

C 80679

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Name.....

Reg. No.....

**FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, MARCH 2020**

(CUCSS)

Chemistry

CH 4C 13—ADVANCED TOPICS IN CHEMISTRY

Time : Three Hours

Maximum : 36 Weightage

**Part A**

*Answer all questions.*

*Each question carries 1 weightage.*

1. How the properties of nanomaterials differ in macro and microstructures ?
2. Explain briefly the principle of STM.
3. Which are the important criterions to select solvents in microwave induced organic reactions ? Give few examples of solvents.
4. Write down Hartree's and Hartree Fock's proposal for molecular trial wave function.
5. Write down the Z-matrix of formaldehyde.
6. Distinguish between 'preorganization' and 'reorganization' in molecular recognition.
7. Briefly explain major classes of drugs.
8. Differentiate between SAR and QSAR.
9. Explain briefly Haughton's tea bag procedure.
10. Explain precipitation and co-precipitation method for the synthesis of catalysts.
11. What is mercury intrusion method ?
12. Illustrate the principle of solar water heater. What type of materials is used for that ?

(12 × 1 = 12 weightage)

**Part B**

*Answer any eight questions.*

*Each question carries 2 weightage.*

13. Explain briefly the use of nano devices in sensing applications.
14. Discuss briefly the top-down approach in nanosynthesis.

Turn over

15. Do you agree with the statement 'green chemistry helps pollution control'. To what extent ?
16. Differentiate between STO and GTO.
17. Explain in detail the advantages and limitations of using semi empirical and ab initio methods.
18. Outline the synthesis, host guest interaction and application of crown ethers.
19. Exemplify supramolecular devices used for transport processes.
20. List general methods of drug synthesis.
21. Illustrate a radio immunoassay with example.
22. Discuss briefly about combinatorial solid phase synthesis.
23. How can you find out surface area and porosity distribution of a solid catalyst using physical adsorption method ?
24. Explain the fabrication and working of any one CdS based solar cell.

(8 × 2 = 16 weightage)

### Part C

*Answer any two questions.  
Each question carries 4 weightage.*

25. How can you compare the green aldol condensation and Grignard reaction with classical counterpart reactions ?
26. Explain in detail the classification and nomenclature of basis sets. Give an account of the relationship connecting basis set and (a) Computing time ; and (b) Accuracy of a calculation.
27. Discuss the importance of hydrogen bonding in supramolecular chemistry.
28. Exemplify the industrial applications of heterogeneous catalysis.

(2 × 4 = 8 weightage)