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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.