MODEL QUESTION PAPER
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
(2013 Scheme)
13.705.2 (Elective III): FUEL CELL TECHNOLOGY (H)

Time: **3 Hrs** Max. Marks: **100**

Part A

*Answer **all** questions. Each question carries **2** marks.*

1. Write a note on ideal and real efficiencies of fuel cell.
2. Discuss the relation between activation energy and reaction rate.
3. What are the major requirements for a candidate fuel cell electrolyte?
4. Discuss the various methods to improve the kinetic performance of a fuel cell.
5. List the important qualities required for an effective fuel cell catalyst material.
6. List two major advantages and two major disadvantages of fuel cells compared to other power conversion devices.
7. Explain the four major steps in the generation of electricity within a fuel cell.
8. Write a note on stack clamping.
9. List the technologies for hydrogen storage.
10. Write the cell reaction of alkaline fuel cell. (10x2=20 Marks)

Part B

*Answer **one full** question from each module. Each full question carries **20** marks*

MODULE - I

11 Derive expressions for temperature dependence of the reversible voltage obtained from a fuel cell. (20 Marks)

12. Derive Nernst equation for a general chemical reaction:

$n\,e^-_A + lA + bB \leftrightarrow mM + nN + ne^-_{Cs}$ (20 Marks)

MODULE - II

13. Explain the following: i) Galvani Potential ii) Butler Volmer Equation iii) Tafel Equation (20 Marks)

14. Write a note on the characteristics of fuel cell charge transport resistance (20 Marks)

MODULE - III

15. Discuss the principle and working of PEM Fuel Cell (20 Marks)

16. Explain the design of a fuel cell stack (20 Marks)

MODULE – IV

17. Discuss the configuration of fuel cell systems with fuel processors. (20 Marks)

18. Discuss the technologies for hydrogen production (20 Marks)