Total No. of Questions :8] *[Total No. of Printed Pages :3*

Roll No .....

MEPE - 301(C)

M.E./M.Tech., III Semester

Examination, June 2016

Non Conventional Energy Sources And Energy Converters (Elective-I)

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions out of eight. All questions carry equal marks. Draw neat diagrams wherever required.

1. a) What is meant by Renewable energy sources? Explain in brief these energy sources with special reference to Indian context.

   b) What are Primary and Secondary energy sources? Give the conclusion on alternate energy strategies.

2. a) What is meant by 'energy plantation'? What are its advantages and disadvantages?

   b) A propeller type wind turbine has following data :

   Speed of free wind at a height of the 10m = 12m/s

   Air density = 1.226kg/m^3, $\alpha = 0.14°$

   Height of tower = 100m

   Diameter of rotor = 80m

   Wind velocity at the turbine reduces by 20%

   Generator efficiency = 85%

Find :

i) Total power available in wind

ii) Power extracted by the turbine

iii) Electrical power generated

iv) Axial thrust on the turbine

3. a) Compare the characteristics of synchronous generator and induction generator.

b) What are hybrid energy systems? State its various possible combinations.

4. a) Discuss different energy measurement techniques used in practice.

b) Describe and explain the characteristics of energy efficient motors.

5. a) What are the different types of energy converters? Discuss briefly and also give comment for futuristic system in this area.

b) Describe in detail the function of mini-hydro generators.

6. a) Discuss some energy conversion techniques in electrical pumps and air-conditioners.

b) What is a community biogas plant? What are the main problems encountered in its operation? What are the techniques suggested for maintaining the biogas production?

7. a) With the help of a neat sketch describe a solar heating system using air heating solar collectors, with advantages and disadvantages of the system.

b) Compare the characteristics of synchronous generator and induction generator.

8. a) Write short notes on :

i) Biomass conversion

ii) Wind-hydro biomass system

b) Compare biochemical chemical and thermo-chemical routes of biomass conversion.

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