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CC184

M.Tech. EXAMINATION, May 2019

(Third Semester)

(B. Scheme) (Re-appear)

(CHE)

CHE653B

FUEL CELL TECHNOLOGIES

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Discuss the working of fuel cell and the advantages and disadvantages of this technology. **15**

2. How the following parameters effect thermodynamically predicted voltage ? Derive the relation :

(a) Temperature

(b) Pressure

(c) Concentration. **15**

Unit II

3. Differentiate the process of ionic conduction among aqueous electrolytes, polymer electrolytes, and ceramic electrolytes. **15**

4. Comment on the following :

(a) Characteristics of fuel cell resistances **9**

(b) Ionic (electrolyte) resistance dominantes over electronic resistance. **6**

Unit III

5. Show how concentration affects Nernst voltage and Reaction rate. **15**

6. How the convection governs fluids transport in flow structures of fuel cells ? **15**

Unit IV

7. (a) How cyclic voltammetry helps in the prediction of fueld cell performance ? **5**

(b) Write short notes on the following techniques :

(i) BET surface area determination

(ii) Gas permeability. **5×2**

8. Discuss in detail, specifying the assumptions made to develop one dimensional fuel cell model. **15**