22103100

QP CODE: 22103100

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, OCTOBER 2022

Second Semester

Core Course - CH2CRT02 - THEORETICAL AND INORGANIC CHEMISTRY

(Common for B.Sc Chemistry Model I, B.Sc Chemistry Model II Industrial Chemistry, B.Sc Chemistry Model III Petrochemicals)

2017 ADMISSION ONWARDS

16AAC29E

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Who discovered electrons?
2. Which quantum number is responsible for Zeeman effect?
3. Give two examples for molecules that contain lone pair of electrons around the central atom.
4. How would you interpret that all the C-H bonds of methane are identical?
5. Name a molecule which is described as T shape and mention the hybridisation of central atom in it.
6. Does water have zero or non zero dipole moment? Why?
7. Define bond order. Give its significance.
8. Why does p-nitrophenol has high boiling point?
9. What is dipole-dipole interaction? Give an example.
10. Write any one method for the preparation of $KMnO_4$.
11. Give two methods for the separation of Lanthanoid salts.
12. What is Mischmetal?

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Explain why the left hand side of the spectrum of black body radiation is small.

14. Write the significance of **Ψ** and **Ψ^2.**

15. Write a note on Fajans rule and its applications.

16. What is resonance and give its characteristics? Draw the resonating structures of carbonate ion.

17. Draw the MO diagram of NO molecule.

18. What is meant by metallic bond? What are the characteristics of metals? Explain the free electron theory of metals.

19. Germanium, Tin and Lead shows +2 as well as +4 oxidation states. Explain.

20. The complexes of ***3d*** transition series are high spin while those of ***4d*** and ***5d*** series are of low spin type. Explain.

21. Why are **La^{3+}, Ce^{3+}, Yb^{3+}** and **Lu^{3+}** are colourless ions?

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Derive the expression for the frequency of spectral lines of hydrogen atom based on Bohr's theory.

23. Define lattice energy. Derive Born-Lande equation.

24. Draw the MO energy level diagram of N_2 molecule and explain its magnetic behaviour. Calculate the bond order of N_2.

25. What is Lanthanide contraction? Discuss the consequences of the lanthanide contraction.

(2×10=20)