51 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.

52 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.

53 Which amongst the following option correct graphical representation of Boyle's Law?

(1)

$T_3 > T_2 > T_1$

(2)

$T_3 > T_2 > T_1$

(3)

$V_1 < V_2 < V_3$

(4)

$T_3 > T_2 > T_1$
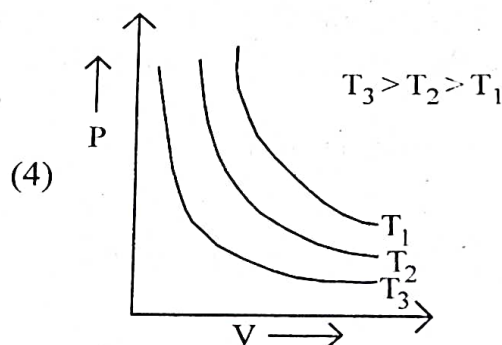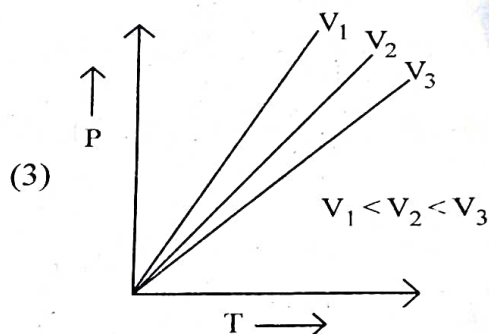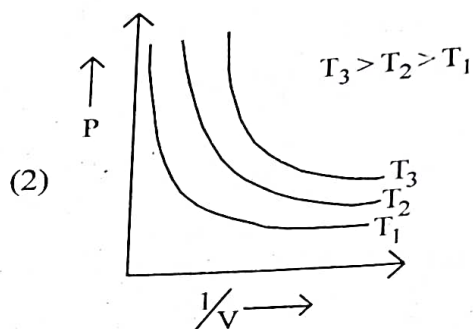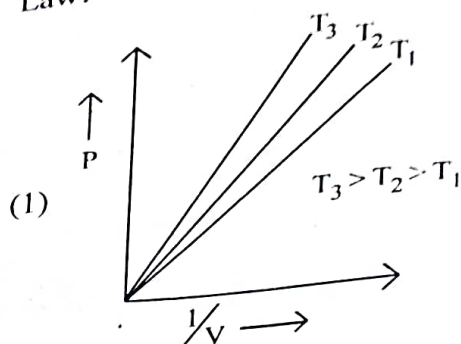
54 Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R** :

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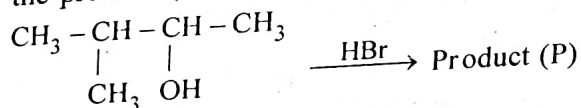
In the light of the above statements, choose the **correct** answer from the options given below :

(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**.

55 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 –
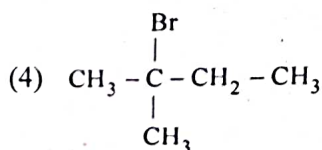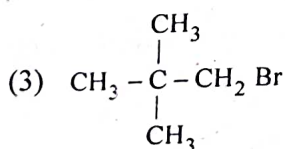
(1) NaSCN

(2) $\left[Fe(CN)_5 NOS\right]^{4-}$

(3) $\left[Fe(SCN)\right]^{2+}$

(4) $Fe_4\left[Fe(CN)_6\right]_3 \cdot x H_2O$

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

$$CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - CH_3 \xrightarrow{\ HBr\ } Product\ (P)$$

3 – Methylbutan – 2 – ol

(1) $CH_3 CH = CH - CH_3$

(2) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_3$

(3) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 Br$

(4) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{Br}{|}}{C}} - CH_2 - CH_3$

57 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.

58 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

59 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.

60 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

61 Homoleptic complex from the following complexes is :

(1) Diamminechloridonitrito - N - platinum (II)

(2) Pentaamminecarbonatocobalt (III) chloride

(3) Triamminetriaquachromium (III) chloride

(4) Potassium trioxalatoaluminate (III)

62 The **correct** order of energies of molecular orbitals of N_2 molecule, is :

(1) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z <$
$\left(\pi 2p_x = \pi 2p_y\right) < \left(\pi^* 2p_x = \pi^* 2p_y\right) < \sigma^* 2p_z$

(2) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z <$
$\sigma^* 2p_z < \left(\pi 2p_x = \pi 2p_y\right) < \left(\pi^* 2p_x = \pi^* 2p_y\right)$

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

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

63 Taking stability as the factor, which one of the following represents **correct** relationship?

(1) $InI_3 > InI$ (2) $AlCl > AlCl_3$

(3) $TlI > TlI_3$ (4) $TlCl_3 > TlCl$

64 Given below are two statements : labelled as **Assertion A** and the oth labelled as **Reason R** :

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

Reasons R : Helium has high solubi in O_2.

