and Statement II are true.

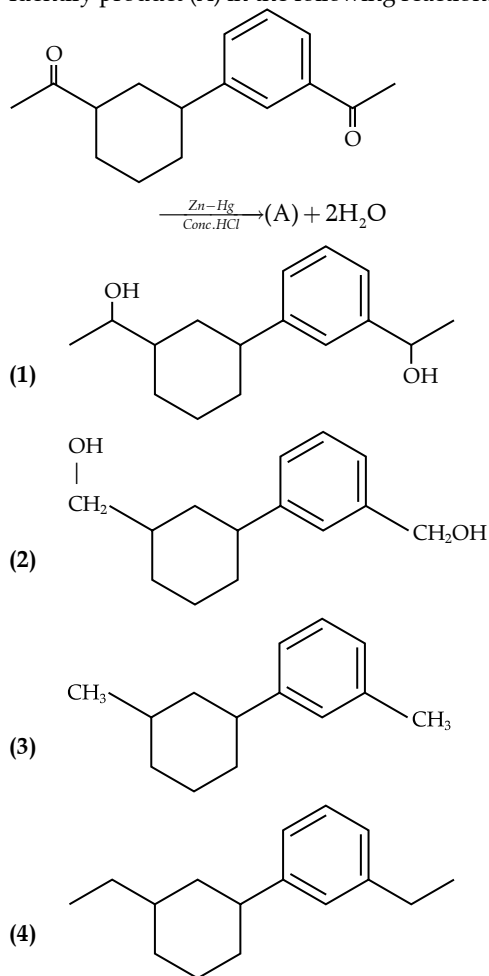
Q. 76. Which one of the following statements is correct?

- (1) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor.
- (2) The bone in human body is an inert and unchanging substance.
- (3) Mg plays roles in neuromuscular function and interneuronal transmission.
- (4) The daily requirement of Mg and Ca in the human body is estimated to be 0.2 - 0.3 g.

Q. 77. Which of the following reactions will NOT give primary amine as the product?

- (1) $\text{CH}_3\text{CN} \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) LiAlH}_4} \text{Product}$
- (2) $\text{CH}_3\text{NC} \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) LiAlH}_4} \text{Product}$
- (3) $\text{CH}_3\text{CONH}_2 \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) LiAlH}_4} \text{Product}$
- (4) $\text{CH}_3\text{CONH}_2 \xrightarrow{\text{Br}_2 / \text{KOH}} \text{Product}$

Q. 78. Identify product (A) in the following reaction:



Q. 79. Match List - I with List - II:

List - I	List-II
A. Coke	I. Carbon atoms are sp^3 hybridised.
B. Diamond	II. Used as a dry lubricant
C. Fullerene	III. Used as a reducing agent
D. Graphite	IV. Cage like molecules

Choose the correct answer from the options given below:

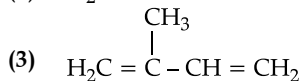
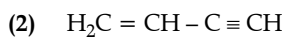
- (1) A-IV, B-I, C-II, D-III
- (2) A-III, B-I, C-IV, D-II
- (3) A-III, B-IV, C-I, D-II
- (4) A-II, B-IV, C-I, D-III

Q. 80. Amongst the given options which of the following molecules/ion acts as a Lewis acid?

- (1) H_2O
- (2) BF_3
- (3) OH^-
- (4) NH_3

Q. 81. Which amongst the following molecules on polymerization produces neoprene?

- (1) $\text{H}_2\text{C} = \overset{\text{Cl}}{\underset{|}{\text{C}}} - \text{CH} = \text{CH}_2$



Q. 82. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

- (1) Meprobamate
- (2) Valium
- (3) Veronal
- (4) Chlordiazepoxide

Q. 83. Homoleptic complex from the following complexes is

- (1) Diamminechloridonitrito - N- platinum (II)
- (2) Pentaamminecarbonatocobalt (III) chloride
- (3) Triamminetriaquachromium (III) chloride
- (4) Potassiumtrioxalatoaluminate (III)

Q. 84. 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 **A** and **R** are true and **R** is **NOT** the correct explanation of **A**.
- (2) **A** is true but **R** is false.
- (3) **A** is false but **R** is true.
- (4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Q. 85. 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 particle of matter.

