 M.Sc. RNLKWC-/CEM-103/22

2022

INORGANIC CHEMISTRY

M.Sc. First Semester End Examination - 2022

PAPER - CEM-103

Full Marks : 40 ***Time : 2 hours***

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

Group-A

1. Answer any four questions **2×4=8**

(i) Show that C_{2h} is an Abelian group.

(ii) What do you mean by cooperative interaction in O_2 affinity of Hemoglobin?

(iii) Prove that : $(ABCD)^{-1}=D^{-1}C^{-1}B^{-1}A^{-1}$

(iv) What is ceruloplasmin?

(v) Find out the inverse of S_6^2- operation.

(vi) What is Wilson's disease?

Group - B

2. Answer <u>any four</u> from the following . 8×4=32

(i) a) Discuss the structural features of Hemerythrin (Hr) and hemocyanin (Hc). Write their role in oxygen transport process.

b) Write the names of two Zn containing enzymes. Discuss their functions. 4+4

(ii) a) Write short note on alzheimer disease.

b) Briefly explain the biofunction of ferrdoxins. 4+4

(iii) a) Find the point group of the following molecules/ ions.
So_3^{2-}, cis$[Pt(NH_3)_2Cl_2]$, trans$[Cr(H_2O)_4Cl_2]$

b) Show that if there are two C_2 axes in a group, there must be a third C_2 axis which is perpendicular to other C_2 axes.

c) Write all symmetry operations present in B_2H_6 molecule. Is it a abelian or non-abelian group? Explain. 3+2+3

(iv) a) Write short note on "Great Orthogolality Theorem".

b) If 'A' is conjugated with 'B' and 'A' is conjugated with 'C', then prove that 'B' & 'C' are mutually conjugate to each other.

c) Derive the matrix form of $S_n(Z)$ operation. Write the charater of $S_3(Z)$ operation. 3+2+3

(v) a) A beam of X-rays of wavelength 0.071 nm is diffracted by (110) plane of rock salt with lattice constant of 0.28 nm. Find the glancing angle for the second-order diffraction.

b) Write with explanation whether the reflections for the plans (111), (200) and (1.35) are allowed for SCC, BCC and FCC lattices.

c) Discuss Edge dislocation with diagram. 2+3+3

(vi) a) Write the difference between Schottky and Frenkel defect.

b) How does the temperature influences the electrical conductivity of metal and semiconductor?

c) Write the differences between type I and type II semiconductor. 2+3+3
