TB142060A

B.Sc DEGREE (CBCSS) EXAMINATION, APRIL 2015
SECOND-SEMESTER-CORE COURSE (CHEMISTRY)
CHE2TIC THEORETICAL AND INORGANIC CHEMISTRY

Time: Three Hours **Maximum: 60 marks**

PART A
Answer all questions. Each question carries one mark

1. State Pauli's exclusion principle
2. Give the mathematical expression of de-Broglie wavelength and explain the terms
3. In a period, electro positivity decreases from left to right. Why?
4. The 2nd Ionization Energy of Sodium is very high as compared to its 1st Ionization Energy. Explain
5. The hybridization in PCl_5 is - - - - - -
6. What do you mean by induced radioactivity?
7. Though the B-F bond is polar, BF_3 is non polar. Account for it.
8. What is meant by critical mass of radioactive material?

(8 x 1mark = 8 marks)

PART B
Answer any six questions. Each question carries 2 marks

9. Calculate the bond order of He_2 molecule
10. Calculate the percentage ionic character in HCl molecule. The bond length of HCl is $1.27°A$ and the dipole moment is 1.08D
11. What is the significance of   and ^{2}
12. Explain Bohr-Bury rule
13. State uncertainty principle? What is its significance?
14. Write some important characteristics of d-block elements
15. $PbSO_4$ is sparingly soluble in water whereas Na_2SO_4 is highly soluble. Why?
16. Define binding energy of nucleus. How is it related to mass defect?
17. Give a brief account of n/p ratio concept
18. What are spallation reactions?

(6 x 2 marks = 12marks)

PART C
Answer any four questions. Each question carries 4 marks

19. State Slatter's rules. How are these rules useful in determining the effective nuclear charge?

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20. Explain why exactly half filled and completely filled orbitals are stable than other orbitals. Illustrate giving suitable example.
21. Define Electron Gain Enthalpy. What are the factors which affect it? Explain how Electron Gain Enthalpy varies along a group and a period
22. What are the factors affecting polarizing power of a cation?
23. Explain Geiger-Nuttal rule
24. Differentiate between nuclear fission and fusion

(4 x 4 marks = 16 marks)

PART D
Answer any 2 questions. Each question carries 12 marks

25. What are the postulates of Bohr atom model? What are its merits and limitations?
26. Discuss VSEPR Theory and assign the shapes of a) XeF_6 b) NH_3 and c) SF_6
27. Explain Born-Haber cycle and show how it is used to determine the lattice energy of ionic solids
28. Write briefly on
    a) Nuclear reactions induced by charged particles and   rays
    b) Stellar energy

(2 x 12 marks = 24 marks)