K20P 0068

Reg. No. : .....

Name : .....

IV Semester M.Sc. Degree (CBSS – Reg./Suppl./Imp.) Examination, April 2020
(2014 Admission Onwards)
CHEMISTRY
CHE4C.11 : Inorganic Chemistry – III

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **1** mark.

1. Which of the following molecules give rotational spectra ?
   H_2, HCl, CH_3Cl, CH_4 and O_2.
2. Name the reference material used in DTA.
3. Which is stronger base : La $(OH)_3$ or $Lu(OH)_3$? Give reason.
4. What are the components present in monazite ?
5. What are prokaryotic cells ?
6. Give two examples for non essential elements.
7. Give the structures for $Fe_2(CO)_9$ and $Fe(CO)_5$.
8. Calculate the number of metal-metal bonds in $Fe_3(CO)_{12}$. **(8×1=8)**

SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. **Each** question carries **2** marks.

9. What is the principle involved in X-ray diffraction studies on crystals ?
10. Explain the basic difference between infrared and Raman spectroscopy.
11. Describe the principle of photoelectron spectroscopy.

P.T.O.

12. Comment on the oxidation states of lanthanides.

13. How is thorium purified ?

14. What are Ellingham diagrams ? Mention their applications.

15. Explain the role of calcium in biological system.

16. Write briefly on anti arthritis drugs.

17. Explain the role of metal ions in stabilizing the cell membrane.

18. How Grignard's reagent is useful for the synthesis of metal carbonyl ?

19. State and explain EAN rule as applied to metal carbonyls.

20. Explain the structure and bonding in metal dinitrogen complexes. **(8×2=16)**

SECTION – C

Short paragraph questions. Answer **any four** questions. **Each** question carries **3** marks.

21. Comment on the complementary nature of thermogravimetry and differential thermal analysis.

22. How do the electronic spectra of lanthanide complexes differ from those of 3d metal complexes ? Give reasons.

23. Write a note on nitrogen cycle.

24. How infrared spectroscopy can be used to identify terminal and bridging carbonyl groups in metal carbonyls ?

25. Discuss the principle involved in polarography. How this technique can be used in quantitative analysis ?

26. Write a note on the magnetic properties of lanthanides. **(4×3=12)**

SECTION – D

Essays type questions. Answer **four** questions. **Each** question carries **6** marks.

27. A) Discuss the principle involved in Mössbauer spectroscopy. Explain how this technique is useful for the study of spin crossover in iron (II) complexes.

OR

B) Describe the principle of AAS. What are its important applications ? Mention its merits and demerits.

28. A) What is lanthanide contraction ? Discuss its consequences.

OR

B) Give an account of the coordination compounds of lanthanides bringing out their coordination number and stereochemistry.

29. A) Give an account of sodium and potassium transport in biological systems.

OR

B) Describe the structure and functions of haemoglobin and myoglobin. How CO interfere with the functions of haemoglobin ?

30. A) Describe the structure and bonding in transition metal carbonyls.

OR

B) How NO form complexes with transition metals ? Describe the different bonding modes of NO towards a metal ion. How these bonding modes can be distinguished using IR spectroscopy ? **(4×6=24)**

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