D 92842 **(Pages : 3)** **Name.....**

Reg. No.....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS—UG)

Core Course—Chemistry

CHE 1B01—THEORETICAL AND INORGANIC CHEMISTRY—I

Time : Three Hours **Maximum : 80 Marks**

Section A (One Word/Sentence)

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

1. The active acquisition of information from a primary source by our senses is called _____
2. The branch of chemistry, that minimize the use and generation of hazardous substances through the scientific design is called _____
3. Alchemist believes in the conversion of base metals into _____
4. Isobars are elements which have same _____ and different _____
5. Express the mass percentage of NaOH when 2g of NaOH is dissolved in 48g of water.
6. The best first aid for the inhalation of a poisonous gas like carbon monoxide is :
7. Methyl orange is used as an indicator for the titration of strong acid with _____base.
8. The use of _____is completely avoided in double burette method of titration.
9. The H_β line of the Balmer series in hydrogen spectrum is due to the shifting of electron from _____ orbit to _____ orbit.
10. The fissionable plutonium is formed by the irradiation of neutron with U^{238} followed by the emission of _____

(10 x 1 = 10 marks)

Section B (Short Answer)

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

11. Write the benefit of controlled experiments.
12. Sampling is commonly used in research. Why ?
13. Calculate the mass of Mohr's salt required for the preparation of 100 mL of 0.025N solution.
14. Distinguish between molality and molarity.

Turn over

15. What are redox indicators ?

16. Addition of dilute H_2SO_4 is essential during the volumetric estimation of Fe^{2+} or oxalic acid using $KMnO_4$ solution. Why ?

17. Write Heisenberg's uncertainty principle and explain the terms,

18. Why Sommerfeld modification is required for the Bohr model of atom ?

19. Calculate the wavelength associated with a β-particle travelling with a velocity 11100th that of light in vacuum.

20. Complete the equations :

    (a) $_{90}Th^{232}$ $_{88}Ra^{228}$ ————

    (b) $_{92}TU^{238}$ + p.

21. What is the source of solar energy ?

22. What is the function of Cd rods in nuclear reactors ?

(10 x 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. With the help of suitable example, show that theory can be modified with new observations.

24. Explain the oxidation number concept of oxidation and reduction. Identify the oxidant and reductant in the reaction :

    $N_2H_{4\,(l)}$ + H202 (1) N2 «» $4H_2O_{(l)}$.

25. Distinguish primary and secondary standard solutions used in volumetric analysis with suitable examples.

26. Give a brief account on complexometric titrations.

27. Explain the Rutherford's gold foil experiment. What is its significance ?

28. Calculate the wave number of the 3rd line of Bracket series in hydrogen spectrum.

29. How will you determine the age of fossils ? A radioactive element decays at such a rate that after 68 minutes only ¼th of the original amount remains. Calculate the disintegration constant and half life period.

30. Briefly explain the Aston's mass spectrograph.

(5 x 6 = 30 marks)

Section D (Essays)

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

31. Explain the scientific method for knowledge acquisition.

32. Discuss the important steps you will adopt for a safe chemistry laboratory.

33. Briefly explain the Planck's quantum concept. How is the theory used in explaining (i) photoelectric effect ; and (ii) wave-particle duality ?

34. How will you explain the stability of nucleus using the different theories proposed for the nucleus ?

(2 x 10 = 20 marks)