

C.U.SHAH UNIVERSITY

Summer Examination-2020

Subject Name: Inorganic Chemistry-I

Subject Code: 5SC01ICH1

Branch: M.Sc. (Chemistry)

Semester : 1

Date : 24/02/2020

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

SECTION – I

Q-1 Attempt the Following questions (07)

- a. Write Schrodinger equation for one dimension. (1)
 - b. Find “b” by applying orthogonal condition to Ψ_1 & Ψ_2 . Where, (1)
- $$\Psi_1 = \frac{1}{\sqrt{3}} \Psi_s + \sqrt{\frac{2}{3}} \Psi_{p_x} \text{ and } \Psi_2 = \frac{1}{\sqrt{3}} \Psi_s + b \Psi_{p_x} + c \Psi_{p_y}.$$
- c. For the $E\Psi = H\Psi$. What is H? (1)
 - d. What is magnetic permeability? (1)
 - e. What do you mean by magnetic field? (1)
 - f. Define Curie temperature. (1)
 - g. What is magnetically dilute substance? (1)

Q-2 Attempt all questions (14)

- a. Derive secular equation for hydrogen molecule ion (H_2^+). (7)
- b. Explain bond angle in sp^2 hybridization (7)

OR

Q-2 Explain bond angle in sp^3 hybridization. (14)

Q-3 Attempt all questions (14)

- a. Explain Russell-Saunders coupling (L-S coupling). (7)
- b. What is diamagnetism? Derive the equation for diamagnetic moment. (7)

OR

Q-3 Attempt all questions (14)

- a. Determination of magnetic susceptibility by Gouy's method. (7)
- b. Explain effect of temperature on susceptibility of paramagnetic, diamagnetic, ferromagnetic and anti-ferromagnetic substance. (7)

SECTION – II



- Q-4 Attempt the Following questions (07)**
- a. In Mossbauer spectroscopy which kind of ray is absorb by absorber? (1)
 - b. What is recoil energy? (1)
 - c. Why $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ complex shows Quadrupole splitting? (1)
 - d. Who observed Mossbauer spectroscopy first and when? (1)
 - e. Draw the structure of Di-thiozone. (1)
 - f. Define masking agent. (1)
 - g. Give the structure of potassium bromate. (1)
- Q-5 Attempt all questions (14)**
- a. Describe chemical shift with example. (7)
 - b. Explain Quadrupole splitting and magnetic splitting. (7)
- OR**
- Q-5 Attempt all questions (14)**
- a. Explain instrumentation of Mossbauer spectroscopy. (7)
 - b. Discus basic principle of Mossbauer spectroscopy. (7)
- Q-6 Attempt all questions (14)**
- a. Write purposes of organic reagent for their uses. (7)
 - b. Write advantages of organic reagents. (7)
- OR**
- Q-6 Attempt all Questions (14)**
- a. Write brief note on cupferron. (7)
 - b. Write brief note on dimethylglyoxime (DMG). (7)

