BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2024
2023 ADMISSIONS REGULAR
SEMESTER II - CORE COURSE CHEMISTRY
CH2C02B23 - Theoretical and Inorganic Chemistry

Time : 3 Hours   Maximum Marks : 60

Part A

I. Answer any Ten questions. Each question carries 1 marks   **(10x1=10)**

1. Recall the energy of the electron in the ground state of the hydrogen atom.

2. Calculate the de Broglie wavelength of an electron of mass 9.1×10^{-31} kg moving with a velocity 5.9×10^5 m/s.

3. Recall the expression for the energy of electron in the nth orbit of hydrogen

4. Calculate the magnetic moment value of Ti^{3+} and also explain it is diamagnetic or paramagnetic .

5. Represent the electronic configuration of Sc^{3+} ion.

6. Give the structure of $PtCl4$

7. Determine the most polar isomer of 1,2 dibromo ethylene.

8. Select the compound with higher melting point- $CaCl_2$ or NaCl.

9. Recall the rules used to predict the covalent and ionic nature of a bond.

10. Cite the dipole moment of Carbon tetrachloride molecule.

11. Compare the polarising power of Ag^+ with K^+.

12. Define resonance energy.

Part B

II. Answer any Six questions. Each question carries 5 marks   **(6x5=30)**

13. Explain Compton Effect

14. Explain hoe the Sommerfeld's overcome the limitation of Bohr's theory

15. Based on Bohr atom model, construct equations to calculate the radius of orbit and energy of electron in Hydrogen atom

16. Discuss the following characteristics of d block elements: a) metallic character b) density.

17. Describe the different transition series in d block of periodic table.

18. Explain the importance of hydrogen bonding.

19. Compare sigma bonds and pi bonds.

20. With the help of free electron theory explain the electrical properties of solids.

21. Water is a liquid, while ammonia is a gas at room temperature. Review the reason.

Part C

III. Answer any Two questions. Each question carries 10 marks   **(2x10=20)**

22. a) Discuss the atomic and ionic radii of the transition elements. b) Explain the Colour exhibited by various

transition elements.

23. Memorize the preparation, properties, structure and uses of Potassium Dichromate.

24. Predict the stability of following molecules using molecular orbital theory a) Carbon molecule b) Oxygen molecule c) Carbon Monoxide molecule.

25. Enumerate the postulates of VSEPR theory. Using VSEPR theory, identify and explain the shapes of XeF_2 and IF_5.