

Reg. No .....

Name .....

18P105

**M.Sc DEGREE END SEMESTER EXAMINATION - NOVEMBER 2018**  
**SEMESTER 1 : CHEMISTRY / PHARMACEUTICAL CHEMISTRY**  
**COURSE : 16P1CHET01 / 16P1CPHT01 : INORGANIC CHEMISTRY - I**  
*(For Regular - 2018 Admission & Supplementary - 2016 / 2017 Admissions)*

Time : Three Hours

Max. Marks: 75

**Section A**

**Answer any 10 (2 marks each)**

1. Distinguish between an atom bomb and nuclear reactor though the reaction taking place in both is nuclear fission.
2. Explain the application of radioiodine in the treatment of hyperthyroiditis.
3. In the nuclear fission reaction,  $^{235}\text{U}_{92} \rightarrow ^{140}\text{Ce}_{58} + ^{94}\text{Zr}_{40} + ^1_0\text{n} + 6^0_{-1}\text{e}$ , calculate the energy released in this process in MeV. Masses of U = 235.0439 amu, Ce = 139.9054 amu, Zr = 93.9063 amu, n = 1.008665 amu and e = 0.00054859 amu.
4. Name the different copper sites in copper enzymes? How they differ each other? Explain.
5. What are vitamin B<sub>12r</sub> and B<sub>12s</sub>? Give the significance of B<sub>12s</sub>
6. Discuss the toxic effects of lead metal in living systems.
7. Discuss the side effects of cisplatin.
8. Explain the variation of carbon –oxygen stretching frequency in the following carbonyl compounds.  
 $[\text{Mn}(\text{CO})_6]^+$ , 2090 cm<sup>-1</sup>;  $\text{Cr}(\text{CO})_6$ , 2000 cm<sup>-1</sup>;  $[\text{V}(\text{CO})_6]^-$ , 1860 cm<sup>-1</sup>
9. What are isolobal fragments? Show that CH is isolobal with Co(CO)<sub>3</sub>.
10. Explain why Carbonyls Pd(CO)<sub>4</sub>, Pt(CO)<sub>4</sub> do not exist where as Ni(CO)<sub>4</sub> exist as a stable compound?
11. In Monsanto acetic acid process, one of the step is the oxidative addition of CH<sub>3</sub>I to  $[\text{Rh}(\text{CO})_2\text{I}_2]^-$  but CH<sub>3</sub>I is not an initial reactant in this process. How this is generated in the reaction.
12. Explain methoxy carbonylation reaction with an example.
13. What is Zeigler Natta catalyst? How it is prepared?

**(2 x 10 = 20)**

**Section B**

**Answer any 5 (5 marks each)**

14. Discuss the two different ways by which daughter nucleus which is in the excited state is deexcited to the ground state in any radioactive process.

15. Explain how the nuclear diameter is correlated with de Broglie wavelength of slow neutrons of energy 1 eV. What will happen when the neutron energy is increased by a factor of 100?
16. Explain the structure and mechanism of nitrogen fixation by nitrogenase enzyme.
17. Discuss the mechanism of muscle contraction.
18. Draw the structure of  $K[PtCl_3(C_2H_4)]$ . How is synergic effect occur in these compounds?
19. Calculate the TEC, PEC and predict the structures of  
a)  $Ru_6(CO)_{17}C$  b)  $[Fe_4(CO)_{12}C]^{2-}$
20. Write a note on Fischer-Tropsch synthesis. Give its mechanism and application.
21. Illustrate the six steps involved in the mechanism of Wacker process for the oxidation of ethylene to acetaldehyde.

**(5 x 5 = 25)**

### **Section C**

**Answer any 2 (15 marks each)**

22. Explain in details about the different types of nuclear reactions by giving suitable examples.
23. What are ionophores? Give examples. Discuss the different mechanisms of ion transport across membranes.
24. Give an account on the synthesis, structure and bonding present in nitrosyl organometallics.
25. What are the three important criteria needed for a Wilkinson type homogeneous hydrogenation catalyst? Discuss the mechanism of hydrogenation of olefins using  $[RhCl(PPh_3)_3]$  with clear emphasis on the role of Rh and  $PPh_3$  in the process.

**(15 x 2 = 30)**