VISUTI Career

CHEMISTRY

TEST PAPER WITH ANSWER

Chemistry : Section-A (Q. No. 051 to 085)

51. 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.

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 **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**.

Ans. (2)

52. 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}

Ans. (2)

53. 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

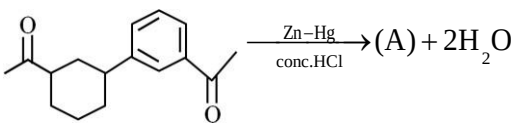
(2) increase by a factor of nine

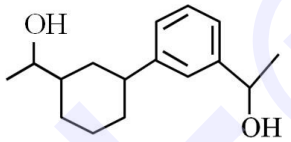
(3) increase by a factor of three

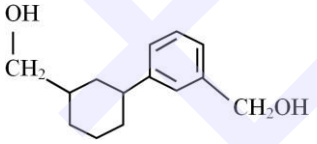
(4) decrease by a factor of nine

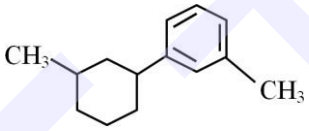
Ans. (2)

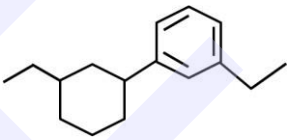
54. Identify product (A) is the following reaction :



(1) 

(2) 

(3) 

(4) 

Ans. (4)

55. Which one is an example of heterogenous catalysis ?

(1) Hydrolysis of sugar catalysed by H^+ ions.

(2) Decomposition of ozone is 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.

Ans. (3)

56. 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 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**.

Ans. (2)

57. 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

Ans. (4)

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

Ans. **(4)**

59. 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

Ans. **(2)**

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

Ans. **(2)**

61. The element expected to form largest ion to achieve the nearest noble gas configuration is

(1) F (2) N

(3) Na (4) O

Ans. **(2)**

62. 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 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**.

Ans. **(1)**

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

$CH_3–\underset{\underset{3}{|}}{CH}–\underset{|}{CH}–CH_3$ (OH) $\xrightarrow{HBr}$ Product (P)

3-Methylbutan-2-ol

(1) $CH_3CH=CH–CH_3$

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

(3) $CH_3–\underset{\underset{CH_3}{|}}{\overset{CH_3}{\overset{|}{C}}}–CH_2Br$

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

Ans. **(4)**

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

Assertion A : In equation $\Delta_r G = -nFE_{cell}$, value of $\Delta_r G$ depends on n.

Reasons 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**.

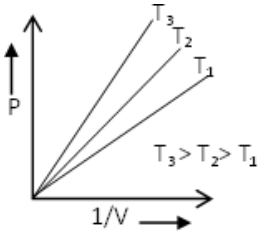
(2) **A** is true but **R** is false

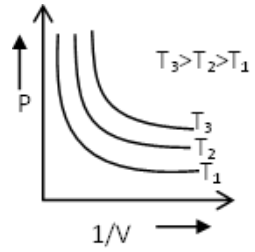
(3) **A** is false but R is true

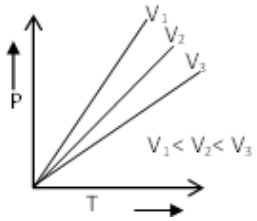
(4) Both **A** and **R** are true and **R** is the correct explanation of **A.**

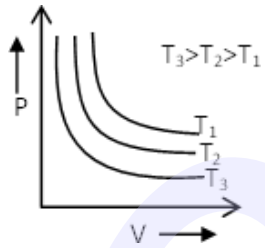
Ans. **(4)**

65. Which amongst the following options is correct graphical representation of Boyle's Law?

(1) 

(2) 

(3) 

(4) 

Ans. **(1)**

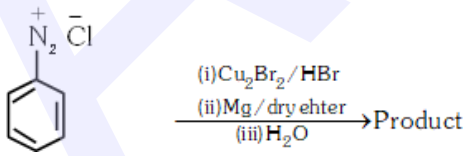
66. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of-

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

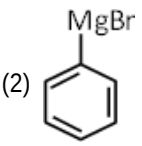
(3) $\left[Fe(SCN)\right]^{2+}$ (4) $Fe_4\left[Fe(CN)_6\right]_3 .xH_2O$

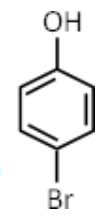
Ans. **(3)**

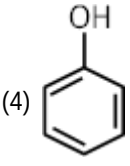
67. Identify the product in the following reaction :



