



BBC-003-1104003

Seat No. _____

M. Sc. (Sem. IV) Examination

June / July - 2021

CPM-403 : Physical Chemistry

(Chemistry of Materials)

Faculty Code : 003

Subject Code : 1104003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Total ten questions, attend 5 only.
(2) Each question carries 14 marks.

- 1** Answer the following : **14**
- (a) Define : Lipophilicity, surface active agent, fuel cells, ultrasonic waves.
 - (b) What is the efficiency of fuel cells ?
 - (c) Give an account of carbon nano tubes.
 - (d) What are the advantages of solar cells ?
 - (e) Give the principle of ultrasonics.
 - (f) Give an account of Gemini surfactant.
 - (g) Discuss methyl alcohol fuel cells.
- 2** Answer the following : **14**
- (a) Define : Solar energy, Nano material, Micelles, Hydrophobicity.
 - (b) What is the environmental effects of solar energy ?
 - (c) Give the various methods used for the synthesis of nano materials.
 - (d) Define surfactants. What are the different components of the typical surfactants, describe with structure.
 - (e) What is Hammet equation ? Give significance of all terms involved in it.
 - (f) What is advantage of fuel cells ?
 - (g) State the factors affecting ultrasonic waves.
- 3** Answer the following : **14**
- (a) Give an account of hydrophobic interactions.
 - (b) Discuss the applications of photovoltaic system.

- 4 Answer the following : 14
(a) Give the co-precipitation method for the synthesis of nanomaterial with suitable examples.
(b) Discuss the general chemistry of fuel cells.
- 5 Answer the following : 14
(a) Give the advantages and disadvantages of QSAR.
(b) What is microemulsion ? Discuss the properties and application of microemulsion.
- 6 Answer the following : 14
(a) Explain :
(i) Advantages and disadvantages of microemulsion.
(ii) Sol-gel method with examples.
(b) Discuss solar technology.
- 7 Answer the following : 14
(a) What is the critical micelle concentration (CMC) ? Explain in detail.
(b) Give the applications of ultrasonics.
- 8 Answer the following : 14
(a) Give an account of packing parameters in micelles.
(b) Explain gas diffusion electrode.
- 9 Answer the following : 14
(a) What are the two models used in thermodynamics of micellization ? Explain any one in detail.
(b) (i) Hydrogen – Oxygen fuel cell.
(ii) Methods used for the characterization of nano materials.
- 10 Answer the following : 14
(a) (i) Explain solar photovoltaic cell.
(ii) Give the classification of micro emulsion.
(b) What are the applications of nano materials in different fields ? Describe in detail.
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