

Time : Three Hours

Maximum : 80 Marks

Section A (One word)

Answer all questions.

Each question carries 1 mark.

1. The abbreviation PMMA stands for _____.
2. Who is credited with establishing the field of Green Chemistry during his time working for the U.S. Environmental Protection Agency as the Chief of the Industrial Chemistry Branch ?
3. A system software that manages computer hardware and software resources and provides common services for computer programs is called as _____.
4. Name the major ingredient used as detergent in toothpaste.
5. Which is the main ore used in the sulphate method of TiO_2 preparation ?
6. Name one refractory boride.
7. Name an antiknock agent used in petroleum industry.
8. What does CNG stand for ?
9. Aspartame is an _____.
10. Name any one of the most common primary surfactants used in modern shampoos.

(10 × 1 = 10 marks)

Section B (Short Answer)

Answer any ten questions.

Each question carries 2 marks.

1. How do physical characteristics of nanomaterials differ from bulk materials ?
2. Quantum dots are examples of zero dimensional nanomaterials. Explain.
3. Explain the phenomenon 'cavitation' associated with sonochemistry.
4. What do you mean by global minimum in computational chemistry ?
5. What are the advantages of Ziegler Natta polymerization ?
6. Why is it that PLA is a biodegradable thermoplastic aliphatic polyester ?
7. What are the major uses of titanium dioxide ?
8. Explain briefly the difference between the generic and trade names of drugs with the help of example.

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19. What is the basic functional use of pasteurization ?
20. Name two commonly used food preservatives.
21. How is cetane number calculated ?
22. What do you mean by sunscreen protection factor (SPF) ?

(10 × 2 = 20 marks)

Section C (Paragraph)

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

23. Distinguish between the “bottom-up” and “top-down” methods of nanoscale synthesis of materials.
24. Explain the green synthesis of Ibuprofen.
25. Which are the four commonly mentioned types of non-covalent interactions ?
26. How ab initio methods differ from semi-empirical methods?
27. Explain the procedure adopted for manufacturing chlorine in TCC Ltd.
28. Explain the chemistry behind the preparation of TiO_2 through the sulphate process.
29. Briefly explain about cryogenic liquid rocket propellants
30. Explain the various pharmacokinetic compartments, ADME, of a drug.

(5 × 6 = 30 marks)

Section D (Essay)

*Answer any two questions.
Each question carries 10 marks.*

31. Write notes on :
 - (i) Rodenticides.
 - (ii) PAN.
 - (iii) Octane number of a fuel.
 - (iv) Health effects of soft drinks.
 - (v) Fullerenes.
32. (a) How soap is functionally and chemically different from detergent ?
(b) Write short note on :
 - (i) Endosulfan.
 - (ii) Nomex.
33. Explain the preparation and uses of Rosaniline and Indigo.
34. Discuss the importance and advantages of :
 - (a) Microwave assisted organic synthesis.
 - (b) Biodegradable polymers.

(2 × 10 = 20 marks)