

2013

CHEMISTRY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words

as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Grignard reagent is used for preparation of

- a) Alkanes b) Alkenes
- c) Alkynes d) All of these.

ii) For a reaction catalyst changes

- a) activation energy b) free energy
- c) equilibrium constant d) none of these.

iii) Solubility of iodine in ethanol is

- a) 15 @ C b) 18 @ C
- c) 20 @ C d) 17 @ C.

iv) Each turn of α -helix contains

- a) 3·6 amino acid b) 3·5 amino acid
- c) 3·2 amino acid d) 3·3 amino acid.

v) Iodine is used to activate

- a) Aluminium b) Magnesium
- c) Titanium d) Sodium.

vi) 4-toluene sulphonyl chloride is used as a reagent in

- a) Curtius rearrangement

- b) Neber rearrangement
 - c) Lossen rearrangement
 - d) both (b) & (c).
- vii) Pinacol-Pinacolone rearrangement converts
- a) a germinal diol to a ketone
 - b) a vicinal diol to a ketone
 - c) a ketone to an amide
 - d) an alcohol to an olefin.
- viii) Hoffman rearrangement is an example of migration to
- a) electron deficient nitrogen
 - b) electron deficient carbon
 - c) electron deficient oxygen
 - d) none of these.
- ix) Galactose is an epimer of
- a) Mannose b) Glucose
 - c) Fructose d) Acarbose.
- x) The unit of k in the first order reaction is
- a) mole/L time
 - b) time^{-1}
 - c) L/mole-time.
- xi) Colligative property depends on
- a) chemical properties of solute
 - b) physical properties of the solute
 - c) concentration of the solute in bulk solution
 - d) all of these.
- xii) Which organometallic compound is used as additive to petrol ?
- a) Tetramethyl zinc

- b) Tetramethyl cadmium
- c) Tetramethyl lead
- d) Tetramethyl magnesium.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. What is activation energy ? It is essential for a catalyst to decrease activation energy. Comment. 1 + 4
- 3. Give an example each of a zero order reaction and a fractional order reaction. Compare the time required for 20% and 80% of a first order reaction. 2 + 3
- 4. What is an active methylene group ? Give the mechanism how active methylene group makes condensation reaction.

2 + 3

- 5. Define half life. What are the half-lives of a zero order reaction and a first order reaction ? 1 + 2 + 2
- 6. Discuss any suitable method for the conversion of aldopentose to aldohexose.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. Write about the chemical reactions of glucose. Discuss Ruff degradation and its importance in chemistry. 10 + 5
- 8. What is the process of production of iodine ? Write down short note on the characteristics of iodine. 8 + 7
- 9. Write down a short note on secondary structure of protein. What is the difference between tertiary structure and quaternary structure of protein. 10 + 5

10. What happens when phenyl acetate is heated with Anhydrous AlCl_3 ? Write the name of the reaction. Write with mechanism what product you will get when *cis* and *trans* but-1,3-diene is treated with maleic acid. Give synthetic use of HIO_4 and PCl_5 . Give the difference between application of LiAlH_4 and NaBH_4 .

(2 + 1) + (2 + 3) + 4 + 3

11. What are oxidising and reducing sugars ? How do you convert an aldose into ketose containing two additional carbon atoms ? How do you convert aldopentose to aldohexose ? What happens when glucose is subjected to reacts with hydroiodic acid and red phosphorous at 100°C ? How sorbitol can be synthesized from glucose ?

3 + 3 + 3 + 3 + 3

12. What are poly halide ions and polyhalides ? How are they classified ? What are solvated polyhalides ? How are simple and mixed polyhalides prepared ? Discuss the structure and shape of trihalide anion and cation.

$\frac{1}{2} + \frac{1}{2} + 1 + 1 + 1 + 3 + 4 + 4$

13. Write an account of any *three* of the following : 3×5

- Fries rearrangement
- Benzidene rearrangement
- Dakine rearrangement
- Cumene hydroperoxide rearrangement
- Allylic rearrangement.

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