

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2016

(CUCSS)

Chemistry

CH 4C 09 – ADVANCED TOPICS IN CHEMISTRY

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A*Answer **all** questions.**Each question carries 1 weightage.*

1. Illustrate the structure of metal-metal triple and quadruple bonded non-carbonyl clusters.
2. Explain **isolobal** analogy.
3. What are higher carbonyl clusters ?
4. Describe **ligand** based β -elimination reactions of **organometallic** compounds.
5. Discuss the catalysts and mechanism of C = C **isomerizations** using **organometallic** catalysts.
6. Explain the water gas shift reaction.
7. What is meant by **QSAR**?
8. Describe the basic structural motif of **penicillins**. Write the structure of a typical penicillin.
9. How can atom economy of a reaction be estimated? How does AE differ from % yield?
10. What is nano CAD?
11. Illustrate the use of nano materials as drug carriers. What are their advantages and disadvantages ?
12. Define the term **nanocomposites**. Using typical examples, highlight their applications.
13. Illustrate with an example a **supramolecular photoreaction**.
14. Discuss the importance of hydrogen bonding in crystal engineering.

(14 x 1 = 14 weightage)

Part B*Answer any **seven** questions.**Each question carries 2 weightage.*

15. Discuss **Wade-Mingos** rules.
16. Explain the details of metal-metal bonding in metal clusters.

Turn over

17. Illustrate with suitable examples, alkene and alkyne insertion reactions of organometallic compounds.
18. Write the mechanism or carbonylation by Collman reagent and exemplify the use of this reaction.
19. Discuss the Fischer Tropsch industrial process. What are the feed stocks and the main constituents in the product mixture? Which catalysts are most commonly used?
20. With examples, illustrate olefin oligo and polymerization reactions catalyzed by organometallics.
21. Describe briefly the principles of green chemistry.
22. Using appropriate examples, illustrate the top-down and bottom-up nano constructions
23. Write a note on nano material based drug delivery. What are its advantages?
24. Describe the preparation and applications of nano composites.

(7 x 2 = 14 weightage)

Part C

Answer any two questions.

Each question carries a weightage of 4.

25. Write the steps in the commercial production of chloramphenicol and phenylbutazone.
26. Which are the alternative energy sources advocated by green chemistry? Illustrate with typical examples. What are their advantages?
27. How can size, structure and properties of nano materials be determined?
28. Write a note on supramolecular chemistry, typical examples of supramolecular assemblies and establish their application in interdisciplinary areas.

(2 x 4 = 8 weightage)