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

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

65 Select the **correct** statements fro following :

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

B. The mass of the electron is 9.10939×10^{-31} kg.

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

D. Protons and electrons are collec known as nucleons.

E. Dalton's atomic theory, regarde atom as an ultimate particle of r

Choose the **correct** answer from the o 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

**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

67 The given compound

$$CH = CH - CH - CH_2 CH_3$$
with X on the CH and a benzene ring attached
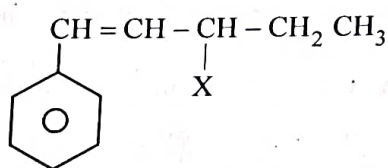
is an example of _____ .

(1) aryl halide

(2) allylic halide

(3) vinylic halide

(4) benzylic halide

68 Identify product (A) in the following reaction:

$$\xrightarrow[\text{conc. HCl}]{\text{Zn-Hg}} (A) + 2H_2O$$
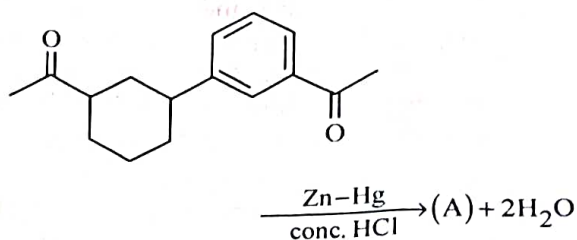
(1)

(2)

(3)

(4)

69 The conductivity of centimolar solution of KCl at 25°C is 0.0210 ohm^{-1} cm^{-1} and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is -
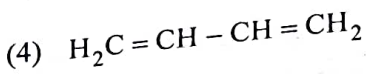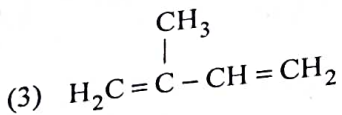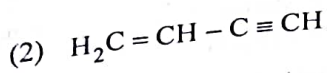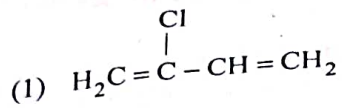
(1) 3.28 cm^{-1} (2) 1.26 cm^{-1}
(3) 3.34 cm^{-1} (4) 1.34 cm^{-1}

70 Amongst the given options which of the following molecules / ion acts as a Lewis acid?
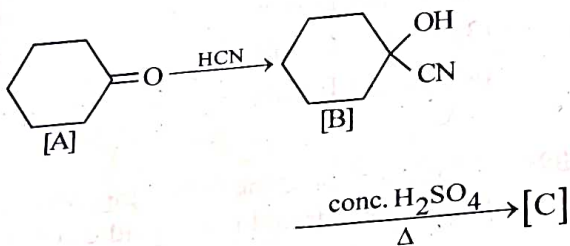
(1) H_2O (2) BF_3
(3) OH^- (4) NH_3

71 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.

72 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) $n_m = 2l^2 + 1$

(3) $n_m = l + 2$

(4) $l = \dfrac{n_m - 1}{2}$

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

$NH_3, AlCl_3, BeCl_2, CCl_4, PCl_5$:

(1) 2

(2) 4

(3) 1

(4) 3

74 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.

75 Given below are two statements : o labelled as **Assertion A** and the ot labelled as **Reason R** :

Assertion A : Metallic sodium dissol liquid ammonia giving a deep blue sol which is paramagnetic.

Reasons R : The deep blue solution i to the formation of amide.

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

(1) Both **A** and **R** are true but **R** is 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** i correct explanation of **A**.

76 The element expected to form largest i achieve the nearest noble gas configur is :

(1) F

(2) N

(3) Na

(4) O

77 Some tranquilizers are listed below. one from the following belon: arbiturates?

(1) Meprobamate

(2) Valium

(3) Veronal

(4) Chlordiazepoxide

78 Given below are two statements : o labelled as **Assertion A** and the oth labelled as **Reason R** :

Assertion A : In equation $\Delta_r G = - nF$ value of $\Delta_r G$ depends on n.

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

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

(1) Both **A** and **R** are true and **R** is 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** i correct explanation of **A**.

[Cor

79 Which amongst the following molecules on polymerization produces neoprene?

(1) $H_2C = \overset{\overset{\displaystyle Cl}{|}}{C} - CH = CH_2$

(2) $H_2C = CH - C \equiv CH$

(3) $H_2C = \overset{\overset{\displaystyle CH_3}{|}}{C} - CH = CH_2$

(4) $H_2C = CH - CH = CH_2$

80 Complete the following reaction :

[C] is _____.

