Reg. No…….. Name…… **19U223**

B. Sc. DEGREE END SEMESTER EXAMINATION - MARCH / APRIL 2019

SEMESTER **– 2: CHEMISTRY (CORE COURSE)**

COURSE: **15U2CRCHE2 – THEORETICAL AND INORGANIC CHEMISTRY - II**

(Common for Regular 2018/Supplementary - Improvement 2017/2016/2015 Admission)

Time: Three Hours Max. Marks: 60

SECTION A

Answer all questions. Each question carries 1 mark

1. In the halogen family …… has the highest electron affinity.
2. The d-block elements are also known as …….. elements.
3. The state of hybridisation of **S** in $\mathbf{SF_6}$ is ……
4. Name a molecule which shows intramolecular hydrogen bonding.
5. The bond order of $\mathbf{He_2}$ molecule is ……
6. Emission of an alpha particle followed by two beta particles produces an --------of the starting atom.
7. In the gravimetric estimation of iron it is precipitated as ……
8. A mixture of two or more volatile liquids can be separated by …….. (1 x 8 = 8)

SECTION B

Answer any Six questions. Each question carries 2 marks

9. Distinguish between the terms *electron affinity* and *electronegativity*.
10. What is ionization enthalpy? How does it vary along a period?
11. Write the Born-Lande equation and explain the terms.
12. Explain electrical conductivity of metals based on band theory.
13. Give the resonance structures of borate ion.
14. What are dipole-induced dipole forces?
15. Explain the terms mass defect and binding energy per nucleon.
16. How is solubility product principle applied in the separation of group II cations and group IV cations. (2 x 6 =12)

SECTION C

Answer any Four questions. Each question carries 5 marks

17. What is effective nuclear charge? Discuss Slater's rules and using this explain why Na^+ ion is smaller than Na atom.
18. Discuss sp^2 and sp^3d hybridisations with suitable examples.
19. Define lattice energy of an ionic compound. Explain how Born-Haber cycle can be applied to determine the lattice energy of NaCl crystal.
20. Discuss the free electron theory of metallic bonding and explain metallic properties based on this theory.
21. Compare the shell model and liquid drop model of the atomic nucleus.
22. Correlate N/P ratio and nuclear stability. (5 x 4 = 20)

SECTION D

Answer any Two questions. Each question carries 10 marks

23. State the postulates of VSEPR Theory. Apply the theory to predict the shapes of NH_3, XeF_2 and ClF_3.
24. Compare the bond length, magnetic behaviour and bond energy of O_2, O_2^+, O_2^{2+}, O_2^- and O_2^{2-} on the basis of the molecular orbital theory.
25. Discuss fission, fusion and spallation reactions of the atomic nucleus.
26. Explain the principle and technique of gas-liquid chromatography. (10 x 2 = 20)

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