FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2017

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 quantum-size effect ?

2. Explain what is meant by making a chemical process "greener". Give an example.

3. What is a basis set ?

4. What is meant by semi empirical method in computational chemistry ?

5. What is a co-receptor ?

6. Define the term 'drag action".

7. Describe how multiplication of chemodiversity can be achieved by combinatorial method.

8. Explain the "tea-bag" method of combinatorial synthesis.

9. Define the significance of the structure and nature of surface in catalysis.

10. What is surface acidity of a catalyst ? How can it be measured ?

11. What are the conventional sources of energy ?

12. What is the principle of photovoltaic based energy generation from sunlight ?

$(12 \times 1 = 12$ weightage$)$

Section B

Answer any eight questions.

Each question has weightage 2.

13. Explain top-down and bottom-up approaches in nano construction.

14. Write an account of the use of microwaves to conduct reactions. What are its advantages ?

15. Explain Hartee-Fock SCF method.

Turn over

16. What is a Z-matrix ? Explain it using any *two* of formaldehyde, methanol and ammonia as examples.

17. Write an account of different types of Hydrogen Bonding, based on the HB bond strength.

18. What are the factors that influence the ability of a molecule to be used as a drug ?

19. Describe the mix-and-split approach to combinatorial synthesis. Write an example.

20. Discuss the solid phase organic synthesis with an example. Highlight its advantages.

21. Explain the methods available for the determination of surface area and pore size of catalysts.

22. Describe the application of heterogeneous catalysts in industrial processes.

23. Discuss the use of solar energy as a non-conventional energy source.

24. Describe the major types of solar cells. How do these generate power ?

                                                          (8 × 2 = 16 weightage)

Section C

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

25. Write an account of the microscopic methods used in nanomaterial **characterization**.

26. Briefly explain the major principles that form the basis of green chemistry.

27. Discuss what is meant by self assembly. What are the forces involved in it ? Explain.

28. Write an account of structure activity relationships SAR and its application in drug design.

                                                          (2 × 4 = 8 weightage)