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

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

Section B

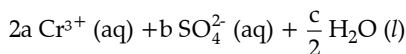
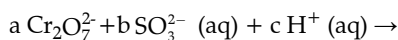
Q. 86. Match **List-I** with **List - II**:

List-I (Oxoacids of Sulphur)		List-II (Bonds)	
A.	Peroxodisulphuric acid	I.	Two S-OH, Four S=O, One S-O-S
B.	Sulphuric acid	II.	Two S-OH, One S=O
C.	Pyrosulphuric acid	III.	Two S-OH, Four S=O, One S-O-O-S
D.	Sulphurous acid	IV.	Two S-OH, Two S=O

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

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

Q. 87. On balancing the given redox reaction,



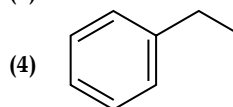
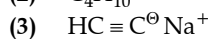
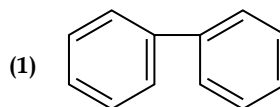
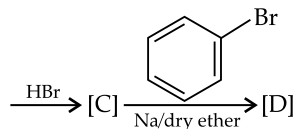
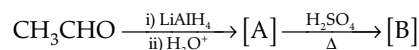
the coefficients a, b and c are found to be, respectively

- (1) 3, 8, 1
- (2) 1, 8, 3
- (3) 8, 1, 3
- (4) 1, 3, 8

Q. 88. What fraction of one edge centred octahedral void lies in one unit cell of fcc?

- (1) $\frac{1}{3}$
- (2) $\frac{1}{4}$
- (3) $\frac{1}{12}$
- (4) $\frac{1}{2}$

Q. 89. Identify the final product [D] obtained in the following sequence of reactions.



Q. 90. Which complex compound is most stable?

- (1) $[\text{Co}(\text{NH}_3)_3(\text{NO}_3)_3]$
- (2) $[\text{CoCl}_2(\text{en})_2]\text{NO}_3$
- (3) $[\text{Co}(\text{NH}_3)_6]_2(\text{SO}_4)_3$
- (4) $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Br}](\text{NO}_3)_2$

Q. 91. Which amongst the following will be most readily dehydrated under acidic conditions ?

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

Q. 92. 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.

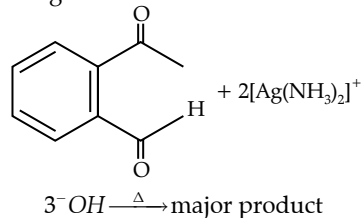
In the light of the above statements, choose the **correct** answer from the options given below:

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

Q. 93. The reaction that does **NOT** take place in a blast furnace between 900 K to 1500 K temperature range during extraction of iron is

- (1) $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$
- (2) $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$
- (3) $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$
- (4) $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow 2\text{FeO} + \text{CO}_2$

Q. 94. Identify the major product obtained in the following reaction :



- (1)

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

Q. 95. Which amongst the following options is the **correct** relation between change in enthalpy and change in internal energy?

- (1) $\Delta H = \Delta U + \Delta n_g RT$
- (2) $\Delta H - \Delta U = -\Delta n RT$
- (3) $\Delta H + \Delta U = \Delta n R$
- (4) $\Delta H = \Delta U - \Delta n_g RT$

Q. 96. Which of the following statements are **INCORRECT**?

- A. All the transition metals except scandium form MO oxides which are ionic.
- B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7 .
- C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5 .
- D. V_2O_4 dissolves in acids to give VO_4^{3-} salts.
- E. CrO is basic but Cr_2O_3 is amphoteric.

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

- (1) B and D only
- (2) C and D only
- (3) B and C only
- (4) A and E only

Q. 97. The equilibrium concentrations of the species in the reaction $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ are 2, 3, 10 and 6 mol L^{-1} , respectively at 300 K. ΔG° for the reaction is ($R = 2 \text{ cal/mol K}$)

- (1) -137.26 cal
- (2) -1381.80 cal
- (3) -13.73 cal
- (4) 1372.60 cal

Q. 98. Consider the following compounds/species:

- (i)
- (ii)

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(A)	10+1 (S)	0 0 0 0 0 0 0 0 0 0
(B)	10-2 (V)	1 1 1 1 1 1 1 1 1 1
(C)	10-3 (A)	2 2 2 2 2 2 2 2 2 2
(D)	Crash (C)	3 3 3 3 3 3 3 3 3 3
(E)		4 4 4 4 4 4 4 4 4 4
(F)	Paper	5 5 5 5 5 5 5 5 5 5
(G)	<input type="text"/>	6 6 6 6 6 6 6 6 6 6
(H)	Paper 1 (1)	7 7 7 7 7 7 7 7 7 7
(I)	Paper 2 (2)	8 8 8 8 8 8 8 8 8 8
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Name

Test Date

Invigilator's Signature

Student's Signature

Certified that all the entries in this section have been properly filled by the student

The OMR Sheet will be computer checked. Fill the circles completely and dark enough for proper detection. Use ballpen (black or blue) for marking.