(1) 

(2) 

(3) 

(4) 

Ans. **(1)**

68. 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 elements 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

Ans. **(3)**

69. A compound is formed by two elements A and B. The elements 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

Ans. **(4)**

70. Given below are two statements:

Statement I : A unit formed by the attachment of a base to l' 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

Ans. **(2)**

71. Which amongst the following molecules on polymerization produces neoprene?

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

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

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

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

Ans. **(1)**

72. 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) $TlCl_3 > TlCl$

Ans. (3)

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

(1) Meprobamate (2) Valium

(3) Veronal (4) Chlordiazepoxide

Ans. (3)

74. 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

Ans. (2)

75. 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

Ans. (2)

76. 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

Ans. (2)

77. The **right** option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is

(Atomic mass of Ca = 40)

$[CaCO_3 \xrightarrow{1200\,K} CaO + CO_2]$

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

Ans. (1)

78. 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) $l = \frac{n_m - 1}{2}$

Ans. (4)

79. 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.

Ans. (2)

80. 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.

Ans. (4)

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

(1) $CH_3CN \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4}$ Product

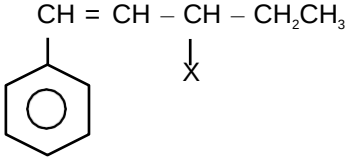
(2) $CH_3NC \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4}$ Product

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

(4) $CH_3CONH_2 \xrightarrow[Br_2/KOH]{}$ Product

Ans. (2)

82. The given compound



is an example of_____.

(1) aryl halide

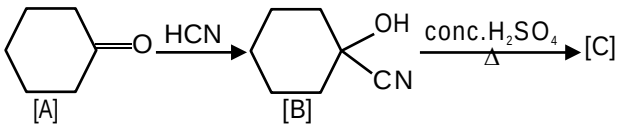
(2) allylic halide

(3) vinylic halide

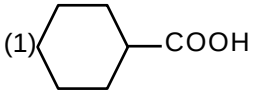
(4) benzylic halide

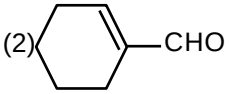
Ans. (2)

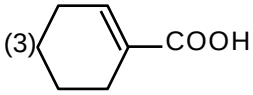
83. Complete the following reaction :

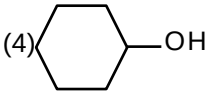


[C] is _____.

(1) 

(2) 

(3) 

(4) 

Ans. (3)

84. Homoleptic complex from the following complexes is :

(1) Diamminechloridonitrito-N-platinum (II)

(2) Pentaamminecarbonatocobalt (III) chloride

(3) Triamminetriaquachromium (III) chloride

(4) Potassium trioxalatoaluminate (III)

Ans. (4)

85. 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 :

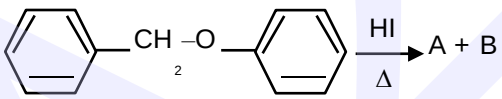
(1) 32 (2) 30

(3) 18 (4) 16

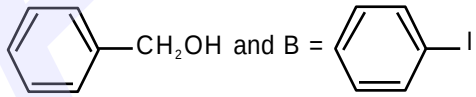
Ans. (1)

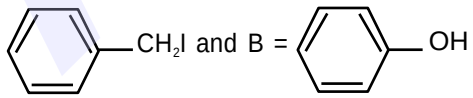
Chemistry : Section-B (Q. No. 086 to 100)

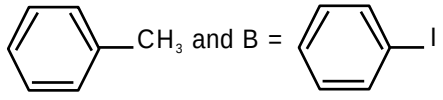
86. Consider the following reaction

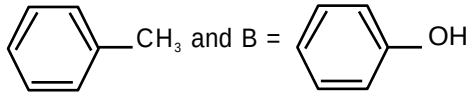


Identify products A and B :-

(1) 

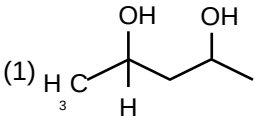
(2) 

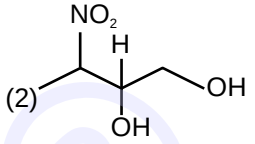
(3) 

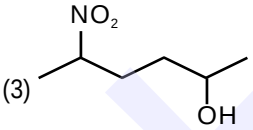
(4) 

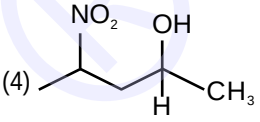
Ans. (2)

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

(1) 

(2) 

(3) 

(4) 

Ans. (1)

88. The equilibrium concentrations of the species in the reaction A + B $\rightleftharpoons$ C + D are 2, 3, 10 and 6 mol L^{-1}, respectively at 300 K. ΔG^0 for the reaction is

(R = 2 cal/mol K)

(1) –137.26 cal (2) –1381.80 cal

(3) –13.73 cal (4) 1372.60 cal

Ans. (2)

89. 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..

