 <b>Sanjay Ghodawat University, Kolhapur</b> Established as State Private University under Govt. of Maharashtra. Act No XL, 2017		2018-19
<b>Year and Program:</b>	<b>School of Science</b>	<b>Department of Chemistry</b>
<b>Course Code: CHS-504</b>	<b>Course Title: Inorganic Chemistry-II</b>	<b>Semester – Even (II)</b>
<b>Day and Date: Wednesday, 22<sup>nd</sup> May, 2019</b>	<b>End Semester Examination</b>	<b>Time: 3 hrs, Max Marks: 100</b>
<b>PRN:</b>	<b>Seat No:</b>	<b>Section A Marks out of 20:</b>
<b>Jr. Supervisor Sign:</b>		<b>Student Sign:</b>

**Section A**

- Instructions:** 1) All Questions are compulsory.  
 2) For MCQs mark tic (✓) for correct answer. No marks for multiple tics (✓).  
 3) Section A should be submitted to Jr Supervisor immediately after first 30 min.


**Q.1 Multiple choice questions.**

**Marks**   **level**   **CO**  
**20**

- |   |  |    |   |
|---|--|----|---|
| 1 | In which one of the following complexes, the formal oxidation state and coordination number of Co is -1 and 4 respectively.                            | L1 | 1 |
|   | a) $\text{Co}_2(\text{CO})_8$<br>b) $\text{RCo}(\text{CO})_4$<br>c) $\text{Na}[\text{Co}_4(\text{CO})_{12}]$<br>d) $\text{Na}[\text{Co}(\text{CO})_4]$ |    |   |
| 2 | In $\text{KMnO}_4$ , $\text{MnO}_4^-$ ion in solution is deep violet in colour though 'd' orbital of Mn is empty because                               | L1 | 1 |
|   | a) $\text{MnO}_4^-$ ion is covalent in nature<br>b) Electronic transition<br>c) Charge transfer<br>d) d-d transition                                   |    |   |
| 3 | The complex which obeys the 18 electron rule is  | L4 | 1 |
|   | a) $\text{Fe}(\text{CO})_4$<br>b) $\text{Ni}(\text{CO})_3(\text{PPh}_3)$<br>c) $\text{Cr}(\text{CO})_3$<br>d) $\text{Cr}(\text{C}_5\text{H}_5)_2$      |    |   |
| 4 | ..... is the only organometallic compound found in the body  | L1 | 2 |
|   | a) Vitamin B-12<br>b) Porphyrin<br>c) Superoxide dismutase<br>d) Rubredoxin  |    |   |

- 5 .....is the Zn containing enzyme which catalyzes hydrolysis of c-terminal amino acid from peptide chain  
a) Carboxypeptidase  
b) carbonic anhydrase  
c) Nitrogenase  
d) Superoxide dismutase L3 2
- 6 Metal ions present in active site of Nitrogenase enzyme are-  
a) Cu and Zn  
b) Fe and Mo  
c) Cu and Fe  
d) Mo and Zn L1 2
- 7 The ore of lanthanides which contains fluocarbonate  
a) Monozite  
b) Bastnaesite  
c) Cerite  
d) None of the above L1 3
- 8 Lanthanides are extracted from  
a) Limonite  
b) Monazite  
c) Magnetite  
d) Cassiterite L2 3
- 9 The Lanthanide contraction is due to  
a) Perfect shielding of 4f electron  
b) Imperfect shielding of 4f electron  
c) Perfect shielding of 3d electron  
d) Imperfect shielding of 3d electron L2 3
- 10 Ceria is used in  
a) Toys  
b) tracer bullets  
c) Gas lamp materials  
d) None of the above L5 3
- 11 Maximum oxidation state exhibited by lanthanides is  
a) +1  
b) +3  
c) +4  
d) +2 L1 3
- 12 Alloys of Lanthanides are called as  
a) Mish metals  
b) Metalloids  
c) Plate metals  
d) Actinides L1 3

