

Roll No. : .....

Total No. of Questions : 11 ]

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# BPG-1090

M.Sc. (Previous) Examination, 2021

## CHEMISTRY

Paper - I

CH-401

(Inorganic Chemistry)

Time : 1½ Hours ]

[ Maximum Marks : 75

### Section-A

(Marks : 2 × 10 = 20)

*Note* :- Answer all *ten* questions (Answer limit 50 words). Each question carries 2 marks.

### Section-B

(Marks : 5 × 5 = 25)

*Note* :- Answer all *five* questions. Each question has internal choice (Answer limit 200 words). Each question carries 5 marks.

### Section-C

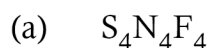
(Marks : 10 × 3 = 30)

*Note* :- Answer any *three* questions out of five (Answer limit 500 words). Each question carries 10 marks.

### Section-A

2 each

1. (i) In which of the following molecules there is a possibility of  $d\pi - p\pi$  bonding :



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( 1 )

BPG-1090 P.T.O.

- (b)  $S_4H_4N_4$
- (c)  $N \equiv SF_3$
- (d)  $H_3SiOSiH_3$
- (e)  $CH_3N = C = S$
- (f)  $Ft_3NO$
- (g)  $R_3PO$
- (ii) Write down limitations of VSEPR theory.
- (iii) What do you mean by energy profile of a reaction ?
- (iv) Give example of 'reactions without metal ligand bond cleavage'.
- (v) Define point group.
- (vi) Assign point symmetries of the  $H_2O$  and  $C_6H_6$ .
- (vii) Write down the various types of electronic spectra found in transition metal compounds.
- (viii) Give formula of :
- (a) Molar susceptibility :
- $$X_m = \dots\dots\dots$$
- (b) Magnetic moment :
- $$\mu = \dots\dots\dots$$
- (ix) Give example of each :
- (a) Nitrosyl halide complex
- (b) Pure nitrosyl complex
- (c) Nitrosyl carbonyl complex
- (d) Nitro cyanide complex
- (x) Explain back bonding.

**Section-B**

5 each

2. Write down some simple reactions of covalently bonded molecules.

*Or*

Explain Bent rule with suitable example.

3. Write a short note on Redox Reaction.

*Or*

Write a short on Anation Reaction.

4. Explain types of bonds present in higher boranes with suitable examples.

*Or*

Write down various steps for formation of character table of  $C_{2V}$  point group.

5. Give a brief account of selection rules for electronic spectroscopy.

*Or*

Write a note on Spin Crossover.

6. Write down safety rules of different materials and chemicals.

*Or*

Explain principles of green chemistry.

**Section-C**

10 each

7. Write down in detail about the factors affecting the stability of metal complexes.

8. Explain kinetic applications of VBT and CFT.

9. Describe structure and bonding in  $B_{10}H_{14}$ .

10. Explain Orgel diagram for transition metal complexes.

11. Describe in detail about important reactions of metal carbonyls.