SHRI S.H.KELKAR COLLEGE OF ARTS, COMMERCE AND SCIENCE, DEVGAD
(SINDHUDURG)
S.Y.B.Sc. SEMESTER IV EXAMINATION MARCH 2023

COURSE: General Chemistry

COURSE CODE – USCH 402

TIME : 8:30 am to 11:30 am.

MAX. MARKS: 100

SET 2

DURATION: 3 HOURS

N.B.   1.All the questions are compulsory

2. Figures to the right indicates full marks

3. The use of log table/Programmable calculators are allowed.

Q. 1 A) Select the correct option and complete the following statement.   12

i) Which is/ are true about the solid state?

   a) they have definite shape and volume

   b) they have high density and low compressibility

   c) all of the above

ii) The crystalline solid among the following is.....

   a) Glass   b) diamond   c) plastic

iii) The Bragg's equation for diffraction of X-rays is

   a) $n \lambda = 2\ d^2 \sin \theta$ b) $n \lambda = 2\ d \sin \theta$ c) $n \lambda = 2\ d \sin 2\ \theta$

iv) Trace substances added to decrease the catalytic activity of catalyst is called as....

   a) inhibitor   b) decelerator   c) promoter

v) pka values are greater than 13 for..................cations.

   a) Nonacidic.   b) weakly acidic.   c) strongly acidic

vi) Pure phosphoric acid is .... crystalline solid.

   a) Yellowish.   b) grayish.   c) white.

vii) ....is used for nitration reaction.

   a) H_3PO_4.   b) HNO_3.   C) H_2SO_4

viii) Hydration energies calculated using ....equations

   a) Latimer.   b) Drago-way land.   C) Born Lande's

ix) .... is example of Secondary amine.

   a) Methyl amine   b) Dimethyl amine   c) Trimethyl amine

x) Electron Donating groups on the aromatic ring ....basicity of amines.

   a) Increases   b) Decreases c) remains same

xi) Reaction of aniline with nitrous acid and HCl is called ....

   a) Reduction   b) Diazotization   c) Amination

xii) ....of the following compound is aromatic .

   a) Piperidine   b) Pyrrolidine   c) Pyrrole

B) State whether the following statements are TRUE or FALSE.   3

i) Number of atoms in BCC are 4

ii) HNO_3 is soluble in water.

iii) Thiphene is six membered heterocyclic ring

C) Match the following   5

| Sr. No.	Column A	Column B
i	XRD technique	Decreases activation energy
ii	Catalyst	X rays
iii	Photochemical smog.	oil of vitrol
Iv	Sulphuric acid.	Nitrogen dioxide
v	Nitration	Gamma rays
		SO_3
		CH_3COONO_2

Q. 2) Attempt any FOUR of the following.

A. State and explain the laws of symmetry for crystal structure . Explain them in brief.   5
B. Explain the various types of unit cells with respect to Bravais lattice.   5
C. Give the basic characteristics of SCC, BCC, and FCC unit cells.   5
D. Give the method for determination of crystal structure using Braggs X ray
   Spectrometer.   5
E. What is catalyst? Give the characteristics of catalyst.   5
F. Give the mechanism of Heterogeneous catalysis. Explain in brief.   5

Q. 3) Attempt any FOUR of the following.

A. Write a short note on photochemical smog.   5
B. What is the full form PAN? Explain PAN in detail.   5
C. How do heat of hydration and magnitude of z^2/r ratio affect the acidity of monoatomic
   cations?   5
D. Describe in detail hydration of anion.   5
E. How does moderately acidic and strongly acidic cation behave in aqueous medium ?   5
F. Give account of oxides of nitrogen.   5

Q. 4) Attempt any FOUR of the following.
A..Discuss the methods for the Preparation of Amine.   5
B.Discuss the following electrophilic substitution reaction in aromatic amines ,
   i) Sulfonation ii) Nitration   5
C.What is Diazotization? Discuss the Sandmeyer reaction & Gomberg reaction.   5
D.Explain the following ,
   i) Vilsmeyer-Haack reactions of Furan
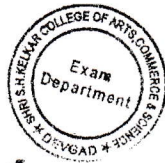
ii) Friedal Craft reaction of Thiophene   5

E. Discuss the Hantzsch synthesis for the preparation of , 2,6-Dimethyl Pyridine.   5

F. Explain the following,

    i) Reduction of Pyridine under different condition

    ii) Pyridine is more basic than Pyrrole.   5

Q. 5) Attempt any FOUR of the following.

  A. If the MgO is having cubic crystal with edge length value of 420 pm and it contains
     4 atoms in its crystal structure. Calculate the density of crystal.   5

  B. Explain the following terms in brief   5
    a) Catalyst support   b) catalytic poisoning and deactivation.

  C. Give the classification of anion on basis of basicity category.   5

  D. Explain Latimer equation.   5

  E. Discuss the synthetic applications of Diazonium salts.   5

  F. Describe the Paal-Knorr synthesis for preparation of , 2,5-Dimethyl derivatives of
    Furan, Pyrrole and Thiophene.   5

****