

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS—UG)

Complementary Course

CHE 1C 01—GENERAL CHEMISTRY

Time : Three Hours

Maximum : 64 Marks

Section A (One Word/Sentence)

*Answer all questions.**Each question carries 1 mark.*

1. The weight of oxalic acid ($\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$) required to prepare two litres of 0.05 N solution is _____
2. The equivalent weight of $\text{K}_2\text{Cr}_2\text{O}_7$ is _____
3. 0.100 mole of NaCl is dissolved in 180 grams of pure H_2O . The mole fraction of NaCl in the solution is _____
4. According to Bronsted-Lowry concept acids are _____ donors.
5. Haemoglobin is a _____ protein.
6. Name the metal ion other than magnesium that is involved in photosynthesis.
7. Which is more polar HF or HCl ?
8. KMnO_4 is a powerful _____ agent.
9. A subshell with $n = 6$ and $l = 3$ is designated as _____
10. _____ are the elements having the same number of neutrons.

(10 x 1 = 10 marks)

Section B (Short Answers)

*Answer any seven questions.**Each question carries 2 marks.*

11. Calculate the approximate volume at STP of : (i) 8 gram O_2 and (ii) 6.02×10^{20} molecules of CO_2 .
12. What is meant by atomic radius ? How do the atomic radii of elements vary when we move (i) down the group ; and (ii) across a period.
13. Differentiate between molarity and molality.
14. Mention any *two* advantages of double burette titration method.

Turn over

15. **Classify the following as acid-base, redox and complexometric indicators :**
 (a) Phenolphthalein ; (b) Eriochrome black-T ; (c) Diphenylamine ; and (d) Methyl Red.
16. **Differentiate between accuracy and precision.**
17. **H₂O is a liquid while H₂S is a gas. Why ?**
18. **Write down the Schrödinger wave equation. Explain the terms involved.**
19. **State Soddy's Group displacement law.**
20. **Explain how the mass defect and binding energy of a nucleus are related ?**

(7 x 2 = 14 marks)

Section C (Paragraphs)

*Answer any four questions.
 Each question carries 5 marks.*

21. **What is electronegativity ? Discuss Pauling's scale of electronegativity.**
22. **Define ionisation energy. What are the factors affecting the ionisation enthalpy of an element ?**
23. **Explain Lewis concept of acids and bases. Which of the following can act as Lewis acids ?**
 (a) H₂O ; (b) AlCl₃ ; (c) SO₂ ; (d) OH⁻ ; (e) CO₂ ; (f) Ag⁺.
24. **State VSEPR theory and predict the geometry of BF₃ and NH₃.**
25. **What is radiocarbon dating ? A fresh piece of wood gives 16,100 counts of beta ray emission per minute per kg and an old wooden bowl gives 13,200 counts per minute per kg. Calculate the age of the wooden bowl. The half life period of ¹⁴C is 5,568 years.**
26. **Give an account of sodium potassium pump in biological systems.**

(4 x 5 = 20 marks)

Section D (Essays)

*Answer any two questions.
 Each question carries 10 marks.*

27. **Discuss the mechanism of the intake of oxygen by haemoglobin and myoglobin.**
28. (i) **What are quantum numbers ? How are they significant ?** (5 marks)
 (ii) **Explain the working of a nuclear reactor.** (5 marks)
29. **Write briefly on common ion effect and solubility product. Explain the application of these qualitative analysis.**
30. (i) **Explain on the basis of MO theory as to why He₂⁺ exists where as He₂ does not.** (4 marks)
 (ii) **Sketch the MO diagram of O₂ molecule and compare the stability of O₂ with O₂²⁺ and O₂²⁻**

(6 mark

[2 x 10 = 20 marks]