D 93775 (Pages : 3) Name.....

Reg. No.....

FIRST SEMESTER B.A./B.Sc. DEGREE EXAMINATION NOVEMBER 2020

(CUCBCSS)

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

Time : Three Hours Maximum : 80 Marks

Section A (One Word)

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

1. Name a base that can be used as a primary standard.
2. Electronic configuration of Cu^+ is ————.
3. An indicator that can be used in weak acid strong base titrations is ————.
4. Number of orbitals possible for $n = 3$ is ————.
5. Write one example of a radioactive isotope used in agriculture.
6. The disintegration constant of a radioactive element with half-life period 100's is ————.
7. Atoms having different mass number and same atomic numbers are called ————.
8. If 1 mol is present in 1 L, then 0.2 mol is present in ———— ml.
9. The first organic compound synthesized was ————.
10. Equivalent weight of oxalic acid is ————.

(10 × 1 = 10 marks)

Section B (Short Answers)

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

11. State group displacement law.
12. What is the principle behind iodometric titration ?
13. What do you mean by radioactive equilibrium ?
14. State Ritz-combination principle.

Turn over

15. Define normality and molarity.

16. Name two interdisciplinary areas of chemistry with physics.

17. Suggest treatment you would adopt for burns due to phenol.

18. State Heisenberg's uncertainty principle.

19. Give an example each for internal and external indicators.

20. Define Hypothesis.

21. What do you mean by black body radiation ?

22. 100 g of a radioactive substance is reduced to 25 g in 24 minutes. What is the half-life of the substance ?

(10 × 2 = 20 marks)

Section C (Paragraph)

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

23. Explain the separation technique of isotopes by gaseous diffusion method and thermal diffusion method.

24. Distinguish between nuclear fission and nuclear fusion reactions.

25. In which regions of visible spectra do the five lines of hydrogen spectrum appear ? Give Rydberg's equation and explain the terms. An electron in the hydrogen atom undergoes transition from $n = 2$ to $n = 5$ state. Calculate the wavelength of light absorbed during the transition.

26. Write short notes on : (a) R and S phrase ; and (b) MSDS.

27. Differentiate between scientific evidence and scientific proof.

28. Explain the first aid management for accidents arising from electric shock, fire and inhalation of poisonous gases.

29. Explain the principle of permanganometry titrations using an example.

30. What is artificial radioactivity ? Illustrate with suitable examples.

(5 × 6 = 30 marks)

Section D (Essays)

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

31. (a) What are the postulates of Bohr Theory ? ; (b) Using Bohr's postulates, derive expression for the velocity of electron moving in the n^{th} orbit of a hydrogen atom ; (c) If the energy of the electron of hydrogen atom in its n^{th} orbit is given by $E = \frac{-13.6}{n^2} ev$, find the ionization energy of hydrogen atom.

32. Discuss the principle and advantages of double burette titrations. Illustrate with an example.

33. Explain the significance of the various components of a research project.

34. Discuss the factors that affect nuclear stability.

(2 × 10 = 20 marks)