TB165125E

Reg. No :.....

Name :.....

B. SC. DEGREE (C.B.C.S.S) EXAMINATION, OCTOBER 2018

(2016 Admission Regular & 2015 Admission Supplementary)

SEMESTER V - CORE COURSE (CHEMISTRY)

CH5B07TB - NUCLEAR CHEMISTRY, METALLURGY AND CHEMICAL BONDING

Time : 3 Hours **Maximum Marks : 60**

Part A

I. Answer all questions. Each question carries 1 marks **(5x1=5)**

1. What do you mean by critical mass?
2. Name the artificial radioactive series.
3. Brass is an alloy of ..... and .....
4. What is the dipole moment of Carbon tetrachloride molecule?
5. The bond angle in Sulphur hexafluoride molecule is ----------

Part B

II. Answer any Five questions. Each question carries 2 marks **(5x2=10)**

6. What are trans uranic elements? Give two examples.
7. What are spallation reactions?
8. Define calcination.
9. What are siderophiles? Give examples.
10. Why helium molecule does not exist?
11. Water has lower molecular weight among the hydrides of group VI elements, but has high boiling point. Explain.
12. What are the salient features of molecular orbital theory?
13. Account for the high electrical conductivity of solids using band theory.

Part C

III. Answer any Five questions. Each question carries 5 marks **(5x5=25)**

14. What do you mean by induced radioactivity? Explain its features.
15. Write a note on nuclear forces.
16. The mass of a proton is 1.00727647 amu, mass of neutron is 1.0086654 a.m.u. and mass of electron is 0.000548579 amu. Calculate the mass defect, binding energy and binding energy per nucleon of a) Ca-40 b) Na-23.
17. Discuss electrolytic refining and oxidative refining of metals?
18. What are alloys? Which are the different types of alloys?
19. What do you mean by bonding, antibonding and nonbonding molecular orbitals ? Illustrate.
20. Explain the important applications of Born Haber cycle.
21. What are the salient features of hybridization? Do you expect all P-Cl bond length to be equal in Phosphorous pentachloride molecule? Explain.

Part D

IV. Answer any Two questions. Each question carries 10 marks **(2x10=20)**

22. a. Explain the terms mass defect and binding energy. How are they related to each other? Also calculate the mass defect and binding energy of C-14. b. Discuss hybridization and shapes of a) ethane b) Phosphorous trichloride molecule.
23. Explain the different methods of extraction of metals.
24. Outline the molecular orbital treatment and predict the stability of following molecules a) Carbon molecule b) Oxygen molecule c) CO
25. Discuss the molecular orbital theory of diatomic molecules. Calculate the bond order and comment on the magnetic properties of Oxygen and Nitrogen molecules.