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M.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

FIRST SEMESTER

Material Science and Nanotechnology

Paper III — FUNDAMENTALS OF CHEMISTRY

Time : Three hours Maximum : 75 marks

(No additional sheet will be supplied)

PART A — (5 × 3 = 15 marks)

Answer any FIVE questions.

Each question carries 3 marks.

Each answer should not exceed 1 page.

1. Explain the covalent and Vander walls bonding.

2. Discuss about inert pair effect.

3. Explain about Werner's Theory.

4. Explain about Geometry in tetrahedral coordination complexes.

5. Explain the Base Hydrolysis.

6. Explain the terms labile and inert complexes.

7. Discuss about chemical reactivity of halides.

8. Explain the formation of RMgX.

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each question carries 15 marks.

Each answer should not exceed 6 pages.

9. Explain the structure and bonding of diborane.

Or

10. Discuss about the Molecular orbital configuration of N_2 and O_2.

11. Explain the crystal filed theory in tetrahedral complexes with suitable example.

Or

12. Discuss the :

    (a) Merits and demerits of CFT

    (b) Valence bond theory.

13. Explain the outer sphere mechanism with suitable examples.

Or

14. Discuss about the substitution reaction in octahedral complexes.

15. Explain the SN^1 Nucleophilic aliphatic substitution reactions.

Or

16. Discuss about the ease of hydrolysis of alkyl and benzyl halides.