(Pages : 3) **D – 3086**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, December 2017
First Degree Programme under CBCSS
CHEMISTRY
Core Course – II
CH 1341 – Inorganic Chemistry – II
(2013 Admission Onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in **one** word to maximum of **two** sentences. **Each** question carries **one** mark.

1. Does water have a zero or non-zero dipole moment ? Why ?
2. Name a molecule which have T shape.
3. What is the shape of IF_7 molecule ?
4. What is hydrogen bonding ?
5. Why nuclear fusion is regarded as thermonuclear reaction ?
6. Mention the range of N/P for stable nuclei.
7. Explain the self-ionization of ammonia.
8. State Beer-Lambert's law.
9. Mention the applications of AAS.
10. What are fullerenes ?

(10×1=10 Marks)

SECTION – B

Short answer type (**Not** to exceed **one** paragraph)

Answer **any 8** questions from the following. **Each** question carries **two** marks.

11. What is the hybridization in benzene ?

P.T.O.

12. What is an ionic bond ? Explain with example.
13. Describe the application of VSEPR theory in the determination of geometry of AB_5 type molecule without lone pairs.
14. Explain induced dipole-induced dipole interactions.
15. State Geiger-Nuttel rule.
16. Explain the release of large amount of energy during nuclear fission.
17. What are protic and aprotic solvents ? Give examples.
18. Ammoniacal solutions of alkali metals are blue in colour. Why ?
19. Distinguish between DTA and DSC.
20. What is XRD ? Explain.
21. Explain the catalytic properties of nanoparticles.
22. Mention different types carbon nanotubes. **(8×2=16 Marks)**

SECTION – C

Short essay (**Not** to exceed **120** words).

Answer **any 6** questions from the following. **Each** question carries **four** marks.

23. Explain free energy theory in metallic bonding.
24. AgCl is sparingly soluble in water while NaCl is soluble. Explain with respect to lattice energy.
25. Explain LCAO of H_2^+ ion.
26. Describe the theory behind ^{14}C dating.
27. A sample of uranium ore is found to contain 6.95g of ^{238}U and 6.15 g of ^{206}Pb. Calculate the age of the ore. The half-life of ^{238}U is 4.5×10^9 years.
28. Describe the use of HF as solvent.
29. Describe the applications of spectrophotometry.
30. Distinguish between top down and bottom to top approach for preparation of nanoparticles.
31. Discuss nanosystems in nature. **(6×4=24 Marks)**

SECTION – D
(Long Essay)

Answer **any 2** questions from the following. **Each** question carries **fifteen** marks.

32. a) State Fajan's rules.

    b) Explain MO theory in O_2, N_2 and CO.

33. a) Explain the use of isotopes as tracers.

    b) Discuss various types of subatomic particles.

34. Describe various instrumental methods and their applications like XRD, AFM, STM, SEM and TEM.

35. Explain the methods for the preparation of nanoparticles. **(2×15=30 Marks)**
