Registration No.: | | | | | | | | | | |

Total Number of Pages: 01 **Course: M.Sc.I**
Sub_Code: FCYC703

7th Semester Regular Examination: 2024-25
SUBJECT: Inorganic Chemistry –VI
BRANCH(S): M.Sc.I(AC)
Time: 3 Hours
Max Marks: 70
Q.Code: R142

Answer Question No.1 (Part-I) which is compulsory, any five from rest (Part-II)
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What do you mean by T & R form of haemoglobin?
b) Write the name of the chelating ligands used for lead poisoning.
c) What is the name of enzyme that hydrolyses ATP in Na^+/ K^+ pump?
d) What is the oxidation state of iron in haemoglobin & myoglobin? Is Iron is in low or high spin in Oxyhaemoglobin?
e) The lowest energy transitions in the rotational spectrum of HF are 41.105 and 82.211 cm^{-1}. Calculate the equilibrium bond length of HF, Ro.
f) Why Stoke lines are more intense than anti-stoke line?
g) In Mossbauer spectroscopy, what does the Doppler effect measure?
h) What do you understand by isomer shift?
i) Define nitrogen rule in mass spectrometry.
j) Why Greater sensitivity is needed to record ^{13}C NMR spectra as compared to ^{1}H NMR spectra.

Part-II

Long Answer Type Questions (Answer Any five)

Q2 **a)** Give the account for the biological function of haemoglobin in living. **(5+5)**
b) How metal ion complexes are helpful in biological system? Write down with special reference to the Iron atom.

Q3 **a)** Give an account for the structure and its biological functions of myoglobin. **(5+5)**
b) Discuss the properties of the Na+ and K+ channels involved in nerve impulse transmission. How do they function? Explain their ion selectivity.

Q4 **a)** Explain isomer shift for iron and tin compounds in different states of oxidation. **(5+5)**
b) Describe the concept of polarizability in Raman scattering.

Q5 **a)** What is metastable ion? Where it is formed and what is its m/z value? **(5+5)**
b) Write notes on Hyperfine interaction with special reference to Fe^{57}.

Q6 Outline the principle of Mossbauer spectroscopy. Explain the application of this technique in the study of Fe(II) and Fe(III) cyanides. **(10)**

Q7 **a)** Discuss resonance Raman scattering and resonance fluorescence. **(5+5)**
b) Explain the spin-spin coupling in AX, AB, and AMX spin systems?

Q8 **a)** Explain with example, the shielding and deshielding proton in NMR spectroscopy **(5+5)**
b) Explain Relaxation methods in NMR spectroscopy