

**D 13793**

(Pages : 2)

Name.....

Reg. No.....

**FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2016**

(CUBCSS-UG)

Chemistry

**CHE 1B 01—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. A medieval chemical science and speculative philosophy aiming to achieve the transmutation of base metals into gold is known as \_\_\_\_\_.
2. Scientific data can be represented by using :  
(a) Tables ; (b) Graphs ; (c) Diagrams ; (d) All of these.
3. The molar volume of an ideal gas at STP is \_\_\_\_\_.
4. The oxidation state of Cr in  $\text{CrO}_4^{2-}$  is \_\_\_\_\_.
5. Titrations involving iodine liberated in chemical reactions are called \_\_\_\_\_.
6. The solution of a substance with accurately known strength is called \_\_\_\_\_.
7. What is Rydberg constant ?
8. The dual nature of matter was proposed by \_\_\_\_\_.
9. The steady-state reached by the members of a radioactive series is called \_\_\_\_\_.
10. What is average life period ?

(10 × 1 = 10 marks)

**Section B (Short Answers)**

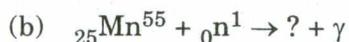
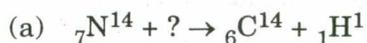
*Answer any ten questions.*

*Each question carries 2 marks.*

11. Differentiate scientific theories and laws.
12. What is meant by formulation of hypothesis ?
13. What are the disposal techniques of broken mercury thermometer ?
14. Distinguish isotope and isobar with an example for each.
15. What are adsorption indicators ? Give two examples.
16. State any two advantages of double burette method of titration.

**Turn over**

17. What are significant figures ? How many significant numbers are there in 3.040 ?
18. State and formulate Heisenberg's uncertainty principle.
19. How did Sommerfeld modify Bohr theory ?
20. Explain the theory of radioactive disintegration.
21. What is Gieger-Nuttal rule ?
22. Complete the following nuclear reactions :



(10 × 2 = 20 marks)

### Section C (Paragraphs)

Answer any **five** questions.

Each question carries 6 marks.

23. Give an account of various branches in modern Chemistry.
24. Define (i) mole fraction ; (ii) molarity ; (iii) normality ; and (iv) molality.
25. State Ritz combination principle. Calculate the wavelength of an electron having mass  $9 \times 10^{-31}$  kg., moving with a velocity 10 % that of light.
26. Explain (i) Planck's quantum hypothesis and (ii) Photoelectric effect.
27. Write a short note on (i) MSDS and (ii) R & S Phrases.
28. Discuss the titration curves for the neutralization of (i) Strong acid × strong base ; (ii) Strong acid × weak base.
29. Explain the principle of Aston's mass spectrograph.
30. Describe radiocarbon dating. The  ${}^{14}\text{C}/{}^{12}\text{C}$  ratio in a piece of wood is 14 % that of the atmosphere. Calculate the age of the wood ( $t_{1/2}$  of  ${}^{14}\text{C} = 5760$  years).

(5 × 6 = 30 marks)

### Section D (Essays)

Answer any **two** questions.

Each question carries 10 marks.

31. (a) Write briefly on Bohr atom model and its limitations.  
(b) Discuss different series of lines in H-spectrum.
32. (a) Describe any one method for the separation of isotopes.  
(b) Explain with examples how radio isotopes are useful in radio diagnosis and radiotherapy.
33. What are complexometric titrations ? Discuss briefly the theory of metallochromic indicators.
34. Write a brief note on the various components of a research project.

(2 × 10 = 20 marks)