

This question paper contains 3 printed pages]

**ST—61—2022**

**FACULTY OF SCIENCE**

**M.Sc. (First Year) (Second Semester) EXAMINATION**

**MAY/JUNE, 2022**

**(New/CBCS Pattern)**

**CHEMISTRY**

**Paper II**

**CH-421**

**(Inorganic Chemistry/Elect. Biophysical Chemistry)**

**(Wednesday, 29-06-2022)**

**Time : 9.30 a.m. to 1.15 p.m.**

*Time— 3.45 Hours*

*Maximum Marks—75*

*N.B. :— (i) Attempt All questions.*

*(ii) Calculator and Log table is allowed.*

1. Solve (any *three*) : 15

(a) What is trans effect ? How does it influence substitution ligand in square planar complex ?

(b) Define catalyst and explain the catalytic activity.

(c) Give an account of non-essential elements.

(d) Calculate the number of fundamental modes of vibration of  $\text{NH}_3$ ,  $\text{SO}_2$ .

(e) Write the basic principle of Mossbauer Spectroscopy.

2. Solve (any *three*) : 15

(a) "Bulkiness of other ligands increases, the rate of substitution decreases." Explain it with suitable examples.

P.T.O.

- (b) Distinguish between homogeneous and heterogeneous catalysts.
- (c) Explain the role of  $\text{Na}^+$  and  $\text{K}^+$  pump in biological system.
- (d) Explain the basic principle of electron spin resonance spectroscopy.
- (e) "The compound  $\text{FeCl}_3 \cdot 3\text{H}_2\text{O}$  gives single line Mossbauer spectrum with no quadrupole splitting." Explain.
3. (a) Explain polarization theory of trans effect. 7

Or

Explain hydrogenation of alkenes with the role of Wilkinson's catalyst.

- (b) Describe structure and function of Haemoglobin. 8
4. (a) Describe the structure and function of Vitamin  $\text{B}_{12}$ . 7

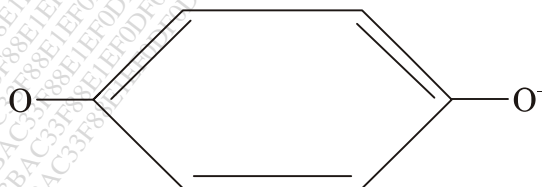
Or

$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  show quadrupole doublet. Explain.

- (b) Describe the structure and working of cytochrome. 8
- Describe Wacker oxidation of alkenes.

Or

Explain the following points of Semibenzoquinone radical.



- (i) Number of lines;

- (ii) Spectrum;
- (iii) Hyperfine structure
- (iv) Relative Intensities.

5. Solve any *three* :

15

- (a) Fischer-Tropsch Synthesis.
- (b) Iron Sulfur Protein
- (c) Cis effect
- (d) Reference compound in ESR.