

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Core Course (Chemistry)

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

(Common with Polymer Chemistry and Industrial Chemistry)

Time : Three Hours

Maximum : 80 Marks

Section A

*Answer in one word or sentence.**Answer all questions.**Each question carries 1 mark.*

1. Founder of modern chemistry.
2. The oxidation number of Mn in MnO_4^- ion is _____.
3. 200g of a 10% (w/w) aqueous solution of glucose contains _____ grams of glucose.
4. The mass of Avogadro number of hydrogen atoms is _____ kg.
5. Eriochrome Black T is used as an indicator in _____ titrations.
6. The number of significant figures in a value reported as 5.0980 is _____.
7. Balmer series of spectral lines occurs in the _____ region of electromagnetic spectrum.
8. The wavenumber of a light with wave length 5×10^{-9} m is _____.
9. The radiant energy of sun is due to nuclear _____.
10. _____ series is called artificial radioactive disintegration series.

(10 × 1 = 10 marks)

Section B

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

11. What is meant by a scientific hypothesis ?
12. Calculate the normality of a solution containing 40g of NaOH in 4L.
13. What are isotopes ? Explain with examples.
14. Name one metal ion indicator and one adsorption indicator.

Turn over

15. What are dessicants ? Give one example.
16. What is a primary standard in volumetric analysis ? Give one example.
17. Calculate the energy of a radiation having a wavelength of 1000\AA ($h = 6.626 \times 10^{-34} \text{ Js}$).
18. What is photoelectric effect ?
19. Write any four limitations of Bohr theory.
20. State Geiger - Nuttal rule.
21. Explain the term packing fraction.
22. Explain K electron capture with an example.

(10 × 2 = 20 marks)

Section C

Answer any **five** questions.

Each question carries 6 marks.

23. Distinguish between the terms molarity, normality and molality.
24. Explain with examples the terms isotopes, isobars and isotones.
25. Write the abbreviation of MSDS. What is its significance ?
26. Write the principles of iodometric and iodimetric titrations.
27. Discuss briefly the components of a research Project report.
28. What is meant by Bohr radius ? Calculate the radius of the first. Bohr orbit of hydrogen atom. ($h = 6.626 \times 10^{-34} \text{ Js}$, $\epsilon_0 = 8.854 \times 10^{-12} \text{ C}^2 \text{ m}^{-1} \text{ J}^{-1}$, $e = 1.602 \times 10^{-19} \text{ C}$ and mass of electron = $9 \times 10^{-31} \text{ kg}$).
29. Derive the de Broglie relation.
30. Write a note on radiocarbon dating.

(5 × 6 = 30 marks)

Section D

Answer any **two** questions.

Each question carries 10 marks.

31. (a) Define the terms mole and Avogadro number. Calculate (1) The number of molecules present in 22g of CO_2 . (2) The absolute mass of one molecule of CO_2 .
- (b) Define the following terms of expressing concentration : weight percentage, normality, molefraction and ppm.

32. (a) Which indicator(s) can be used for titration of (1) oxalic acid *vs* NaOH (2) Na_2CO_3 *vs* HCl ? Explain.
- (b) What are the first aid treatments for a person who suffers (1) skin contact (2) eye contact with bromine ?
33. (a) Write the important postulates of Bohr's atomic theory.
- (b) Discuss the Davisson-Germer experiment on electron diffraction.
34. (a) Calculate the number of alpha and beta particles emitted during the disintegration of ${}_{92}\text{U}^{235}$ to ${}_{82}\text{Pb}^{207}$.
- (b) Write a note on nuclear fission.

(2 × 10 = 20 marks)