

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2023**(Regular/Improvement/Supplementary)****CHEMISTRY****GCHE1B01T: THEORETICAL AND INORGANIC CHEMISTRY- I****Time: 2 Hours****Maximum Marks: 60****SECTION A: Answer the following questions. Each carries *two* marks.****(Ceiling 20 Marks)**

1. Apples sold at that shop are tastier than the mangoes sold there.” Is this a scientific statement? Justify your answer.
2. What do the terms absolute error and relative error mean with regard to an analytical determination?
3. Can you directly prepare standard solution of HCl? Justify your answer.
4. Which indicator can be used in the titration of i) weak base vs strong acid; ii) strong base vs weak acid; iii) strong base vs strong acid.
5. Which has a higher first ionization enthalpy: nitrogen or oxygen? Why?
6. Define electronegativity. Which element has the highest electronegativity value in Pauling's scale and which has the lowest?
7. How many equivalent orbitals are produced in sp^3d^2 hybridisation?
8. Predict the shape of BeF_2 molecule on the basis of the VSEPR theory.
9. Mention one difference between a sigma bond and a pi bond.
10. Account for the fact that bismuth is a strong oxidizing agent in pentavalent state.
11. Name and formulate a compound each in which Cl shows an oxidation state of (i) +1 and (ii) +5.
12. Why hydrogen bomb is referred as fission-fusion bomb?

SECTION B: Answer the following questions. Each carries *five* marks.**(Ceiling 30 Marks)**

13. Logically differentiate between the terms science and pseudoscience.
14. Define the term normality. 20 mL of 0.25 N Potassium Dichromate ($K_2Cr_2O_7$) is made up to 100mL using a standard flask. Calculate the resultant normality of solution.
15. Explain Iodometric titration with a suitable example.
16. Explain the variation of the polarizing power of cations along a period and down a group.

(PTO)

17. What is the geometry of NH_3 molecule? How will you explain this geometry on the basis of hybridization?
18. Explain Born–Haber cycle with a suitable example.
19. Define the term binding energy per nucleon. How is it related to the stability of the nucleus?

SECTION C: Answer any *one* question. Each carries *ten* marks.

20. Explain the structure of diborane and discuss its bonding on the basis of the concept of hybridisation.
21. a) Discuss the application of radioisotopes as tracers.
b) A certain rock sample contains U-238 and Pb-206 in the mass ratio 5:4.
Calculate the age of the rock if the half- life of U-238 is 4.5×10^9 years.

(1 x 10 = 10 Marks)