C 33295 (Pages : 3) Name.....

Reg. No.....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017

(CUCBCSS—UG)

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

Time : Three Hours Maximum : 80 Marks

Section A

Answer in one word **or** *sentence.*
Answer **all** *questions.*

1. Name one interdisciplinary area of science involving chemistry and physics.
2. Define atomic mass unit.
3. Equivalent mass of an oxidant = ————.
4. Define mole fraction of a component in solution.
5. The number of moles in 14g of CO is ————.
6. Name one adsorption indicator.
7. Square root of variance is called————.
8. Paschen series of spectral lines occurs in the ———— region of electromagnetic spectrum.
9. State Planck's quantum theory.
10. Radioactive decay follows ———— order kinetics.

(10 × 1 = 10 marks)

Section B

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

11. What is meant by a scientific theory ?
12. Calculate the absolute mass of one atom of Oxygen (O = 16).
13. What are the mole fraction of the components in a solution containing 4moles of ethanol, 1 mole of acetic acid and 5moles of water.

Turn over

14. What are isobars ? Explain with examples.

15. Name one acid- base indicator and one metal ion indicator.

16. Name two desiccants used in desiccators.

17. What are primary standards in volumetric analysis ? Give one example.

18. Calculate the momentum of a particle having a de broglie wavelength of 10A° ($h = 6.626 \times 10^{-34}$Js).

19. Calculate the uncertainty in the position of a particle whose uncertainty in momentum is 2×10^{-2} kg m s^{-1}.

20. Explain the term 'artificial radioactivity' with a suitable example.

21. The half life period of a radionuclide is 2.4 minutes. Calculate its decay constant.

22. Explain the nuclear fission chain reaction.

(10 × 2 = 20 marks)

Section C

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

23. Distinguish between scientific theories and laws .

24. Define the concentration terms molality, molarity and mass percentage. Calculate the molality of a 10% solution of NaOH.(Na = 23, O = 16, H = 1).

25. Explain the significance of material safety data sheets of chemicals.

26. What are complexometric titrations ? Explain with special reference to EDTA titrations.

27. Distinguish between :
    (i) Accuracy and precision.
    (ii) Equivalence point and end point.

28. Discuss the Heisenberg's uncertainty principle. Explain its significance.

29. State and explain the phenomenon photoelectric effect.

30. Explain the applications of tracers.

(5 × 6 = 30 marks)

Section D

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

31. (a) Define the terms mole and molar volume. Calculate the number of molecules and number of mloles present in 10 L of CO_2 at 273K and 760mm.

    (b) Distinguish between relative atomic mass and absolute mass of atom .

32. (a) Explain the theory of acid - base indicators with examples.

    (b) Calculate the de Broglie wavelength of an electron accelerated by a potential of 100 volts, ($h = 6.626 \times 10^{-34}$ Js, charge of electron $e = 1.602 \times 10^{-19}$ C and mass of electron $= 9 \times 10^{-31}$kg)

33. (a) Explain the origin of line spectrum of hydrogen on the basis of Bohr's atomic theory

    (b) What are the limitations of Bohr's atomic theory.

34. (a) Correlate N/P ratio and nuclear stability.

    (b) Write a short note on nuclear reactor.

($2 \times 10 = 20$ marks)