

C.U.SHAH UNIVERSITY

Summer Examination-2022

Subject Name: Inorganic Chemistry-I

Subject Code: 5SC01ICH1

Branch: M.Sc. (Chemistry)

Semester: 1

Date: 21/04/2022

Time: 11:00 To 02:00

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 (1 Mark × 7= 7) (07)

- a. Write Schrodinger equation for three dimension. (1)
 - b. Find “b” by applying orthogonal condition to Ψ_1 & Ψ_2 . Where, (1)
- $$\Psi_1 = \frac{1}{\sqrt{2}} \Psi_s + \sqrt{\frac{1}{2}} \Psi_{p_x} \text{ and } \Psi_2 = \frac{1}{\sqrt{2}} \Psi_s + b \Psi_{p_x}.$$
- c. For the $E\Psi = H\Psi$. What is Ψ ? (1)
 - d. What is conjugated molecule? (1)
 - e. What do you mean by magnetic induction? (1)
 - f. Write equation for volume susceptibility. (1)
 - g. What is multiplet width? (1)

Q-2 Attempt all questions (14)

- a. Explain secular equation for hydrogen molecule atom. (7)
- b. Explain bond angle in sp hybridization (7)

OR

Q-2 (14)

Explain bond angle in sp^3 hybridization.

Q-3 Attempt all questions (14)

- a. Derive magnetic moment equation when multiplet width large as compare to kT (7)
- b. Derive Pascal's constant. (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 (1 Mark $\times 7 = 7$) (07)**
- a. In Mossbauer spectroscopy which kind of ray is absorb by absorber? (1)
 - b. What is recoil energy? (1)
 - c. Why $[\text{Fe}(\text{CN})_6]^{2+}$ complex does not shows Quadrupole splitting? (1)
 - d. In Mossbauer spectroscopy why sample and absorber are put in crystal lattice? (1)
 - e. Draw the structure of cupferron complex.. (1)
 - f. Define masking agent. (1)
 - g. Give the structure of Co-DMG complex. (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 note on cupferron. (7)
 - b. Write brief note on DMG. (7)
- OR**
- Q-6 Attempt all Questions (14)**
- a. Write note on Dithiozone. (7)
 - b. Write note on Rubeanic acid. (7)

