D1BCH2202   (PAGES 2)   Reg.No.................................

Name: ....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2022
(Regular/Improvement/Supplementary)
CHEMISTRY COMPLEMENTARY COURSE FOR PHYSICS, BOTANY & ZOOLOGY
GCHE1C01T: GENERAL CHEMISTRY

Time: 2 Hours   **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries 2 marks.
(Ceiling 20 Marks)

1. Define normality. Calculate the normality of a solution containing 20 g of NaOH in 2 L.

2. Methyl orange is not a suitable indicator for titrating acetic acid and sodium hydroxide. Why?

3. Give two examples for redox indicators.

4. Explain the origin of Lyman and Balmer series in the line spectrum of hydrogen. How we could find the wavelength of any line in a Lyman as well as Balmer series of spectrum?

5. Why doesn't the wave nature of a moving cricket ball become evident to an observer?

6. Which quantum number assists in predicting the number of orbitals present in the given sublevel? Explain it's significance.

7. How can the three types of radioactive rays be distinguished?

8. State Yukawa's meson field theory of nucleon forces.

9. What is the principle involved in hydrogen bomb?

10. Name two transition metal ions and two non-transition metal ion playing important roles in biological process.

11. Discuss the differences between haemoglobin and myoglobin.

12. In which direction is sodium ion pumped across the cell membrane?

SECTION B: Answer the following questions. Each carries 5 marks
(Ceiling 30 Marks)

13. Distinguish between the terms valency and oxidation number with suitable examples

14. A solution is prepared by mixing 30 grams of ethanol and 30 grams of water. Determine the mole fraction of each component. The molecular weight of ethanol and water is 46.07 g/mol and 18 g/mol respectively.

15. Explain the application of solubility product in the group separation of cations in qualitative analysis.

(PTO)

16. Account for the shape of SF_4 and ClF_3 molecule based on VSEPR theory.

17. Calculate the lattice energy of calcium fluoride (CaF_2) from the following data: Madelung constant = 2.519; ionic radii: Ca^{2+} =0.99 Å, F^- = 1.36 Å; Born exponent =7; electronic charge = 1.6022×10^{-19} C; $\varepsilon_o = 8.854 \times 10^{-12} C^2 m^{-1} J^{-1}$. (Hint: r_o = sum of the radii of the cation and anion)

18. Given: mass of proton = 1.00758 amu; mass of a neutron = 1.00897 amu; mass of a helium nucleus = 4.00820 amu. Calculate the binding energy of the helium nucleus in MeV and in Joule.

19. Give short note on the principle underlying in nuclear reactor.

SECTION C: Answer any 1 question. Each carries 10 marks.

20. What are the salient features of MOT? Discuss different types of sigma and pi molecular orbitals that are obtained from the overlap of different atomic orbitals.

21. Discuss briefly photosynthesis emphasising the role of chlorophyll.

(1 x 10 = 10 Marks)