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

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech I Semester End Examinations (Regular) - January, 2018

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) Describe with neat sketch various solar cell configurations. **[7M]**
   (b) At 300K in silicon, the intrinsic carrier concentration is $n_i = 1.45 \times 10^{16}/m^3$ the impurity charge carrier concentration are $N_D = N_A = 10^5 n_i$. Estimate **[7M]**
      i. the barrier voltage
      ii. the barrier width
      iii. the maximum electric field across the barrier.
      $\left[K = 8.6174eV/K, q = 1.6022 \times 10^{-19}Coul, \varepsilon_o = 8.842 \times 10^{-12}F/m, \varepsilon_r = 12 foeSi\right]$
2. (a) List out the test specifications for PV systems and its purpose. **[7M]**
   (b) Explain the term fill factor and its importance as a performance parameter for a solar cell. **[7M]**

UNIT – II

3. (a) Discuss the principle and procedure of Magneto Hydro Dynamic (MHD) power generation. **[7M]**
   (b) What are important factors to be considered while selecting materials for a MHD generator. **[7M]**
4. (a) Derive an expression for energy that can be extracted from wind. **[7M]**
   (b) Write the advantages and disadvantages of wind energy conversion systems. **[7M]**

UNIT – III

5. (a) Explain with a neat sketch creation of spring and neap tides. **[7M]**
   (b) What are the important components of a tidal power plant? Explain each. **[7M]**
6. (a) Write a short note on wave energy conversion and factors affecting the wave energy. **[7M]**
   (b) Describe the closed cycle Ocean Thermal Energy Conversion(OTEC) system and mention its advantages and limitations. **[7M]**

UNIT – IV

7. (a) Describe with block diagram Lurgi coal gasification process. **[7M]**
   (b) Discuss a geothermal power plant using single flash system. **[7M]**
8. (a) Explain combined cycle co generation with neat sketch. **[7M]**
   (b) Explain anaerobic digestors for biomass energy conversion system. **[7M]**

UNIT – V

9. (a) Give a complete description of the working and constructional features of a hydrogen-oxygen fuel cell. **[7M]**
   (b) List types of fuel cells. Illustrate advantages and applications of fuel cells. **[7M]**
10. (a) What is the principle of battery and explain secondary battery system. **[7M]**
    (b) Write a short notes on types of batteries and applications for large power. **[7M]**