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NA—09—2023

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (First Year) (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(CBCS/New Pattern)

CHEMISTRY

Paper-III

(Organic and Inorganic Chemistry)

(Tuesday, 5-12-2023)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Figures to the right indicate full marks.

1. Solve any *three* of the following : 3×5=15

- (a) Explain oxidising and reducing properties of *p*-block elements.
- (b) Discuss acidic and basic characteristics of hydroxides of *p*-block elements.
- (c) Explain Lewis and Bronsted-Lowry concepts of acids and bases.
- (d) Define acids and bases according to solvent system concept and Cady-Elsey concept with suitable examples.
- (e) Discuss the following theories of softness and hardness :
 - (i) Electronic theory
 - (ii) Pi-bonding theory.

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2. Attempt any *three* of the following :

3×5=15

(a) What is the action of :

(i) Ethyl amine on ethyl acetate

(ii) Phosphorous pentachloride on acetic acid

(iii) Nitric acid on glycerol

(iv) Peracetic acid on ethene

(v) Ethyl alcohol on acetic anhydride.

(b) Explain the Friedel-Crafts alkylation of benzene with mechanism.

(c) What are Phenols ? Give its classification with suitable example.

(d) Explain the relative reactivity of Alkyl halide Vs. Aryl and Vinyl halides towards nucleophilic substitution reaction.

(e) Define trihydric alcohols. Give the method of preparation of glycerol from propene.

3. Solve any *two* of the following :

2×5=10

(a) Explain the ortho/para directing nature of $-\text{CH}_3$ group in toluene and meta-directing nature of $-\text{NO}_2$ group in nitrobenzene.

(b) What is the action of the following reagent on allyl iodide ?

(i) Br_2

(ii) KCN

(iii) NaOH

- (c) (1) What are aromatic compounds ? Categorise the following compounds as aromatic and non-aromatic compounds :
- (i) Naph-thalene
 - (ii) Pyridine
 - (iii) Cyclopentadienyl anion
 - (iv) Thiophene
 - (v) Anthracene
 - (vi) Cyclopropenyl cation.
- (2) Which functional groups are present in acetic anhydride, acid chloride, ester and amides.
- (d) Explain the acidic character of phenol and compare with ethanol.