Avoid Improper Marking

Partially Filled

Lightly Filled

Test Center Code

51 (1) (2) (3) (4)

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Q. No.	Answer Key	Topic's Name	Chapter Name
51	2	Atomic Size	Classification of Elements and Periodicity in Properties
52	3	Qualitative analysis	Organic Chemistry some Basic Principles and Techniques
53	4	Quantum number	Structure of Atom
54	3	Catalysis	Surface chemistry
55	1	Gas laws	States of matter
56	2	Aryl halide naming	Haloalkanes and Haloarenes
57	4	Addition of HBr	Alcohol phenol ether
58	2	Henry's law	Solution
59	2	Conductance	Electrochemistry
60	2	Sigma pi bond	Chemical Bonding and Molecular structure
61	2	Physical properties of alkali metal	s block
62	1	Mole concept	Some Basic Concepts of Chemistry
63	2	Intermolecular forces	States of Matter : Gases and Liquids
64	2	Rate of reaction	Chemical kinetics
65	3	Inert pair effect	p block
66	2	Properties of hydrogen	Hydrogen
67	1	Decarboxylation	Hydrocarbons
68	3	Nucleophilic addition reaction	Aldehydes, Ketones and Carboxylic Acids
69	1	Free energy	Thermodynamics
70	4	Octet rule	Chemical Bonding and Molecular structure
71	4	Molecular Orbital Theory	Chemical Bonding and Molecular structure
72	4	Octahedral Void	Solid State
73	2	Hydration Energy	Chemical Bonding and Molecular structure
74	1	Diazonium Salt	Organic Compounds Containing Nitrogen
75	2	Nucleoside and nucleotide	Biomolecules
76	4	Role of Mg and Ca	s block element
77	2	Amines	Organic Compounds Containing Nitrogen
78	4	Leibniz reduction	Aldehyde, ketone and carboxylic acid
79	2	Allotrope of carbon	p block
80	2	Acids and bases	Equilibrium
81	1	Monomer	Polymer
82	3	Tranquillizer	Chemistry in Everyday Life
83	4	Homoleptic complexes	Coordination Compounds
84	1	Activation energy	Chemical kinetics
85	3	Fundamental particle	Atomic structure
86	1	Oxo acids of sulphur	p block
87	4	Balancing of equation	Redox reaction
88	2	Void	Solid state
89	4	Reduction of aldehyde	Aldehyde, ketone and carboxylic acid, Haloalkanes
90	2	Stability of complexes	Coordination compound
91	1	Dehydration of alcohol	Alcohol phenol ether
92	3	Eutrophication	Environmental Chemistry
93	4	Blast furnace	General Principles and Processes of Isolation of Elements

Q. No.	Answer Key	Topic's Name	Chapter Name
94	2	Tollens reagent	Aldehyde, ketone and carboxylic acid
95	1	Internal energy	Thermodynamics
96	2	Properties of d block element	d block
97	2	Equilibrium constant	Equilibrium
98	4	Huckel rule	Organic Chemistry some Basic Principles and Techniques
99	2	Types of sol	Surface chemistry
100	2	Cleavage of ether	Alcohol phenol ether

NEET (UG) Examination

7th May 2023

ANSWERS WITH EXPLANATION

CHEMISTRY

Section A

51. **Option (2) is correct.**

Explanation: $F(1s^2 2s^2 2p^5) + e^- \rightarrow F^\ominus(1s^2 2s^2 2p^6)$
 $N(1s^2 2s^2 2p^3) + 3e^- \rightarrow N^{3-}(1s^2 2s^2 2p^6)$
 $Na(1s^2 2s^2 2p^6 3s) \rightarrow Na^+(1s^2 2s^2 2p^6) + e^-$
 $O(1s^2 2s^2 2p^4) + 2e^- \rightarrow O^{2-}(1s^2 2s^2 2p^6)$
 $F^\ominus, N^{3-}, Na^+, O^{2-}$ have same number of electrons.
 So they are known as iso electronic species. As the charge on anion increases, ionic size also increases.

$\therefore N^{3-}$ is the anion with largest ionic size.

52. **Option (3) is correct.**

Explanation: $Na + \underset{\text{Organic compound}}{C+N+S} \rightarrow NaSCN$
 $Fe^{3+} + NaSCN \rightarrow [Fe(SCN)]^{2+}$
 Blood Red Colour

In case of organic compound containing both Nitrogen and Sulphur, they react with sodium and lead to the formation of sodium thiocyanate which gives blood red colour on reaction with Fe^{3+} .

