

# Anjuman Islam Janjira Degree College of Science

Murud-Janjira, Raigad-402401  
Affiliated to University of Mumbai

<b>Class: -S.Y.B.Sc.(G.S)</b>	<b>Subject: - Chemistry- II</b>
<b>Semester:- IV</b>	<b>Course code: -USCH402</b>
<b>Exam Event:- Summer 2024 (FH)</b>	<b>Marks: - 75</b>
<b>Date: - 03/04/2024</b>	<b>Duration: - 2:00 Hours</b>

**N.B:**

1. All questions are compulsory.
2. **Figures** to the right indicate full marks.
3. Use of log-table/non programmable calculator is allowed.
4. Answer for the same question as far as possible should be written together.

## Q.1 Attempt any Four of the following

20M

- A. Explain and Derive Bragg's equation.
- B. Explain The Three Law of Crystallography.
- C. The first order reflection of beam of X-rays from (100) plane of NaCl occurs at an angle of  $6.2^\circ$ . Calculate the wavelength X-rays. What would be the angle of reflection if X-rays of wavelength 154.0 ppm are used?  $D_{100}$  for NaCl is 282.0 pm.
- D. What are the characteristic features of catalyst?
- E. Describe the following: a) catalytic activity b) catalyst selectivity c) catalytic support.
- F. Provide an appropriate graphical representation for the Michaelis-Menten equation for an enzyme catalyst.

## Q.2 Attempt any Four of the following

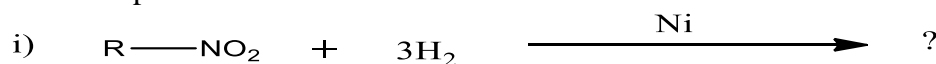
20M

- A. Explain Relation between acidity and pKa and charge to radius ratio of monoatomic cation by means of graphical representation
- B. With the help of predominance diagram, explain non-acidic cation and feebly acidic cation with suitable example.
- C. Write note on Classification of Oxo-anion.
- D. Explain the process of hydration of cation with suitable diagram. How can cation render acidity of solution?
- E. Discuss the Sources of emission of Nitrogen oxides.
- F. Write the uses of  $\text{HNO}_3$ .

## Q.3 Attempt any Four of the following

20M

- A. How will you obtain an aromatic amine by reduction of nitro compounds using  
i) Catalytic hydrogenation ii) Sn-HCl
- B. Write a note on Sandmeyer reaction.
- C. What are the diazonium salt and Explain the Preparation of Diazonium salts.
- D. How does sulfonation & nitration of pyridine take place.
- E. Write a Note on Chichibabin reaction, Give its Mechanism.
- F. Write the product of the reaction



**Q.4 (A) Select the correct option & complete the sentences (Any Eight)****08M**

- I. The total number of effective atoms in the unit cell of body centered cubic System is \_\_\_\_\_  
a) 4.            b) 2.            c) 3
- II. There are \_\_\_\_\_ crystal system and \_\_\_\_\_ Bravais lattices.  
a) 7,7.            b) 14,7            c) 7,14
- III. A \_\_\_\_\_ accelerates reaction by decreasing the energy of activation of the reaction  
a) Catalyst    b) inhibitor.    c) pressure
- IV. The enzyme which can catalyze the conversion of \_\_\_\_\_ into glucose is maltase  
a) Maltose.    b) invertase.    c) Zymase
- V. During hydration of cation, \_\_\_\_\_ pole of water approaches the cation  
a) Positive.    b) negative.    c) neutral
- VI. Cation cannot render \_\_\_\_\_ to aqueous solution  
a) Acidity.    b) basicity.    c) neutrality
- VII. \_\_\_\_\_ is called as laughing gas  
a) N<sub>2</sub>O.            b) NO.            c) NO<sub>2</sub>
- VIII. The hydronium ion of acid rain metabolised toxins. Like \_\_\_\_\_  
a) Iron            b) Magnesium.    c) aluminum
- IX. Benzene diazonium salt on treatment with steam gives  
a) Phenol    b) benzene    c) amine
- X. \_\_\_\_\_ amine does not undergo acetylation reaction  
a) Primary.    b) secondary.    c) tertiary
- XI. Pyrrole is \_\_\_\_\_  
a) 5-members carboxylic compound  
b) 6-member heterocyclic compound  
c) 5-member heterocyclic compound
- XII. Nitration of thiophene is carried out by conc. HNO<sub>3</sub> in Presence of \_\_\_\_\_  
a) H<sub>2</sub>SO<sub>4</sub>.    b) CH<sub>3</sub>COOH.    c) H<sub>2</sub>SO<sub>3</sub>

**Q.1 (B) State whether the following statement true or false (Any Three)****3M**

- I. Sulfuric acid use in production of fertilizers
- II. Pyrrole is a stronger base than pyrrolidine
- III. Temperature accelerates the rate of catalyst reaction
- IV. Sulfonation of the furan can be carried out by the action of H<sub>2</sub>SO<sub>4</sub>
- V. Sodium chloride crystallizes in body centered cubic lattice form.
- VI. In aqueous solution of Na<sup>+</sup> ions and H<sub>3</sub>O<sup>+</sup> ions do not exist.

**Q.1 (C) Match the pairs. (Any Four)****4M**

Column A		Column B	
i	F	a)	Moderately basic anion
ii	Oxide ion	b)	Weakly basic anion
iii	Inhibitors	c)	Retard rate of reaction
iv	Gomberg reaction	d)	Replacement of -N <sub>2</sub> Cl by aryl group
v	Nano catalyst	e)	Feebly basic anion
		f)	gold supported on metal oxide
		g)	strongly basic anion