Ans. (3)

90. 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) $\Delta H - \Delta U = -\Delta nRT$

(3) $\Delta H + \Delta U = \Delta nR$ (4) $\Delta H = \Delta U - \Delta n_g RT$

Ans. (1)

91. 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

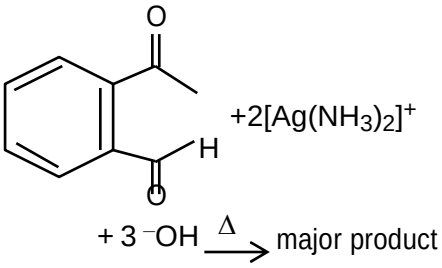
Choose the **correct** answer from the options given below:

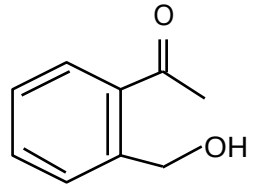
(1) A-III, B-IV, C-I, D-II (2) A-I, B-III, C-IV, D-II

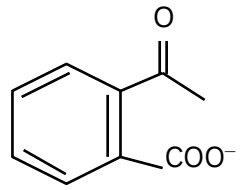
(3) A-III, B-IV, C-II, D-I (4) A-I, B-III, C-II, D-IV

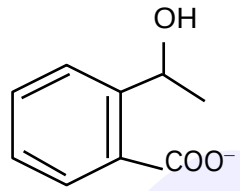
Ans. (1)

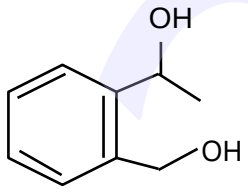
92. Identify the major product obtained in the following reaction:



(1) 

(2) 

(3) 

(4) 

Ans. (2)

93. Pumice stone is an example of -

(1) gel (2) solid sol

(3) foam (4) sol

Ans. (2)

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

(1) $FeO + CO \rightarrow Fe + CO_2$

(2) $C + CO_2 \rightarrow 2CO$

(3) $CaO + SiO_2 \rightarrow CaSiO_3$

(4) $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

Ans. (4)

95. 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^{3-}_4 salts.

E. CrO is basic but Cr_2O_3 is amphoteric.

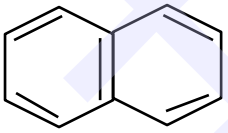
Choose the **correct** answer from the options given below:

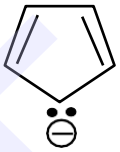
(1) B and D only (2) C and D only

(3) B and C only (4) A and E only

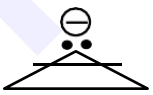
Ans. (2)

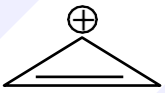
96. Consider the following compounds/species:

(i) 

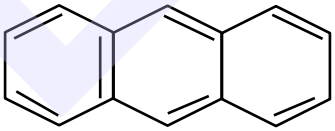
(ii) 

(ii) 

(iv) 

(v) 

(vi) 

(vii) 

The number of compounds/species which obey Huckel's rule is_____.

(1) 6 (2) 2 (3) 5 (4) 4

Ans. (4)

97. 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) $\frac{1}{2}$

Ans. (2)

98. Which complex compound is most stable?

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

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

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

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

Ans. (2)

99. On balancing the given redox reaction,

$aCr_2O_7^{2-} + bSO_3^{2-}(aq) + cH^+(aq) \rightarrow 2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(\ell)$

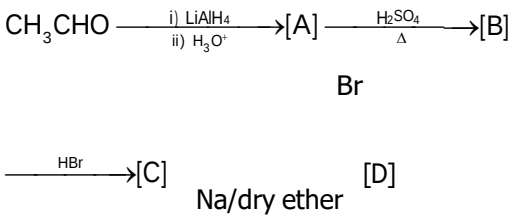
the coefficients a, b and c are found to be, respectively -

(1) 3, 8, 1 (2) 1, 8, 3

(3) 8, 1, 3 (4) 1, 3, 8

Ans. (4)

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



(1) (2) C_4H_{10}

(3) $HC \equiv C^- Na^+$ (4)

Ans. (4)