53. **Option (4) is correct.**

Explanation: For given value of l , m_l can take values

$$m_l = -l, \dots, 0, \dots, +l$$

$$\text{if } l = 1, m_l = -1, 0, +1$$

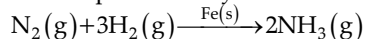
$$\therefore n_m = 2l + 1$$

$$l = \frac{n_m - 1}{2}$$

54. **Option (3) is correct.**

Explanation: Heterogeneous catalyst in that catalyst in which Reactant is present in different state

with respect to catalyst.



55. **Option (1) is correct.**

Explanation: According to Boyle's law at constant temperature, pressure is inversely proportional to volume.

$$PV = nRT$$

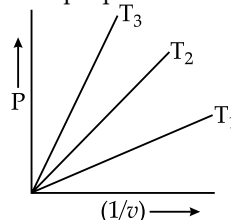
$$P = \frac{nRT}{V}$$

$$P = \frac{1}{v} nRT = \text{constant}$$

$$y = mX$$

\therefore Graph between P and $\frac{1}{v}$ given a straight line

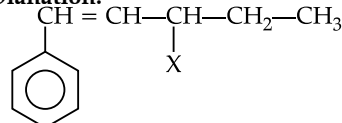
with slope equal to nRT



$$T_3 > T_2 > T_1$$

56. **Option (2) is correct.**

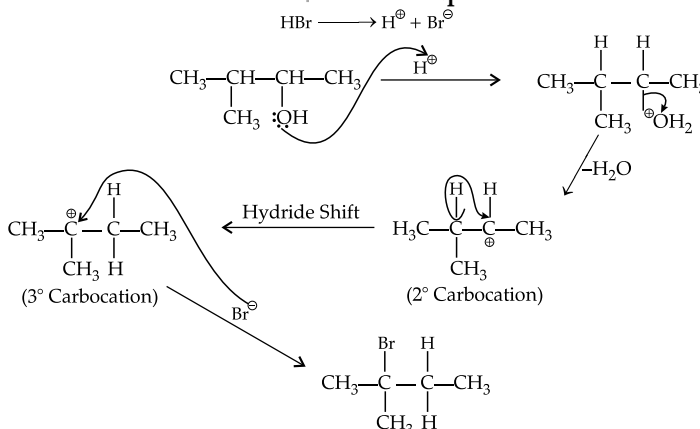
Explanation:



α' Carbon Atom attached to multiple bond is called Allylic carbon Atom.

57. **Option (4) is correct.**

Explanation:



Reaction proceeds through Carbenium ion intermediate, less stable Carbenium ion rearranges itself to more stable Carbenium ion.

58. **Option (2) is correct.**

Explanation: Helium is used to dilute oxygen in diving apparatus because it has low solubility in blood.

∴ Assertion is true but reason is false.

59. **Option (2) is correct.**

Explanation: $(k) = g \times \frac{l}{a}$... (i)

Conductivity = conductance \times cell constant

Since, we know that $g = \frac{1}{R}$

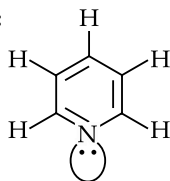
$$k = \frac{1}{R} \times \frac{l}{a} \Rightarrow \frac{l}{a} = R \times k$$

$$R = 60 \Omega, k = 0.0210$$

$$\therefore \frac{l}{a} = 0.0210 \times 60 = 1.26 \text{ cm}^{-1}$$

60. **Option (2) is correct.**

Explanation:



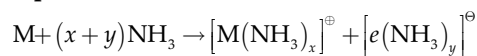
No. of π bond = 3

No. of lone pair = 1

No. of σ bond = 11

61. **Option (2) is correct.**

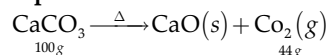
Explanation:



When metal is dissolved in liquid ammonia, blue colour paramagnetic solution is formed. This blue colour paramagnetic solution is due to unpaired electron.

62. **Option (1) is correct.**

Explanation:



$$\text{Amount of CaCO}_3 = 20 \times \frac{20}{100} = 4 \text{ g}$$

$$(\because \text{CaCO}_3 \text{ from } 20\% \text{ pure})$$

$$\therefore 100 \text{ g of CaCO}_3 \text{ produce } \text{CO}_2 = 44 \text{ g}$$

$$1 \text{ g of CaCO}_3 \text{ produce } \text{CO}_2 = \frac{44}{100}$$

$$4 \text{ g of CaCO}_3 \text{ produce } \text{CO}_2 = \frac{44}{100} \times 4$$

$$= 1.76 \text{ g}$$

63. **Option (2) is correct.**

Explanation: Since covalent bond holds atoms within the molecule together however intermolecular forces of attraction and repulsion between the molecules.

