Code: 15A03606

R15

B.Tech III Year II Semester (R15) Supplementary Examinations December/January 2018/19

NON CONVENTIONAL SOURCE OF ENERGY

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define solar constant.
(b) Define attitude angle and hour angle.
(c) Write the function of absorber and glass cover in a flat plate solar collector.
(d) Write the advantages of concentric solar collectors over flat plate solar collectors.
(e) Write any four important applications of solar energy.
(f) Write basic function of yaw control in a horizontal wind mill.
(g) What are the basic differences between pyrolysis and liquefaction?
(h) Write the basic components in a geothermal conversion system.
(i) What is peltier effect?
(j) Write components in a single basin tidal power plant.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 What are the different renewable energy sources? Write the advantages and limitations of renewable energy sources compared to non-renewable energy sources.

OR

3 Calculate the angle made by beam radiation with the normal to a flat plate collector on November 25 at 9.00 am solar time for a location at $27° 25' N$. The collector is tilted at an angle of latitude plus $12°$ with the horizontal and pointing due to South.

UNIT – II

4 Explain the working of a solar flat plate collector with a neat diagram. Write the function of its various components.

OR

5 What are the different focusing type concentrating solar collectors? With a neat diagram, explain the working of a Fresnel lens collector.

UNIT – III

6 What are the main components of a PV power generation system? Write and explain the basic principle of PV cell.

OR

7 Wind at 1 standard atmospheric pressure and $16℃$ temperature has a velocity of 12 m/s. The turbine has a diameter of 125 m and is operating at a speed of 45 rpm at maximum efficiency. Calculate: (i) The total power density in the wind stream. (ii) The maximum obtainable power density using $\eta = 40\%$. (iii) The total power produced in kW. (iv) The torque and the axial thrust.

UNIT – IV

8 Explain the working of a floating drum bio-gas generation plant with a neat sketch.

OR

9 Explain the working of a binary-fluid gas thermal power system with a neat flow diagram.

UNIT – V

10 Describe the Closed Cycle OTEC system. Write its advantages over open cycle system.

OR

11 Discuss the principle of MHD power generation system with a neat sketch. Write the advantages and limitations of MHD closed cycle system.

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