8. What is fuel cell ? Give the working principle of fuel cell. How the fuel cell can be modeled mathematically ? Explain the mathematical model. **15**

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M. Tech. EXAMINATION, Dec. 2018

(Third Semester)

(B. Scheme) (Main & Re-appear)

EE(PS)

MPS605B

SMART GRID

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 Section. All questions carry equal marks.

Unit I

1. (a) Define smart grid. Why do we need smart grid ? What are the advantages of the smart grid ?

(b) What are the components of the smart grid ? Show the components using the block diagram. Explain the functions of each component. **15**

2. (a) Give the smart grid control architecture. Represent both the hardware and software architecture.

(b) Discuss PLCs' verses RTUs. Give RTU clock diagram. Expalin its working. **15**

Unit II

3. (a) What are the smart grid threats ? Discuss the cyber security strategies to avoid the smart grid threads.

(b) What is false data injection in the smart grid ? Explain about the attacks in Electric Grid Cyber Physical system security. **15**

4. Give the architecture of cyber security management of electric power grids. Explain with block diagram the functions of the different components. **15**

Unit III

5. Define energy management system. What are the functions of energy management system ? Show the EMS with block diagram and explain the functions of the each components. **15**

6. Why demand side management has gained importance in the smart grid ? What are the functions of the demand side management ? What methods are adopted for the demand side management ? **15**

Unit IV

7. What is distributed generation ? Why it has gained importance ? What are the distributed generation sources ? What are the advantages of DGs ? **15**