



General Instructions

- (i) The examination will be conducted in Computer-Based Test (CBT) mode.
- (ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.
- (iii) The total number of questions are 50.
- (iv) Duration of the exam is 1 hour (60 minutes).

1. Given below are two statements :

Given: Molar masses of C, H, O, Cl are 12, 1, 16 and 35.5 g mol⁻¹ respectively.

Statement I: In 30%(w/w) solution of methanol in CCl₄ (at T K), the mole fraction of CCl₄ is equal to 0.33.

Statement II: Mixture of methanol and CCl₄ shows positive deviation from Raoult's law.

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

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

2. Which statements are True?

- A. In Hoffmann bromamide degradation, 4 moles of NaOH and 2 moles of Br₂ are consumed per mole of an amide.
- B. Hoffmann bromamide reaction is not given by alkyl amides.
- C. Primary amines can be synthesized by Hoffmann bromamide degradation.
- D. Secondary amide on reaction with Br₂ and NaOH will give secondary amine.

E. The by-products of Hoffmann degradation are Na_2CO_3 , NaBr and H_2O .

Choose the correct answer from the options given below:

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

3. The incorrect statement from the following with respect to carbohydrates is :

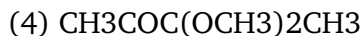
- (1) All monosaccharides are reducing sugars.
 - (2) The monosaccharide units obtained from hydrolysis of oligosaccharides are always the same.
 - (3) Starch and cellulose are typical examples of polysaccharides, which are very high molecular weight compounds of more than ten monosaccharide units.
 - (4) Open chain and cyclic structures co-exist at equilibrium that are responsible for certain properties as in the case of D-(+)-glucose.
-

4. An organic compound (P) on treatment with aqueous ammonia under hot condition forms compound (Q) which on heating with Br_2 and KOH forms compound (R) having molecular formula $\text{C}_6\text{H}_7\text{N}$. Name P, Q and R respectively are :

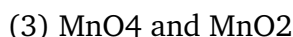
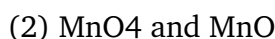
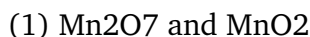
- (1) Benzoic acid, benzamide, aniline
 - (2) Toluic acid, methylbenzamide, 2-methylaniline
 - (3) Benzoic acid, 4-methylbenzamide, 4-methylaniline
 - (4) Phenylethanoic acid, phenylethanamide, benzamine
-

5. An organic compound P of molecular formula $\text{C}_6\text{H}_{12}\text{O}_3$ gives positive iodoform test but negative Tollens' test. When P is treated with dilute acid, it produces Q. Q gives positive Tollens' test and also iodoform test. Identify compound P

- (1) $\text{CH}_3\text{COCH}(\text{OCH}_3)\text{CH}_2\text{OCH}_3$
- (2) $\text{CH}_3\text{COCH}_2\text{CH}(\text{OCH}_3)_2$



6. MnO_2 in acidic medium disproportionates to :



7. Given below are two statements:

Statement I: Among $[\text{Cu}(\text{NH}_3)_4]^{2+}$, $[\text{Ni}(\text{NH}_3)_6]^{2+}$ and $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$, $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ has the maximum number of unpaired electrons.

Statement II: The number of pairs among $\{[\text{NiCl}_4]^{2-}, [\text{Ni}(\text{CO})_4]\}$, $\{[\text{NiCl}_4]^{2-}, [\text{Ni}(\text{CN})_4]^{2-}\}$ and $\{[\text{Ni}(\text{CO})_4], [\text{Ni}(\text{CN})_4]^{2-}\}$ that contain only diamagnetic species is two.

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

(1) Statement I is false but Statement II is true

(2) Both Statement I and Statement II are true

(3) Both Statement I and Statement II are false

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

8. Identify the correct statements.

A. Arginine and Tryptophan are essential amino acids.

B. Histidine does not contain heterocyclic ring in its structure.

C. Proline is a six membered cyclic ring amino acid.

D. Glycine does not have chiral centre.

E. Cysteine has characteristic feature of side chain as $\text{MeS}-\text{CH}_2-\text{CH}_2-$

Choose the correct answer from the options given below:

(A) C and E Only

(B) B and E Only

(C) C and D Only

(D) A and D Only

9. The correct statements are:

- A. Activation energy for enzyme catalysed hydrolysis of sucrose is lower than that of acid catalysed hydrolysis.
- B. During denaturation, secondary and tertiary structures of a protein are destroyed but primary structure remains intact.
- C. Nucleotides are joined together by glycosidic linkage between C1 and C4 carbons of the pentose sugar.
- D. Quaternary structure of proteins represents overall folding of the polypeptide chain.

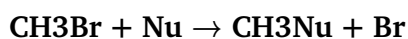
(A) A, C and D Only

(B) A, B and D Only

(C) A and B Only

(D) B and C Only

10. The correct order of the rate of the reaction for the following reaction with respect to nucleophiles is:



(A) $\text{PhO} > \text{OH} > \text{CH}_3\text{COO} > \text{ClO}_4$

(B) $\text{ClO}_4 > \text{CH}_3\text{COO} > \text{OH} > \text{PhO}$

(C) $\text{CH}_3\text{COO} > \text{PhO} > \text{OH} > \text{C}$

(D) $\text{OH} > \text{PhO} > \text{CH}_3\text{COO} > \text{ClO}_4$
