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RN-8199

B. E. II (Sem. IV) (GTU) Examination

May / June – 2010

Energy Systems

(Elective - I)

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 2 (Sem. 4) (GTU)**

Name of the Subject :

☛ **Energy Systems (Elective - 1)**

☛Subject Code No. : **8 1 9 9** ☛Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to the **right** indicate full marks.

SECTION - I

1 Answer in one or **two** sentences :

(a) Define declination angle and state is range. **2**

(b) Classify the winds as per the factors that give rise to it. **1**

(c) Define concentration ratio. **1**

(d) List the various types of concentrating solar collectors. **2**

(e) List the factors on which the output of wind turbine depends. **2**

(f) List the name of different types of solar collectors. **2**

2 (a) Explain the solar (radiation) spectrum. **6**

(b) List the advantages of solar drying. **4**

3 (a) Distinguish between concentrating type and non-concentrating type solar collectors. **7**

(b) What is hybrid system ? Discuss the operation of independent wind-diesel hybrid energy system. **8**

OR

3 (a) Prove that the maximum efficiency of a wind energy system is 59.26%. **8**

(b) Discuss the various components and their functions of a grid-connected wind energy systems. **7**

4 (a) What is solar drying ? Write a brief note on any one forced convection solar dryer. 8

(b) Write a brief note on the optical characteristics of the absorber and the cover for the flat plate collectors. 7

OR

4 (a) Write a brief note on different components of solar radiation and hence, explain the radiation balance in detail. 8

(b) Explain the I-V and P-V characteristics of photovoltaic cell. 7

SECTION – II

5 Do as directed : **20**

(1) What is metallurgical limit in steam power plant ? **2**

(2) For low head _____ or _____ turbine is used. **2**

(3) Define specific speed and its relevant terms. **2**

(4) Write the function of penstock in Hydro power plant. **2**

(5) Write the function of surge tank in Hydro power plant. **2**

(6) How fuel cell based generation is different from traditional generation ? **2**

(7) What is Pulverization ? Write its advantages in thermal power plant. **2**

(8) Write requirements of Electrolyte/Membrane in fuel cell. **2**

(9) Draw a schematic of typical fuel cell showing all of its components clearly. **2**

(10) List down four advantages of using Bio-fuel. **2**

6 (a) Classify Hydro power plants in all aspects. 7

(b) List down at least four important advantages and disadvantages of nuclear power plant. 8

OR

6 (a) List down important four advantages and four disadvantages of steam power plant. 7

(b) Explain the working of diesel engine in terms of different strokes in diesel based power plant. 8

7 Attempt any **three** : **15**

(1) Draw schematic and explain fuel preparation system and its different components.

(2) Write a short note on super-heater.

(3) What is dam ? List and explain at least **three**.

(4) Write short note on fluidized based firing system.

(5) Draw polarization curve of fuel cell and explain its different regions.