- EXM/P/09/00  
L2 3
- 13 Isolation of uranium oxide is carried out using the..... ore  
 a) Monazite  
 b) Pitchblend  
 c) Magnetite  
 d) Pyrite
- 14 The following Wilkinson's catalyst is used for hydrogenation reaction  
 a)  $\text{Rh}(\text{PPh}_3)_3\text{Cl}$   
 b)  $\text{RhH}(\text{PPh}_3)_3\text{Cl}$   
 c)  $\text{RhH}(\text{PPh}_3)_2\text{Cl}$   
 d)  $\text{RhCO}(\text{PPh}_3)_2\text{Cl}$   
 L1 4
- 15 Give the hapticity of ligands  $\text{H}_2\text{C}=\text{CH}_2$   
 a) 1  
 b) 2  
 c) 4  
 d) 3  
 L4 4
- 16 .....is used as anticancer drug  
 a) Cis-Platine  
 b) Trans-Platine  
 c) Cobalmine  
 d) None of the above  
 L1 4
- 17 The Vaska's compound is  
 a)  $\text{IrCOCl}(\text{PPh}_3)_2$   
 b)  $\text{IrCO}(\text{PPh}_3)_3$   
 c)  $\text{RhCOCl}(\text{PPh}_3)_2$   
 d)  $\text{RhCO}(\text{PPh}_3)_3$   
 L4 4
- 18 The catalyst used in Zeigler-Natta polymerization process is  
 a)  $\text{HCo}(\text{CO})_4$   
 b)  $[\text{PdCl}_4]^{2-}$   
 c)  $\text{V}_2\text{O}_5$   
 d)  $\text{TiCl}_4 + \text{Al}(\text{C}_2\text{H}_5)_3$   
 L3 4
- 19 Which is the actual catalyst for hydroformylation reaction?  
 a)  $\text{HCo}(\text{CO})_4$   
 b)  $\text{HCo}(\text{CO})_3$   
 c)  $\text{Co}_2(\text{CO})_8$   
 d)  $\text{RhHCl}(\text{PPh}_3)_2$   
 L6 4
- 20 .... is the first organometallic transition metal compound  
 a) Zeise's Salt  
 b) collman's reagent  
 c) Schwartz reagent  
 d) d) None of the above  
 L5 4

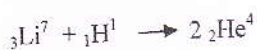
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## Section B

Marks level CO

- Q.2 Solve any Two of the following 12**
- |    |   |   |    |   |
|----|---|---|----|---|
| a) | Discuss the factors affecting crystal field stabilization energy. | 6 | L2 | 1 |
| b) | Calculate R-S terms for $Ni^{2+}$ compound.                       | 6 | L2 | 1 |
| c) | Explain Nephelauxetic series of transition elements.              | 6 | L2 | 1 |
- 
- Q.3 Solve any Two of the following 12**
- |    |   |   |    |   |
|----|---|---|----|---|
| a) | Write a note on Non Blue copper protein, Tyrosinase and Superoxide dismutase. | 6 | L3 | 2 |
| b) | Write a note on Hemoglobin the oxygen transport protein.                      | 6 | L3 | 2 |
| c) | Explain the role of metal in biological nitrogen fixation.                    | 6 | L3 | 2 |
- 
- Q.4 a) Solve any Two from the following 12**
- |     |   |   |    |   |
|-----|---|---|----|---|
| i)  | Explain in detail the process of extraction of uranium. | 6 | L4 | 3 |
| ii) | Calculate the Q value of the following reactions        | 6 | L4 | 3 |





$${}_3\text{Li}^7 = 14.00753, {}_2\text{He}^4 = 4.00387, {}_1\text{H}^1 = 1.00814$$

- |   |   |           |    |   |
|---|---|-----------|----|---|
| iii)  | What are the different methods for the separation of lanthanides?   | 6         | L4 | 3 |
| <b>b) Solve any Four from the following</b>       |   | <b>16</b> |    |   |
| i)  | Write a note on Artificial radioactivity.   | 4         | L2 | 3 |
| ii)   | Explain the occurrence of lanthanides.  | 4         | L2 | 3 |
| iii)  | Explain Magnetic properties of lanthanide elements  | 4         | L2 | 3 |
| iv)   | What are shift reagent? Explain in detail use of lanthanide as shift reagent.   | 4         | L2 | 3 |
| v)  | Define radioactive decay. What are the properties of radioactive decay?   | 4         | L2 | 3 |
| <b>Q.5 a) Solve any Two of the following</b>      |   | <b>16</b> |    |   |
| i)  | Explain Hydroformylation reaction process with mechanism.   | 8         | L3 | 4 |
| ii)   | Explain Zeigler-Natta polymerization reaction process with mechanism.   | 8         | L3 | 4 |
| iii)  | Explain with mechanism in detail Wacker's process for aldehyde preparation.   | 8         | L3 | 4 |
| <b>b) Write note on the following (any three)</b> |   | <b>12</b> |    |   |
| i)  | Calculate the total electron, M-M bond and draw the structure of $\{[\text{PMe}_3]_2\text{Pd}[\eta^3\text{C}_3\text{H}_3]\}^+$ organometallic compound. | 4         | L6 | 4 |
| ii)   | Explain oxidative addition of hydrogen and oxygen in  | 4         | L5 | 4 |

organometallic compound with proper examples.

- |      |   |   |    |   |
|------|---|---|----|---|
| iii) | Explain Monsanto process of acetic acid preparation.  | 4 | L5 | 4 |
| iv)  | Calculate the total number of electrons and M-M bond in the organometallic compound, $(\mu\text{-CO})_2 [\text{CpRh}]_3\text{CO}$ . | 4 | L5 | 4 |

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