Total No. of Questions :8] *[Total No. of Printed Pages :2*

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MMTP-302(B)

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

Examination, June 2016

Non Conventional Energy Sources (Elective-II)

Time : Three Hours

Maximum Marks: 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Differentiate between :
   i) Primary and Secondary Energy
   ii) Commercial and Non-commercial Energy
   iii) Conventional and Renewable Energy
   b) Write a detailed note on world's production and reserves of commercial energy sources.

2. a) State types of solar radiation. How radiations can be measured? Explain the working principle of any one instrument used for solar radiation measurement.
   b) State the working principle of solar flat plate collectors. Name various solar flat plate and concentrators.

3. a) Draw a component layout of WECS and state the function of each element.
   b) Define the following terms related to wind turbine :
   i) Power curve of wind turbine
   ii) Capacity factor and
   iii) Wind rose

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4. a) Explain briefly the commercial production of ethanol from biomass.
   b) Explain the process of gasification of solid biofuels. What is the general composition of the gas produced and what are its main applications?

5. a) Define half-life, mean life and decay constant. State their significance in nuclear energy. The half-life of a radioactive element is 3.82 days, find its decay constant. What percentage of radioactive atoms originally present will decay in 30 days?
   b) Draw a neat diagram of breeder reactor and list out its advantages and disadvantages. Why only sodium is used as coolant in breeder reactors?

6. a) Explain working of an open cycle Magneto-Hydro Dynamic (MHD) generator with the help of a neat diagram.
   b) What is a fuel cell? Explain the working of a Hydrogen-Oxygen fuel cell with the help of a neat diagram.

7. a) What is Michaelis-Menten equation? Explain how Michaelis-Menten equation can be derived for enzymatic kinetics from first principles.
   b) Discuss the Monod equation for the growth of micro organisms.

8. Write short notes on any three of the following :
   a) Energy security
   b) Solar photovoltaic cell
   c) Ocean thermal energy conversion
   d) Nuclear waste and its disposal
   e) Geothermal power plants

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