(Pages : 3) **8073—B72—II SS—MAY 2019**

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL/MAY 2019

CHEMISTRY (Optional)

: Three Hours

Maximum : 80 Marks

All questions *are* **Compulsory** *and write in one answer book.*
Draw neat diagram and give equation wherever necessary.

Answer any *ten* of the following :

1 Helium molecule doesnot exist, why ?

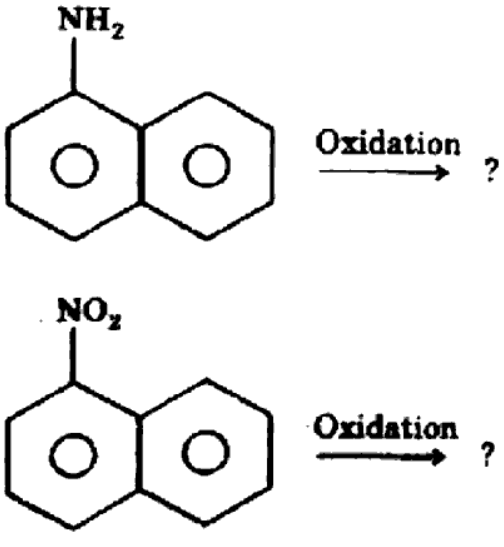
2 Calculate the bond order in Nitrogen molecule.

3 Give reason, *d*-block elements show variable oxidation states.

4 Write the electronic configuration of Chromium and Copper.

5 ? + Dienophile → ? (Adduct)

6 Define Huckel's rule taking the example of Cyclopropenium cation.

7 

8 – OH substituent is an electron releasing group, give reason.

9 What are reversible reactions ? Give an example.

10 Define Raoult's law.

11 What are Azeotropic mixture ? Give an example.

12 Define Dipole moment. Mention its units.

(10 × 2 = 20 mar

II. Answer any *six* of the following :

13 Write a note on colour and magnetic properties of *d*-block elements.

14 Write the energy level diagram of O_2^- ion, calculate its bond order and mention its magn property.

15 Explain SP^3d hybridisation with suitable example.

16 Write the mechanism of hydration of alkene by Oxymercuration–Demercuration.

17 Explain aromaticity in benzene using molecular orbital theory.

18 Discuss the mechanism of the following reaction ?

$$\xrightarrow[AlCl_3]{R^1COCl} \ ?$$

19 Derive an expression for rate constant of second order reaction when $a = b$.

20 Discuss the boiling point–composition diagram for the completely miscible liquid pairs type–I.

21 Define optical activity. Explain, how it is useful in the determination of structure takin suitable example.

(6 × 5 = 30 mark

III. Answer the following :

22 (a) Explain Born–Haber cycle taking NaCl as an example. (5 mark

(b) Define resonance, write the resonance structures of NO_3^- ion. (5 mark

Or

(a) What are Lanthanides ? Explain Lanthanide contraction. (5 marks)

(b) Define metallic bond. Explain band theory. (5 marks)

23 (a) Discuss Ozonolysis reaction of alkenes. Write its significance in assigning the position of double bond taking the example of 1-butene and 2-butene. (5 marks)

(b) Write the mechanism of Nitration reaction of aromatic compound. (5 marks)

Or

(a) Write Howarth's synthesis of Naphthalene. (5 marks)

(b) Define axial and equitorial bond. Discuss conformation of Cyclohexane. (5 marks)

24 (a) Derive first order rate constant equation in case of parallel reaction. (5 marks)

(b) Explain Nicotine-water system with neat diagram. (5 marks)

Or

(a) Derive Gibbs-Duhem Margules equation. (5 marks)

(b) Explain the determination of dipole moment by temperature variation method. (5 marks)

[3 × 10 = 30 marks]