21U118S (Pages: 2) Name: …….……

Reg. No: …..……

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS-UG)

CC15U CHE1 B01 - THEORETICAL AND INORGANIC CHEMISTRY - I

(Chemistry - Core Course)

(2016 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 80 Marks

Section A

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

1. What is meant by a standard solution?
2. The significant figure in the reported value 20.01 is ----------
3. N-phenyl anthranilic acid is used as an indicator ---------- titration.
4. What is a dissicant? Give an example.
5. Pb-208 is the end product of radioactive decay series called ----------
6. The N/P ratio of a stable nuclide vary between ----------
7. The oxidation number of Cr in $K_2Cr_2O_7$ is ----------
8. Mass percentage of methanol when 5g glucose is dissolved in 96g water is ----------
9. A ---------- in science corresponds to paradigm shift.
10. The energies of two radiations with wavelength 7000 Ă and 5000 Ă are in the ratio ----------
11. Diffraction of light correlates to ---------- nature of light.

(10 × 1 = 10 Marks)

Section B

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

12. Explain scientific hypothesis.
13. Calculate the number of molecules present in 2.2 g of CO_2.
14. Calculate molarity of a solution containing 60g of urea (NH_2CONH_2) in 500ml of it?
15. Explain R-phrases and S-phrases in hazard codes.
16. Calculate the wavelength of a spectral line in Balmer series if n_2=3?
17. Calculate the number of paricles emitted and their type in formation of $^{209}Bi_{83}$ from $^{237}NP_{93}$.
18. Explain Geiger-Nuttal rule.
19. Differentiate accuracy and precision.
20. Compare ionizing powers of α, β, γ ray.

21. How is mass defect related to binding energy?
22. Write briefly about pictograms for laboratory safety purpose.
23. The half-life period of a radionuclide is 10 minutes. Calculate is decay constant.

(10 × 2 = 20 Marks)

Section C

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

24. Write a note on radioisotopes and their use in i) medical diagnosis, ii) radio therapy
25. Briefly explain packing fraction and comment on is dependence on mass number.
26. Explain Rutherford model of the atom.
27. Discuss the principle of complexometric titrations.
28. Explain the action of Eriochrome Black-T in EDTA titrations.
29. A sample of water with density 1.03 g/ml contains $8x10^{-3}$ g of dissolved oxygen/L. Calculate concentration of dissolved oxygen in ppm.
30. Write a note on essential steps involved in chemical research.
31. Derive de Broglie relationship.

(5 × 6 = 30 Marks)

Section D

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

32. Derive expression for radius of n^{th} electron orbit in a hydrogen atom and for velocity and energy of an electron revolving in it.
33. i) Discuss the principle and salient feature of nuclear reactor.
    ii) Calculate decay constant and half-life of a radioisotope which decays at a rate such that after 50 minutes only 25% of its original amount remains.
34. Discuss the theory of permanganometeric titrations.
35. Explain components of research project report.

(2 × 10 = 20 Marks)

****