

**SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017**

(CUCBCSS—UG)

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

Time : Three Hours

Maximum : 80 Marks

**Section A (One word)***Answer all questions.**Each question carries 1 mark.*

1. Name an Operating system.
2. State whether true or false. The potential energy of all systems in molecular mechanics is calculated using force fields.
3. Identify the monomers used for the synthesis of nylon 6.
4. Name the major ingredient used as the abrasive in toothpaste.
5. What does FACT stand for ?
6. Name main chemical constituent of soap.
7. Ketoconazole or selenium sulphide present in shampoos act as \_\_\_\_\_.
8. "Higher the Cetane number the more easily the fuel will combust in a compression setting such as a diesel engine". State whether it is true or false.
9. Give an example of an analgesic drug.
10. Which cosmetic item has para-phenylenediamine as a major component ?

(10 × 1 = 10 marks)

**Section B (Short Answers)***Answer any ten questions.**Each question carries 2 marks.*

11. What happens to the melting point when the particle size of a material approaches to the nanoscale ranges ?
12. Write a short note on graphene.
13. Bromoethane(desired product) and hydrogen bromide (waste product) are obtained by the reactants ethane and bromine through a substitution reaction. Calculate the % atom economy for the reaction.
14. What are the advantages of microwave assisted organic synthesis ?

**Turn over**

15. What do you mean by geometry optimization in computational chemistry ?
16. Distinguish between Buna S and Buna N.
17. What are the monomers used for the synthesis of Kevlar. Give the structural formula and its main applications ?
18. Briefly describe various biodegradable polymers available.
19. Which among the following can be naturally produced :
  - (i) PHBV.
  - (ii) PMMA.
  - (iii) PVC.
20. What are the major component present in Potash fertilizer ?
21. What are the main disadvantages of detergents ?
22. Explain the primary and secondary structures of protein.

(10 × 2 = 20 marks)

### Section C (Paragraphs)

*Answer any five questions.  
Each question carries 6 marks.*

23. Discuss the optical properties of nanomaterials.
24. Explain how molecular recognition plays an important role in biological systems ?
25. Identify the basic principles of combinatorial synthesis. How combinatorial synthesis is useful in drug discovery process ?
26. Which are the main types of chemical rocket propellants ? Give examples.
27. How is Portland cement manufactured ?
28. What are refractory materials ?
29. What do you mean by knocking of fuels. Name any *two* antiknock agents used.
30. How is paracetamol synthesized ?

(5 × 6 = 30 marks)

**Section D (Essays)**

*Answer any two questions.*

*Each question carries 10 marks.*

31. (a) Discuss the theories of colour and chemical constitution.  
(b) What are the common methods of preservation of food ?
32. (a) What are the common food adulterants in various food materials like milk, tea, and chilly powder. How the presence of these adulterants are identified.  
(b) Discuss the physical and chemical characteristics of nanomaterial.
33. (a) Which are the basic molecular properties which can be computationally calculated ?  
(b) Write note on :  
(i) Plastic identification codes.  
(ii) Biodegradable polymers.
34. (a) Explain any of the five principles of Green Chemistry.  
(b) Explain insecticides, herbicides, rodenticides and fungicides with suitable examples.

(2 × 10 = 20 marks)