Reg. No. : ....
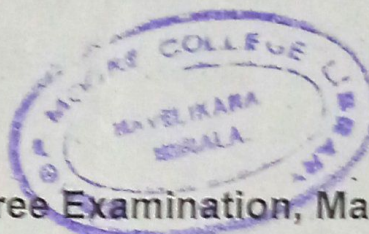
Name : ....

Third Semester B.Sc. Degree Examination, March 2022

First Degree Programme under CBCSS

Chemistry

Core Course II

CH 1341 – INORGANIC CHEMISTRY II

(2013-2016 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Answer **all** questions. Answer in one word to maximum two sentences. **Each** question carries **1** mark)

1. What are isobars?

2. What is the geometry of ClF_3?

3. Define hydration energy.

4. What is the state of hybridisation of the central atom in ClF_5?

5. What is the half-life period of C^{14} isotope?

6. What is the H-O-H bond angle in H_2O ?

7. What happen for the atomic mass of a nuclide when it decays by β-emission?

8. What is the expansion for STM?

9. Give an example for a protic non-aqueous solvent.

10. Give any two applications of atomic absorption spectroscopy.

<div align="right">(10 × 1 = 10 Marks)</div>

SECTION – B

(Short answer type. Answer **any eight** questions. Each question carries **2 marks**)

11. What is binding energy?

12. What is the specialty of Lycurgus cup?

13. What is the relationship between dipole moment and percent ionic character?

14. Explain induced dipole- induced dipole interaction.

15. Explain Geiger- Nuttal rule.

16. What are fullerenes?

17. What will be the effect of intermolecular hydrogen bonding in physical properties of compounds?

18. What are the applications of spectrophotometry?

19. Write the Born-Lande equation and explain the terms.

20. Calculate the bond order of B_2 and O_2^-.

21. What is a polar covalent bond?

22. Distinguish between natural and artificial radioactivity.

<div align="right">(8 × 2 = 16 Marks)</div>

SECTION – C

(Short essay type. Answer **any six** questions. Each question carries **4 marks**)

23. Discuss applications of radioisotope as tracers.

24. Distinguish between levelling solvents and differentiating solvents.

25. Write a note on :

    (a) AFM

    (b) SEM.

26. Explain Fajan's rules.

27. Write a note on instrumentation and applications of DTA.

28. Explain nuclear fusion with a suitable example.

29. Give a comparison of VB and MO theories.

30. What is mass defect? Calculate energy released in the following reaction.

    [Atomic mass (in amu) of U^{235} = 235.044, Ba^{141} = 140.908, Kr^{92} = 91.905 and mass of $_0n^1$ = 1.009]

    $$_{92}U^{235} +_n n^1 \rightarrow_{56} Ba^{141} +_{36} Kr^{92} + 3_0n^1$$

31. Discuss the optical and magnetic properties of nanomaterials.

$$(6 \times 4 = 24 \text{ Marks})$$

SECTION – D

(Answer **any two** questions. Each question carries **15** marks)

32. Discuss

    (a) Born-Haber cycle.

    (b) Hydrogen bonding

33. Discuss the shapes of XeF_4, IF_5, NH_3 and H_3O^+ on the basis of VSEPR theory.

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34. Discuss about the following methods of preparation of nanomaterials.

    (a) Sol-gel method

    (b) Hydrothermal technique.

    (c) High energy ball milling

35. Write a note on :

    (a) Nature and properties of radioactive radiations.

    (b) Rock dating

$(2 \times 15 = 30 \text{ Marks})$

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