Total No. of Printed Pages : 2
Total No. of Questions : 9

ICH 453

Sl.No. : 0030

II Semester M.Sc. Degree Examination, May 2018
(CBCS Pattern/ Revised Syllabus)
INDUSTRIAL CHEMISTRY
Energy Systems, Colloids and Petrochemicals

Time : 3 Hours **Max. Marks : 70**

Instructions: *1) Answer any five questions from Part - A and any five questions from Part - B.*
2) Figures to the right indicate marks.

PART - A

Q1) Answer any five questions. **(5 × 2 = 10)**

a) What are breeder reactors?

b) Why efficiency of Zn-MnO_2 battery drops rapidly upon use?

c) 'Water content maintenance plays crucial role in polymer electrolyte fuel cell' Justify the statement.

d) How do you distinguish between photoelectrochemical and photogalvanic cells?

e) List the merits of hydrogen fuel.

f) Mention the salient features of Langmuir adsorption isotherm.

g) What is power alcohol?

h) Write the schematic representation of Bergius process.

PART - B

Q2) a) Write a note on the advantages and disadvantages of coal energy source.

b) Discuss about the following characteristics of a battery.

i) Voltage

ii) Energy efficiency

c) Illustrate with neat diagram the construction, working and applications of Ni - Cd battery.

(3+4+5)

Q3) a) Explain construction, working and application of lead - acid battery.

b) What are Fuel Cells? Give the construction, working features of H_2 - O_2 fuel cell.

c) Discuss the working principle of Li - ion batteries.

(4+4+4)

Q4) a) How photovoltaic cell converts solar energy into electricity. Explain with a diagram.

b) Discuss about the interaction at semiconductor - electrolyte interface in PEC cell.

(6+6)

Q5) a) Explain the process of photocatalysis of water to obtain hydrogen.

b) Write a note on artificial photosynthesis.

c) Discuss working principle geothermal energy systems.

(4+4+4)

Q6) a) How is particle size of colloids determined? Explain any two methods.

b) What are the applications of Donnan membrane equilibrium?

c) Derive an expression for membrane potential.

(4+4+4)

Q7) a) Derive an equation for Gibbs adsorption isotherm.

b) Explain the method of cellulose acetate electrophoresis.

(6+6)

Q8) a) What is cracking of petroleum? Explain the fluidized catalytic cracking process.

b) What is synthetic petrol? Mention different methods of its production.

c) Discuss about the finishing process of petroleum treatment.

(4+4+4)

Q9) a) What is reforming of petroleum? Give three reactions involved in its mechanism.

b) Illustrate Fischer - Tropsch process.

(6+6)