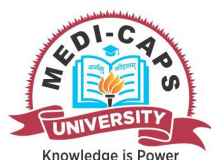


Enrollment No.....



Faculty of Science

End Sem (Even) Examination May-2022

CH5CO05 Inorganic Chemistry -II

Programme: M.Sc.

Branch/Specialisation: Chemistry

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

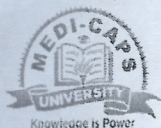
- Q.1 i. Spectroscopically detectable energy levels are termed as: **1**
 (a) Microstates (b) Terms
 (c) Orbitals (d) None of these
- ii. Electronic spectrum of d^5 ions are- **1**
 (a) Laporte's forbidden (b) Spin forbidden
 (c) Both (a) and (b) (d) None of these
- iii. The magnetic susceptibility of a paramagnetic material is- **1**
 (a) Independent of temperature
 (b) Increase with increase in temperature
 (c) Decrease with decrease in temperature
 (d) None of these
- iv. Susceptibility of diamagnetic substance is- **1**
 (a) Positive (b) Negative (c) Both (a) and (b) (d) None of these
- v. Number of unpaired electrons in oxyhaemoglobin- **1**
 (a) 0 (b) 2 (c) 4 (d) 6
- vi. Metals in carbonyls are- **1**
 (a) Low oxidation state
 (b) High oxidation state
 (c) Both (a) and (b)
 (d) None of these
- vii. By Wade's rules, which cluster description is incorrect? **1**
 (a) $[B_5H_8]^-$ is a nido cluster
 (b) $[B_6H_6]^{2-}$ is a closo cluster
 (c) $[B_{10}H_{13}]^-$ is an arachno cluster
 (d) $[B_4H_9]^-$ is an arachno cluster

- viii. Which of the following compound exists in liquid state? **1**
 (a) Diborane (b) Pentaborane
 (c) Decaborane (d) Borane
- ix. Specific rotation depends on- **1**
 (a) Concentration (b) Wavelength
 (c) Temperature (d) All of these
- x. Optical rotatory dispersion phenomenon was first studied by- **1**
 (a) Fresnel (b) Orgel (c) Tanabe Sugano (d) Frank

- Q.2 i. Describe the relaxation from Laporte's rule. **2**
 ii. Draw the Orgel diagram of d^5 system. **3**
 iii. Write selection rules of electronic spectroscopy. **5**
- OR iv. The electronic spectrum of $[Cr(CN)_6]^{2+}$ shows absorption bands of **5**
 264 nm, 310 nm and 378 nm. Determine the value of Δ_o and β .
- Q.3 i. Write a note on diamagnetism. **2**
 ii. Explain magnetic exchange coupling with example. **8**
- OR iii. Explain anomalous magnetic moment. Also give reasoning to **8**
 account for it.
- Q.4 i. Explain synergistic bonding in carbonyls. **3**
 ii. Write a detailed note on dinitrogen and dioxygen complexes. **7**
- OR iii. Describe the complexes containing tertiary phosphine as ligand with **7**
 reference to preparation, properties and uses.
- Q.5 i. Write a note on classification and nomenclature of Borane. **4**
 ii. Describe preparation methods for the carboranes. **6**
- OR iii. Discuss structure and bonding in closo, nido and arachno boranes. **6**
- Q.6 Attempt any two: **5**
 i. Explain cotton effects and its applications. **5**
 ii. Describe Kerr effect and its applications. **5**
 iii. Discuss the application of ORD and CD for the absolute **5**
 determination of configuration.

P.T.O.

Scheme of Marking



Faculty of Science		
End Sem (Even) Examination May-2020		
Inorganic Chemistry-II CH5CO05		
Programme: M.Sc.		Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	B	1
	ii)	B	1
	iii)	C	1
	iv)	B	1
	v)	B	1
	vi)	A	1
	vii)	A	1
	viii)	C	1
	ix)	D	1
	x)	A	1
Q.2	i.	Laporte's rule.	2
	ii.	Orbital diagram.	3
	iii.	selection rules \rightarrow 5 marks each	5
OR	iv.	Δ_0 (2.5) Δ_3 (2.5)	5
Q.3	i.	dia magnetism	2
	ii.	Magnetic Exch. (3) Example (5)	8
OR	iii.	Anomalous m.m. - (3) - reason (5)	8
Q.4	i.	Bonding CO -	3
	ii.	dinitrogen (4) dioxygen (3)	7
OR	iii.	phosphene 2+2+3	7
Q.5	i.	Classification (2) nomenclature (2)	4

	ii.	melts \rightarrow $\text{Pr}^{3+} \rightarrow 2+2+2$	6
OR	iii.	close - 2, nido - 2, alkyne - 2	6
Q.6			
	i.	Coition effects - 2, Appl ⁿ - 3	5
	ii.	Kerr effects - 2, Appl ⁿ - 3	5
	iii.	ORD & CD \rightarrow Appl ⁿ - at least 2. (5)	5
