D 52727 (Pages : 3) Name.....

Reg. No.....

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 mar

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.

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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 1000A° ($h = 6.626 \times 10^{-34}$ 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. ($h = 6.626 \times 10^{-34}$Js, $\varepsilon_0 = 8.854 \times 10^{-12}$ C^2 $m^{-1}J^{-1}$, $e = 1.602 \times 10^{-19}$ C and mass of electron = 9×10^{-31}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 $_{92}U^{235}$ to $_{82}$ Pb207.

(b) Write a note on nuclear fission.

(2 × 10 = 20 marks)