Reg. No. | | | | | | | | | |

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)**