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ICH 453

II Semester M.Sc. Degree Examination, September/October 2022
INDUSTRIAL CHEMISTRY
Energy Systems, Colloids and Petrochemicals

Time : 3 Hours

Max. Marks : 70

Instructions : I) Answer Part – **A** and **any five** from Part – **B**.
II) Figures to the **right** indicate **marks**.

PART – A

Answer **any five** questions.

(5×2=10)

1. a) What are batteries ? Give the classification of batteries with an example each.
- b) Mention different chemical energy sources, with example for each.
- c) Write the composition of petroleum.
- d) Explain the term Betz Limit.
- e) Mention different types of cracking. What is petroleum cracking ?
- f) Write differences between gel and emulsion.
- g) What is geothermal energy ? Mention different types of geothermal energy systems.
- h) Mention any four differences between physical and chemical adsorption.

PART – B

Answer **any five** questions.

2. a) Explain the construction, reactions and applications of Methanol Fuel Cell.
- b) Write a short note on Alkaline MnO_2 batteries.
- c) Explain the characteristics for batteries.

(6+4+2)

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3. a) Write a short note on lithium based conducting polymer battery.
b) Discuss the construction, working and advantages of Lead-acid battery. **(6+6)**
 4. a) Explain the principles of ocean thermal energy conversion system.
b) Discuss the physicochemical characteristics of biomass. **(6+6)**
 5. a) Explain the principle and working of solar cells.
b) Explain the process of photo reduction of CO_2 and photoelectrochemical waste removal. **(6+6)**
 6. a) How do we determine the particle size of colloids ? Explain any two methods in brief.
b) Mention different types of electrophoresis. Explain method of separation of protein by gel-electrophoresis. **(6+6)**
 7. a) Explain different types of catalysis along with their industrial applications.
b) Write a note on Gibbs adsorption isotherm. Explain any two applications of adsorption. **(6+6)**
 8. a) Explain the caustic washing and Merox process.
b) What is catalytic reforming process ? Explain the process with the help of a diagram and write the reactions involved. **(6+6)**
 9. a) Explain the Bergius process for the production of synthetic petrol.
b) Discuss Fischer-Tropsch Method for petroleum cracking.
c) Explain the process of hydrocracking **(4+4+4)**
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