PRN:		Course Code :	P61PC202

First Year **M.Sc**, Semester II, End Semester Examination Summer 2024

Chemistry of Transition Elements

Day and Date: 24 MAY 2024, Friday Max Marks: **75**

Time : 2:00 to 5:00 pm Duration: **03** hrs

Instructions:
1. All questions are compulsory.
2. Draw neat and systematic diagram where ever necessary.
3. Use of scientific calculator and log table is allowed.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following Questions.**	**15**		
a)	Calculate the number of microstate and multiplicity of $3d^2$ system.	3	L1	CO1
b)	Explain the term 1) Chelating agent 2) Passive transport	3	L1	CO2
c)	Give the classification of elements based on their uses in biological system.	3	L1	CO3
d)	What are the applications of lanthanides and actinides?	3	L1	CO4
e)	Calculate the valance electron according to the 18 electron rule in $Fe(CO)_5$ compound.	3	L1	CO5
Q.2	**Attempt <u>any three</u> of the following Questions.**	**15**		
a)	Discuss the factors affecting crystal field stabilization energy with proper example.	5	L3	CO1
b)	Write a note on nephelauxetic series.	5	L3	CO1
c)	Describe the spectrochemical series. Describe the spectrochemical series. Draw energy levels with filling of electrons in $[CoF6]^{3-}$ complexes on the basis of Crystal field theory (CFT).	5	L2	CO1
d)	Calculate the R.S term symbol for the $[V(H_2O)_6]^{3+}$ states and also work out possible value of J	5	L3	CO1
Q.3	**Attempt <u>any three</u> of the following Questions.**	**15**		
a)	Draw structure of Nitrogenase Enzyme and explain the role of metal in biological nitrogen fixation.	5	L3	CO2
b)	Explain the role and deficiency of the trace element in the biological system	5	L2	CO2
c)	Give the sources of toxic element. Explain its toxicity effect on living organism.	5	L3	CO2
d)	Explain role of calcium in biological system	5	L3	CO2

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Q.4	**Attempt <u>any three</u> of the following Questions.**	**15**		
a)	Write a Structure of Hemoglobin and explain its role in the oxygen transport system.	5	L3	CO3
b)	Describe the structure and function of carbonic anhydrase with mechanism	5	L4	CO3
c)	Write a note on role of copper in biological chemistry in detail.	5	L4	CO3
d)	Explain Monsanto process of preparation of acetic acid.	5	L3	CO5
Q.5	**Attempt <u>any three</u> of the following Questions.**	**15**		
a)	Describe artificial transmutation process with disintegration in it with proper examples.	5	L3	CO4
b)	What is lanthanide contraction and what are its consequences?	5	L3	CO4
c)	Explain oxidative addition of hydrogen and oxygen in organometallic compound with proper example.	5	L3	CO5
d)	What are the sandwich compounds? Explain synthesis, properties of ferrocene.	5	L3	CO5

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