(1) cyclohexane-COOH   (2) cyclohexene-CHO

(3) cyclohexene-COOH   (4) cyclohexane-OH
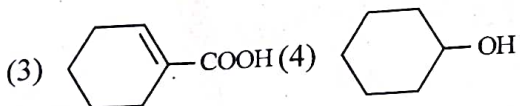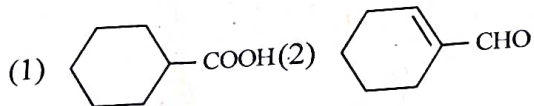
81 Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :

(1) 32   (2) 30

(3) 18   (4) 16

82 Which of the following reactions will NOT give primary amine as the product?
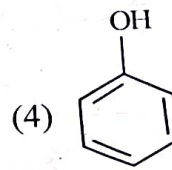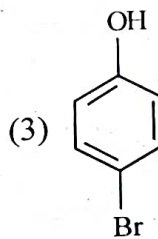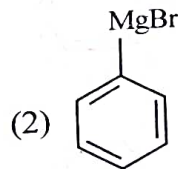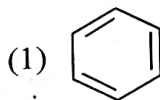
(1) $CH_3CN \xrightarrow[\text{(ii) }H_3O\oplus]{\text{(i) }LiAlH_4}$ Product

(2) $CH_3NC \xrightarrow[\text{(ii) }H_3O\oplus]{\text{(i) }LiAlH_4}$ Product

(3) $CH_3CONH_2 \xrightarrow[\text{(ii) }H_3O\oplus]{\text{(i) }LiAlH_4}$ Product

(4) $CH_3CONH_2 \xrightarrow{Br_2/KOH}$ Product
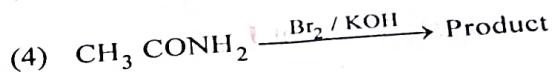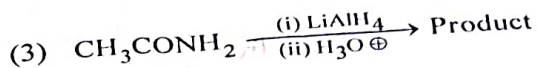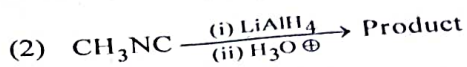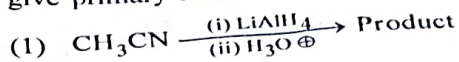
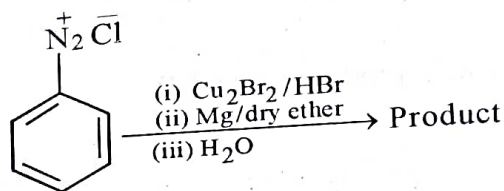**83** The **right** option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is (Atomic mass of $Ca = 40$)

$$\left[CaCO_3 \xrightarrow{1200\ K} CaO + CO_2 \right]$$
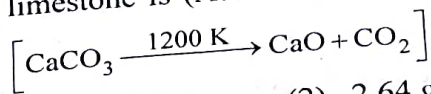
(1) 1.76 g   (2) 2.64 g

(3) 1.32 g   (4) 1.12 g

84 Identify the product in the following reaction:

$\xrightarrow[\text{(iii) }H_2O]{\substack{\text{(i) }Cu_2Br_2/HBr \\ \text{(ii) }Mg/dry\ ether}}$ Product

(1) benzene   (2) phenyl-MgBr

(3) 4-bromophenol   (4) phenol

85 The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are

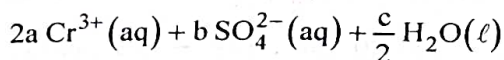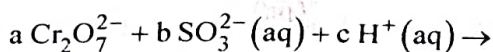(1) 12, 3, 0   (2) 11, 3, 1

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

95 Which complex compound is most stable?

(1) $\left[Co(NH_3)_3(NO_3)_3\right]$

(2) $\left[CoCl_2(en)_2\right]NO_3$

(3) $\left[Co(NH_3)_6\right]_2(SO_4)_3$

(4) $\left[Co(NH_3)_4(H_2O)Br\right](NO_3)_2$

96 On balancing the given redox reaction,

$$a\,Cr_2O_7^{2-} + b\,SO_3^{2-}(aq) + c\,H^+(aq) \rightarrow$$

$$2a\,Cr^{3+}(aq) + b\,SO_4^{2-}(aq) + \frac{c}{2}H_2O(\ell)$$

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

97 Given below are two statements :
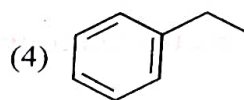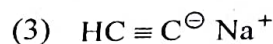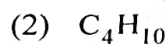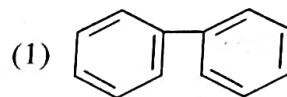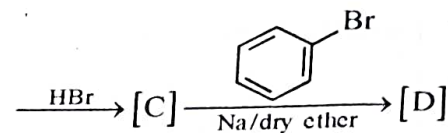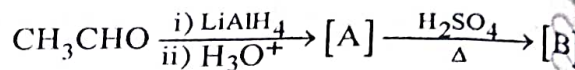
Statement I : The nutrient deficient water bodies lead to eutrophication.

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.

98 Identify the final product [D] obtained the following sequence of reactions.

$$CH_3CHO \xrightarrow[\text{ii) } H_3O^+]{\text{i) LiAlH}_4} [A] \xrightarrow[\Delta]{H_2SO_4} [B]$$

$$\xrightarrow{HBr} [C] \xrightarrow[\text{Na/dry ether}]{} [D]$$

(1)

(2) C_4H_{10}

(3) $HC \equiv C^{\ominus} Na^+$

(4)

99 Pumice stone is an example of -

(1) gel   (2) solid sol

(3) foam   (4) sol

100 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=C
C.	Pyrosulphuric acid	III. Two S-OH, Four S=O One S-O-O-S
D.	Sulphurous acid	IV. Two S-OH, Two S=C

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