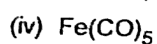
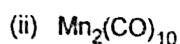
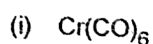


(b) Discuss the EAN rule and apply it to the following compounds : 12



10. Explain the role of Na, K and Fe in the biological system. 20

✓ 11. What is Mossbauer spectroscopy ? Discuss its principle and applications. 20

✓ 12. Give two method for the preparation of Borazine. Discuss its chemical properties and structure. 20



YK - 14/3 (11,000) (4) XE(H-3) — Ch (6)

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XE(H-3) — Ch (6)

2018

Time : 3 hours

Full Marks : 100

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer **five** questions selecting not more than **two** from any Group.

Group — A

✓ 1. (a) Derive Schrodinger's wave equation and discuss its application to the hydrogen atom. 14

(b) What eigen functions and eigen values ? 6

2. (a) Draw the shapes of molecular orbitals obtained by the overlap of : 10

(i) Two s-orbitals

(ii) Two p-orbitals axially

(iii) Two p-orbitals non-axially

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(Turn over)

(b) What do you mean by bond-order ?

Calculate the bond order of  $\text{He}_2^+$ ,  $\text{O}_2$  and  $\text{N}_2$ .

10

3. (a) What is mass defect ? How is it related to the binding energy and stability of nucleus ?

12

(b) Calculate the mass defect, binding energy and binding energy per nucleon of  ${}^4_2\text{He}$  which has an isotopic mass = 4.0026 amu

if  $m_p = 1.0081$  and  $m_n = 1.0089$ . 8

4. Write short notes on any three of the following :

6+7+7 = 20

(a) Radius-ratio rule

(b) Radioactive series

(c) Chelates

(d) CFSE

(e) Normal and orthogonal wave functions

#### Group – B

5. (a) What are f-block elements ? Discuss the electronic Configurations and position of Lanthanides in the periodic table. 7

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(2)

Contd.

(b) What do you mean by lanthanide contraction ?

Discuss its consequences. 8

(c) Explain the magnetic properties of lanthanides. 5

6. (a) What are the positions of Cr and Pt in the periodic table ? 6

(b) Discuss the chemistry of Cr with respect to the oxidation states exhibited and complex formation. 14

7. Discuss the preparation and important properties of : 20

(a) Hydrazine

(b) Hydroxylamine

(c) Hydrogen peroxide

8. (a) What are the positions of N, P, O, S and Te in the periodic table ? 10

(b) What are the name and structural formula of different oxy acids of P and S ? 10

#### Group – C

9. (a) What are metal Carbonyls and metal Nitrosyls ? Explain with examples. 8

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(3)

(Turn over)