C 61872 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2019

(CUCSS—PG)

Chemistry

CH 4C 13—ADVANCED TOPICS IN CHEMISTRY

(2015 Admissions)

Time : Three Hours Maximum : 36 Weightage

Section A

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

1. What is the principle of AFM ?
2. Explain the difference between atom economy and percentage yield of a reaction.
3. What are STOs and GTOs ?
4. Explain a basis set.
5. Illustrate with structure a supramolecular switching device.
6. Explain briefly the term biosensor.
7. Describe the difference between parallel synthesis and combinatorial synthesis.
8. What is the need for tagging during a combinatorial solid phase library synthesis ?
9. Explain the process of energy exchange at a catalyst surface.
10. What is the TPD method used in catalyst characterization ?
11. Explain the difference between conventional and renewable energy sources.
12. How can power be generated from sun light ?

(12 × 1 = 12 weightage)

Section B

Answer any **eight** *questions.*
Each question has weightage 2.

13. What are XPS and DLS ? Explain their uses in nano characterization.
14. Illustrate with typical examples, the use of alternative energy sources in green chemistry reactions.
15. What is a Z matrix ? Construct one for ammonia.

Turn over

16. Describe the pros and cons of semi empirical and ab initio quantum chemical computational methods.
17. Describe the importance of hydrogen bonding in supramolecular assembly.
18. What is the importance of SAR and QSAR in drug design ?
19. What is the Furka's method of pool-and-split combinatorial approach ?
20. Explain the use of solid phase synthesis in combinatorial chemistry. What are the advantages and disadvantages of combinatorial synthesis of an array of molecules ?
21. What are zeolites and mesoporous materials and how can these be obtained ?
22. Write notes on : (i) sol gel method (ii) polymer supported catalysis (iii) catalytic ammonia synthesis and (iv) phase transfer catalysis.
23. What are the dye sensitized solar cells ? Describe their working.
24. Explain solid state junction based solar energy conversion methods and appliances. What are the advantages and disadvantages of these ?

(8 × 2 = 16 weightage)

Section C

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

25. Write an account of the different strategies used for synthesis of nano structures.
26. Describe very briefly the twelve green chemistry principles.
27. Write an account of the design and synthesis of molecular receptors of various structural types.
28. Discuss the different types of immunoassays used in medial diagnosis.

(2 × 4 = 8 weightage)