Question 1:

An ionic compound is expected to have tetrahedral structure if \( \frac{r_+}{r_-} \) lies in the range of:

(A) 0.414 to 0.732

(B) 0.225 to 0.414

(C) 0.155 to 0.225

(D) 0.732 to 1

Answer: (B)

Question 2:

An octahedral complex is formed when hybrid orbitals of the following type are involved:

(A) sp3

(B) d sp2

(C) d2sp3

(D) sp2d2

Answer: (C)
Question 3:
An organic compound on heating with CuO produces CO₂ but no water. The organic compound may be

(A) Methane
(B) Ethyl iodide
(C) Carbon tetrachloride
(D) Chloroform

Answer: (C)

Question 4:
An organic compound X is oxidised by using acidified K₂Cr₂O₇. The product obtained reacts with Phenylhydrazine but does not answer the silver mirror test. The possible structure of X is

(A) (CH₃)₂CHOH
(B) CH₃CHO
(C) CH₃CH₂OH
(D) CH₃ — O — CH₃
Question 5:
An oxygen containing organic compound upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is ______.

(A) a primary alcohol

(B) an aldehyde

(C) a ketone

(D) a secondary alcohol

Answer: (A)

Question 6: Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called
(A) Wurtz’s reaction
(B) Williamson’s reaction
(C) Fittig’s reaction
(D) Etard’s reaction

Answer: (B)

Question 7: Argon is used
(A) in high temperature welding
(B) in radiotherapy for treatment of cancer
(C) in filling airships
(D) to obtain low temperature

Answer: (A)

Question 8: Arrange the following in the increasing order of their basic strengths:
CH₃NH₂, (CH₃)₂NH, (CH₃)₃N, NH₃
(A) (CH₃)₃N < NH₃ < CH₃NH₂ < (CH₃)₂ NH
(B) CH₃NH₂ < (CH₃)₂NH < (CH₃)₃N < NH₃
(C) NH₃ < (CH₃)₃N < (CH₃)₂NH < CH₃NH₂
(D) NH₃ < (CH₃)₃N < CH₃NH₂ < (CH₃)₂NH

Answer: (D)

Question 9: Arrange the following in the increasing order of their bond order:
O₂, O²⁺, O²⁻, and O
(A) O²⁺, O₂, O²⁻, O²⁻
(B) O₂, O²⁺, O²⁻, O²⁻
(C) O²⁻, O²⁻, O₂, O²⁺
(D) O²⁻, O²⁻, O²⁺, O₂

Answer: (C)

Question 10: Based on the first law of thermodynamics, which one of the following is correct?
(A) For an adiabatic process: ΔU = –w
(B) For an isochoric process: ΔU = –q
(C) For a cyclic process: q = –w
(D) For an isothermal process: q = +w

Answer: (C)
Question 11: The yellow precipitate formed during the chromyl chloride test is chemically
(A) lead chromate
(B) chromic acid
(C) sodium chromate
(D) lead acetate
Answer: (A)

Question 12: The typical range of molar enthalpies for the strongest intermolecular (Hydrogen) bonds
is
(A) 200 – 300 kJ
(B) 300 – 500 kJ
(C) 4 – 25 kJ
(D) 4 – 25 J
Answer: (C)

Question 13: The time required for 100% completion of a zero order reaction is
(A) a/2k
(B) ak
(C) 2k/a
(D) a/k
Answer: (D)
**Question 14:**

The standard emf of a galvanic cell involving 2 moles of electrons in its redox reaction is 0.59 V. The equilibrium constant for the redox reaction of the cell is

(A) $10^5$

(B) $10^{20}$

(C) $10^{10}$

(D) 10

**Answer:** (B)

**Question 15:**

The spin only magnetic moment of Fe$^{2+}$ ion (in BM) is approximately

(A) 7

(B) 4

(C) 6

(D) 5

**Answer:** (D)