∴ Intermolecular forces are dipole-dipole forces, dipole-induced dipole forces, Hydrogen Bonding dispersion forces.

64. **Option (2) is correct.**

Explanation: Since Rate = $K [A]^2 [B]$

New concentration of A

$$[A] = 3 \times [A]$$

$$\therefore \text{Rate} = K [3A]^2 [B]$$

$$\text{Rate} = 9K [A]^2 [B]$$

∴ Rate increases by a factor of 9.

65. **Option (3) is correct.**

Explanation: B Al Ga In Tl

As we move down the group stability of +1 oxidation state increases due to inert pair effect.

∴ Tl in +1 oxidation state has more stability

∴ $\text{TlI} > \text{TlI}_3$

66. **Option (2) is correct.**

Explanation: Hydrogen is used to reduce heavy metal oxides to metal as it is a good reducing agent.

D_2O (Heavy water) is used in organic reaction mechanism to study reaction mechanism.

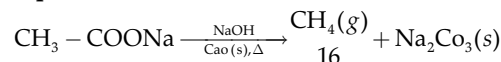
Hydrogen can also be used to make saturated fats from oils.

H-H bond dissociation energy is maximum.

Hydrogen reduces only those oxides of metal which are more reactive than iron.

67. **Option (1) is correct.**

Explanation:

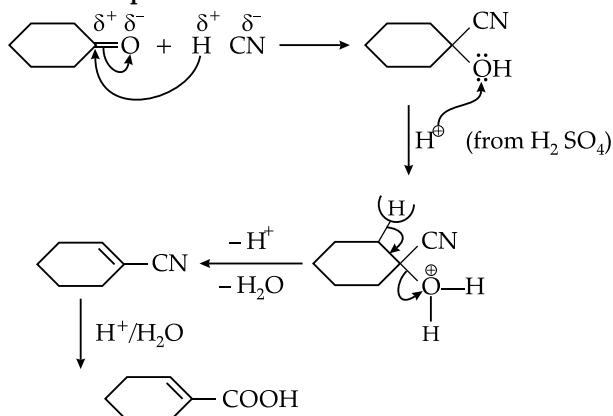


Weight of 1 mole of $\text{CH}_4 = 16 \text{ g}$

2 mole of $\text{CH}_4 = 2 \times 16 = 32 \text{ g}$

68. **Option (3) is correct.**

Explanation:



69. **Option (1) is correct.**

Explanation: Relationship between ΔG and E_{cell}° is given by

$$\Delta G = -n F E_{\text{cell}}$$

n = no. of electron

F = Faraday

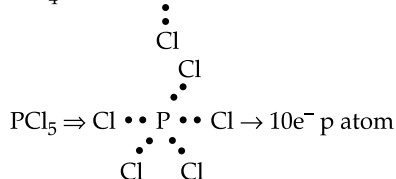
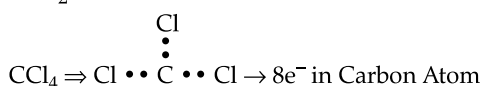
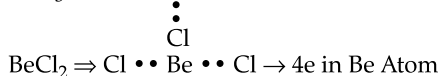
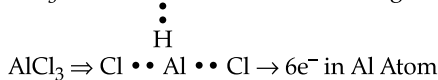
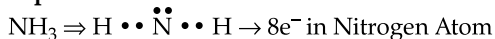
Also E_{cell} is an intensive property

ΔG is an extensive property

∴ Both Assertion and Reason are correct but reason is not correct explanation of Assertion.

70. **Option (4) is correct.**

Explanation:



71. **Option (4) is correct.**

Explanation: For molecule up to N_2 increasing order of energies in various molecular orbital is $\sigma 1s, \sigma^* 1s, \sigma 2s, \sigma^* 2s, \pi 2p_x = \pi 2p_y, \sigma 2p_z, \pi^* 2p_x = \pi^* 2p_y, \sigma^* 2p_z$

