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Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, MAY 2018

Fourth Semester

Faculty of Science

Branch III : Chemistry—Pure Chemistry

CH 4E 01—ADVANCED INORGANIC CHEMISTRY

(2012 Admission—Regular)

Time : Three Hours Maximum Weight : 30

Section A

Answer any **ten** *questions.*
Each question carries a weight of 1.

1. What are Smart Nanomaterial ? Illustrate with examples. Explain why they are called smart.
2. Suggest a green method for the synthesis of Nano Gold.
3. Discuss the applications of Nanomaterial in medicinal field.
4. FT-ICR is regarded as an ideal tool for detection and analysis of gas phase clusters. Explain.
5. Explain how Carbon dioxdie and water vapor in the atmosphere increases the temperature of the earth ?
6. Draw the linear combination of a_{1g} and a_{2u} orbitals of cyclopentadiene with Fe^{+2} orbitals.
7. Give the selection rules for electronic transition.
8. The chlorine trifluoride molecule is T shaped. How many absorption peaks are expected for the molecule in its IR spectra.
9. What is self ionization of solvents ? Explain with a suitable example.
10. Describe the process of nitrogen fixation.
11. Calculate the ESR frequency Magnetic field = 25000 Gauss, g = 2 and $\beta = 2.71 \times 10^{-24}\ JT^{-1}$.
12. What are metal complex sensitizers ?
13. How is moisture is expelled from a sample. Explain the difference between essential and nonessential water in a sample.

(10 × 1 = 10)

Turn over

Section B

Answer any **five** *questions.*
Each question carries a weight of 2.

14. What is AFM ? How does it aid in Nano structure determination ?
15. What are quantum dots ? How will you characterize them ? Give their important applications.
16. What is photochemical smog ? How they are formed in the atmosphere ? What are their consequences ?
17. Define g value. What are the factors affecting it ? How it is determination by ESR spectroscopy.
18. Give an account of the photochemcial reactions of Ruthenium complexes.
19. Critically evaluate the role of HF as on aqueous solvent.
20. Expalin the use of IR and Raman spectroscopy in the structure elucidation of complexes.
21. How do the ground F-terms of d^2 and d^8 split in an octahedral field ? Indicate the relative energies of the levels.

(5 × 2 = 10)

Section C

Answer any **two** *questions.*
Each question carries a weight of 5.

22. Explain the principle behind the delivery of drugs using Nano materials ? What are the different types of Nanometerial which can be used as drugs ? How they are produced ?
23. Explain the principle of Mossbauer spectroscopy. How is it helpful in the study of Fe (III) complexes ?
24. Analyze the IR and Raman spectra of BF_3 molecule using group theory.
25. Write briefly on :
    1 Microwave assisted reactions.
    2 Ion exchange capacity of soils.
    3 Application of flures.
    4 The characters of the reducible representation for d orbital wave functions in a square planar field.

(2 × 5 = 10)