



PAH-003-1104003

Seat No. _____

M. Sc. (Sem. IV) Examination

August – 2020

Physical & Material Chemistry : C(PM)-403

(Chemistry of Materials)

(New Course)

Faculty Code : 003

Subject Code : 1104003

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

[Total Marks : 70

- Instructions :**
- (1) All questions are compulsory.
 - (2) All questions carry equal marks.

1 Answer the following : (Any **Seven**)

- (a) Define : Surface active agents, Fuel cell, Nanomaterials, Lipophilicity.
- (b) How can nanomaterials be detected and analysed?
- (c) What are Ultrasonic waves? Give the advantages of Ultrasonic waves.
- (d) Give an account of Kraft temperature.
- (e) What are the advantages of solar cells?
- (f) Give an account of quantum dots.
- (g) What are the different physicochemical properties, which are important to study QSAR?
- (h) Explain Methyl alcohol fuel cell.
- (i) Define micelle. State the different types of micelles.
- (j) What is Top-bottom approach for the synthesis of nanomaterials? Give the advantages and disadvantages of Top-bottom approach.

2 Answer the following : (Any **Two**)

- (a) What are the factors affecting size, shape and aggregation number of micelles ? Explain in detail.
- (b) Define critical micelle concentration. What are the factors affecting critical micelle concentration ? Explain in detail.
- (c) Discuss Fuel cells with examples.

3 Answer the following :

- (a) Discuss (i) Packing parameters in micelle and (ii) Co-precipitation method with examples.
- (b) What is the full form of QSAR? What are the properties responsible for transport and distribution of drugs in biological systems? Discuss Solubility parameter and capacity factor.

OR

3 Answer the following :

- (a) Discuss solar technology.
- (b) Answer the following:
 - (i) What is the difference between emulsion and microemulsion? Describe in detail.
 - (ii) Carbon nanotubes.

4 Answer the following :

- (a) What are the various acoustical parameters determined by ultrasonic techniques? Give equations for any three along with significance of all the terms involved in equations.
- (b) What is the classification of surfactants? Describe different types in detail with examples.

5 Answer the following : (Any **Two**)

- (a) Give an account of solar photovoltaic cell.
- (b) Define microemulsion? Discuss various types, properties and applications of microemulsion.
- (c) Explain :
 - (i) Effect of Hammett substitution constant on dissociation constants of compounds.
 - (ii) Effect of σ on electron donating and electron accepting nature of compounds.
- (d) Discuss applications of nanomaterials.