

B.Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2020**SEMESTER –2: CHEMISTRY (CRE COURSE)****COURSE: 15U2CRCHE2: THEORETICAL AND INORGANIC CHEMISTRY II***(Common for Improvement 2018/Supplementary 2018 /2017/2016 /2015 Admissions)*

Time: Three Hours

Max Marks: 60

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

1. The most electronegative element is
2. The f-block elements are also called elements.
3. The shape of PCl_5 molecule is
4. The bond order of N_2 molecule is
5. Among B_2 , C_2 and N_2 the paramagnetic species is.....
6. An alpha particle is a nucleus.
7. The precipitant used in the gravimetric estimation of barium is
8. In the gravimetric estimation of iron the precipitated $\text{Fe}(\text{OH})_3$ is converted to by strong heating. (1 x 8 = 8)

SECTION B***Answer any Six questions. Each question carries 2 marks***

9. Using Slater's rules explain why Cl^- ion is larger than Cl atom.
10. What is electron affinity? How does it vary along a period?
11. What is meant by the polarity of a covalent bond? How is it measured?
12. What are intermolecular and intramolecular hydrogen bonding? Give one example each.
13. What are antibonding molecular orbitals?
14. Explain the resonance in nitrate ion.
15. State Geiger – Nuttal rule.
16. What are the stationary and mobile phases in paper chromatography? (2 x 6 = 12)

SECTION C***Answer any Four questions. Each question carries 5 marks***

17. Explain the Pauling and Mulliken scales of electronegativity.
18. State and explain Fajan's rules.
19. Discuss the shapes of XeF_2 and ClF_3 on the basis of VSEPR Theory.
20. Discuss briefly the valence bond theory and band theory of metallic bonding.
21. Explain the liquid drop model and shell model of the atomic nucleus.
22. Write a note on induced radioactivity. (5 x 4 =20)

SECTION D

Answer any Two questions. Each question carries 10 marks

23. What is meant by hybridisation? Discuss sp , sp^2 , sp^3 and sp^3d^2 hybridisations with one example each.
24. a) What are the criteria for the formation of molecular orbitals from atomic orbitals?
b) Explain bonding in O_2 molecule on the basis of MOT.
25. Explain how N/P ratio, packing fraction and binding energy per nucleon are related to nuclear stability.
26. a) Discuss how the principles of solubility product and common ion effect are applied in the separation of cations in qualitative analysis.
b) Suppose you are given a solution containing Cu^{2+} and Zn^{2+} as cations. How will you separate these ions? (10 x 2 = 20)