72. **Option (4) is correct.**

Explanation: Let us suppose that number of B atom in CCP = n

$$\text{Tetrahedral void} = 2n$$

$$\text{Octahedral void} = n$$

$$\therefore \text{No. of A atom} = \frac{1}{3} \times 2n = \frac{2n}{3}$$

$$\therefore \text{A} : \text{B} = \frac{2n}{3} : n$$

$$\text{A} : \text{B} = 2 : 3$$

$$\text{Formula} = \text{A}_2 \text{B}_3$$

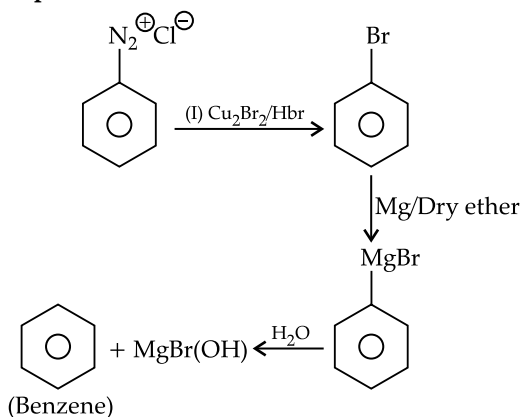
$$x=2, y=3 \Rightarrow x+y=2+3=5$$

73. **Option (2) is correct.**

Explanation: Stability of Cu^{2+} in more than Cu^+ salts in aqueous solution. This is due to high hydration energy of Cu^{2+} ion than Cu^+ .

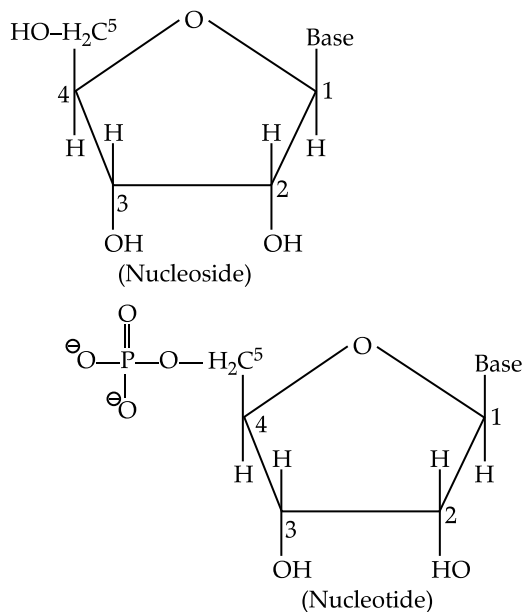
74. **Option (1) is correct.**

Explanation:



75. **Option (1) is correct.**

Explanation:



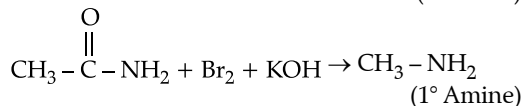
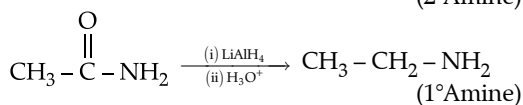
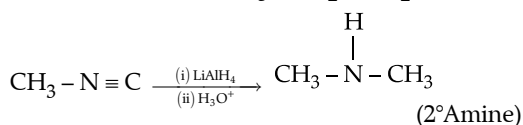
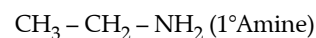
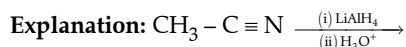
Nucleoside is formed by the attachment of a base to 1' position of sugar. Nucleotide is formed when nucleoside is attached to position 5' to the phosphoric acid.

76. **Option (4) is correct.**

Explanation: All enzymes that utilize ATP in phosphate transfer required Mg as the cofactor. Bone in human body is not an inert and unchanging substance. Ca plays roles in neuromuscular function.

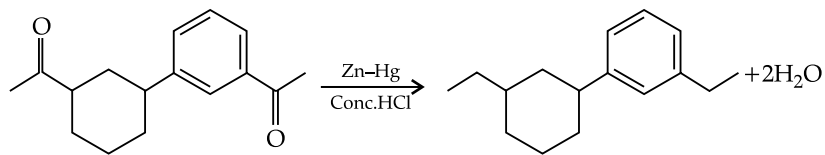
The daily requirement of Mg. and Ca in human body is 200 – 300 mg.

77. **Option (2) is correct.**



78. Option (4) is correct.

Explanation:



Zn.Hg/Conc. HCl reduces $\text{—}\overset{\text{O}}{\parallel}\text{C—}$ to —CH_2

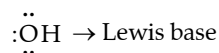
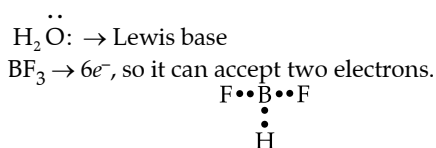
79. Option (2) is correct.

Explanation:

- Coke is used as reducing agent in metallurgical process.
- Diamond each Carbon Atom is sp^3 hybridized.
- Fullerene consist of a Cage like structure.
- Graphite is used as lubricant.

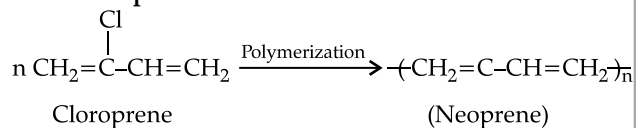
80. Option (2) is correct.

