Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE701

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech I Semester End Examinations (Supplementary) - July, 2017

Regulation: IARE–R16

RENEWABLE ENERGY SYSTEMS
(Common to ES|(CAD/CAM)|STE)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Classify the various configurations of solar cells and explain PIN solar cell with neat sketch. **[7M]**
   (b) Explain characteristics of photo current and derive the expression for total current of solar cell. **[7M]**

2. (a) Describe various physical properties and application of superconducting materials in electrical systems. **[8M]**
   (b) A 2cm × 2cm × 0.05mm solar cell has the I-V characteristic with approximate short circuit current of 0.166 A and open circuit voltage of 0.6V. The I-V characteristic is constant at 0.166A up to 0.5V. Calculate the fill factor, assuming solar radiation to occur at the intersection of the two straight lines. **[6M]**

UNIT – II

3. (a) What are the classifications of MHD systems? Describe any one of the MHD system with neat sketch? **[7M]**
   (b) What are the important factors to be considered while selecting materials for MHD generator. **[7M]**

4. (a) With the help of neat sketch, discuss different types of rotors used in wind turbines. **[9M]**
   (b) Calculate the maximum power output of a 15m diameter wind turbine at one atmospheric pressure and wind speed of 12m/s. **[5M]**

UNIT – III

5. (a) Explain with neat sketch, the single basin double effect tidal power plant. **[8M]**
   (b) Illustrate the merits and demerits of tidal power. **[6M]**

6. (a) Describe with block diagram of wave energy conversion system and vertex motion of wave. **[8M]**
   (b) Explain working principle of open cycle OTEC system and its applications. **[6M]**

UNIT – IV

7. (a) Describe with block diagram, "coal liquefaction process". **[7M]**
   (b) Discuss the thermo chemical conversion and ethanol production from biomass. **[7M]**

8. (a) Discuss geothermal power generation using binary cycle. **[7M]**
   (b) Describe thermo electric energy conversion. **[7M]**

UNIT – V

9. (a) Give a complete description of the working and constructional features of a Phosphoric Acid fuel cell. **[7M]**
   (b) Distinguish between battery and fuel cell. **[7M]**

10. (a) What is the principle of battery and classify various barriers briefly. **[7M]**
    (b) Describe the construction and reaction taking place in a lead acid storage battery during charge and discharge. **[7M]**

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