24I103 (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER M.Sc. INTEGRATED GEOLOGY DEGREE EXAMINATION, NOV. 2024

(CBCSS)

(Regular/Supplementary/Improvement)

CC23 CHE1 IC01 - GENERAL CHEMISTRY

(Chemistry)

(2023 Admission onwards)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 2 marks.

1. Define the term atomic mass unit.
2. Explain the term equivalent mass of an reductant with suitable example.
3. What are metallochromic indicators? Give an example and name a titartion for which it is used.
4. Calculate the uncertainty in the position of a particle whose uncertainty in momentum is 3.3 x 10-3 kg m/s.
5. State the aufbau principle. What is the aufbau order of energy levels
6. Write the MO configurations of B_2 and C_2 molecules.
7. How is N/P ratio related to stability of nucleus?
8. Why do isotopes have almost identical chemical properties but different physical properties?
9. Explain the release of a large amount of energy during nuclear fission.
10. What are metallocoenzymes ?
11. What do you mean by light reactions?
12. Name the metal present in vitamin B12 and mention its function.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer ***all*** questions. Each question carries 5 marks.

13. Two solutions of a substance (non-electrolyte) are mixed in the following manner. 480ml of 1.5M first solution + 520ml of 1.2M second solution. What is the molarity of the final solution?
14. Discuss the Ostwald's thory of acid -base indicators.
15. Calculate the lattice energy of calcium fluoride (CaF_2 from the following data: Madelung constant= 2.519; ionic radii: Ca^{2+} =0.99 A0,$^{F-}$ =1.36 A0: Bom exponent =7; electronic charge = 1.6022 x 10^{-19} C; Ɛ0= 8.854 x 10^{-12} C^2 m^{-1} J^{-1}
16. Explain the shapes of (i) $SO_4^{2-}$and (i) NH_4^+; on the basis of VSEPR theory.

17. Discuss the distinguishing characteristics of the different types of radioactive rays.

18. Calculate the age of uranium mineral that contains 0.2g of 206 Pb per gram of 238U. Half life of 238U is 4.5×10^9 years.

19. Explain the role of haemoglobin and myoglobin in the transport and storage of oxygen and carbon dioxide.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. Discuss briefly the principle underlying the separation of cations into groups in qualitative analysis.

21. What is meant by orbital hybridisation? Explain the molecular geometries associated with sp^2 and sp3 hybridizations with illustrative examples.

(1 × 10 = 10 Marks)

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