Explanation: Lewis Acids are those substance which can accept a pair of electron, Lewis base are those substance which can donate a pair of electron.



81. Option (1) is correct.

Explanation:



Chloroprene produces neoprene with the help of free radical polymerization.

82. Option (3) is correct.

Explanation: Meprobamate, Valium and Chlordiazepoxide are tranquillizers.

Veronal is the derivatives of barbituric acid and considered as barbiturate.

83. Option (4) is correct.

Explanation: Homoleptic complexes are those complexes which contain only one types of ligand.

$\text{K}_3[\text{Al}(\text{OX})_3]$ – Potassium trioxalatoaluminate (III)

84. Option (1) is correct.

Explanation: Activation energy of certain reaction may be zero.e.g., diradical reaction.

Reason: Activation energy in defined as the minimum energy which must be supplied to the reactant so that there energy become equal to threshold energy.

85. Option (3) is correct.

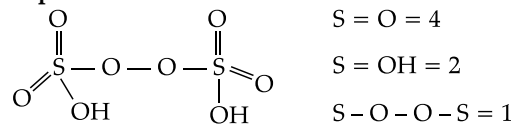
Explanation: Atom consist of three fundamental particle proton, electron and neutron.

- Mass of electron (m_e) = 9.10939×10^{-31} kg
- Isotope have same chemical properties.
- Nucleon = neutron + proton
- According to Dalton's Atomic theory atom can't be further subdivided.

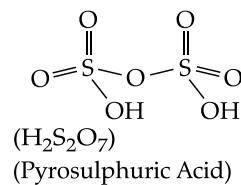
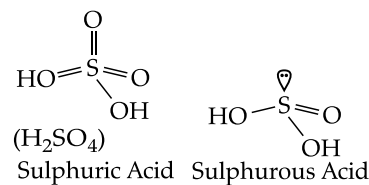
Section B

86. Option (1) is correct.

Explanation:

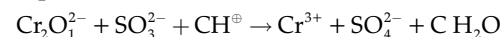


$\text{H}_2\text{S}_2\text{O}_8$
Peroxodisulphuric Acid

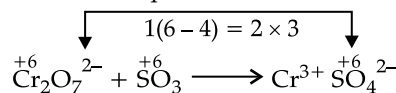


87. Option (4) is correct.

Explanation:

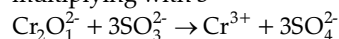


Step (i) to write balanced equation first of all write Skelton eqn.

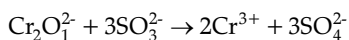


Change in O.N = $2(3-6) = -6 \times 1$

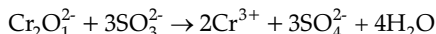
Step (ii) balance increase and decrease by multiplying with 3



Step (iii) balanced all other atoms except O. So in order to balance cr multiply it with 2

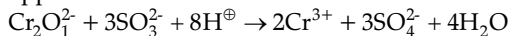


Step (iv) balance O atom by adding H_2O molecule



O = 16

Step (v) balance H atom by adding H^{\oplus} ions opposite site



$\therefore a = 1, b = 3, c = 8$

88. **Option (2) is correct.**

Explanation: No. of atom in fcc = 4

\therefore Octahedral Void in fcc = 4

Octahedral void in fcc = Body centre + edge centre

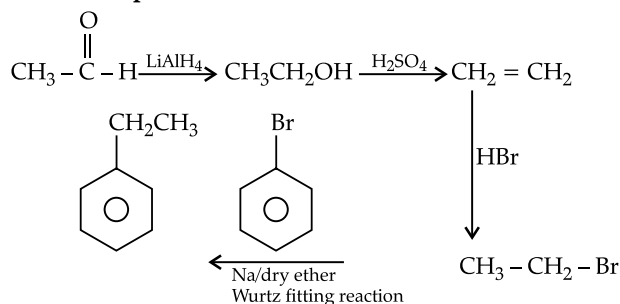
Contribution at edge centre = $\frac{1}{4}$

\therefore Fraction of one edge centered octahedral void

in one unit of FCC = $\frac{1}{4}$

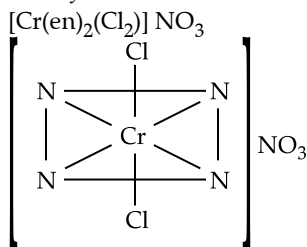
89. **Option (4) is correct.**

Explanation:



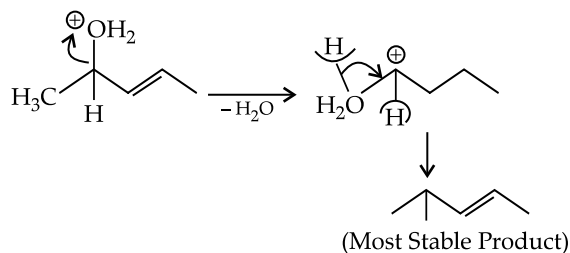
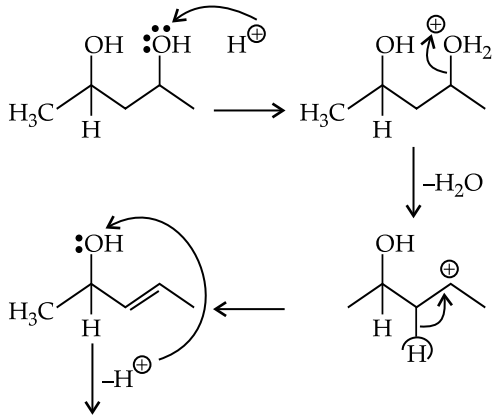
90. **Option (2) is correct.**

Explanation: Chelating complexes are more stable as they lead to the formation of cyclic structure.



91. **Option (1) is correct.**

Explanation: Acidic dehydration process through carbocation formation.

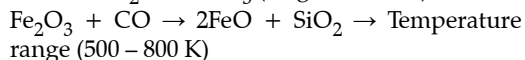
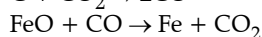
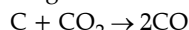


92. **Option (3) is correct.**

Explanation: Eutrophication is the excessive growth of plant in water bodies due to presence of nutrient. Due to Eutrophication level of dissolved oxygen decreases in water bodies.

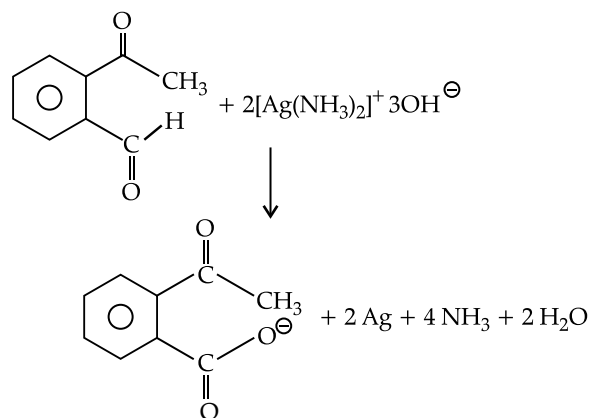
93. **Option (4) is correct.**

Explanation: Reaction which take place in a blast furnace between 900 K to 1500 K Temperature range are



94. **Option (2) is correct.**

Explanation: Tollen's Reagent used to differentiate Aldehyde and Ketone and it produces silver mirror.



95. **Option (1) is correct.**

Explanation: The correct relationship between ΔH and ΔU in given by eqn.

$$\Delta H = \Delta U + \Delta n_g RT$$

96. **Option (2) is correct.**

Explanation: All the transition metal except scandium form Mo which are ionic.

Highest Oxidation state corresponding to group number in transition metal oxide is attained in Sc_2O_3 to Mn_2O_7 .

Acidic character increases from V_2O_3 to V_2O_5

V_2O_4 gives VO^{2+} when dissolved in acid.

CrO is basic but Cr_2O_3 is Amphoteric

97. **Option (2) is correct.**

Explanation: $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$

2 3 10 6 \rightarrow at equilibrium

$$K_{eq} = \frac{[C][D]}{[A][B]} = \frac{10 \times 6}{2 \times 3} = 10$$

$$\begin{aligned} \Delta G &= -RT \ln K_{eq} = -2.303 RT \log_{10} K \\ &= -2.303 \times 2 \times 300 \times \log(10) \\ &= -1381.8 \text{ cal} \end{aligned}$$

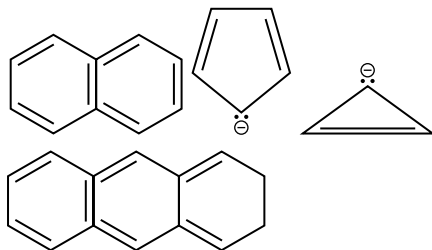
98. **Option (4) is correct.**

Explanation: Aromatic compounds are those compounds which satisfy Huckel's Rule

(i) Compound must be planar

(ii) Complete delocalisation.

(iii) Must contain $(4n+2)$ π electrons.



99. **Option (2) is correct.**

Explanation: Dispersed phase = Gas

Dispersion medium = Solid

\therefore Pumice Stone in Solid Sol.

100. **Option (2) is correct.**

Explanation:

