

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 91602

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Sixth Semester

Mechanical Engineering

ME 2023/ME 603/10122 MEE 14 — RENEWABLE SOURCES OF ENERGY

(Regulation 2008/2010)

(Common to PTME 2023 – Renewable Sources of Energy for B.E. (Part-Time)
Sixth Semester – Mechanical Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Use of standard charts and tables are allowed.

Any missing data can be suitably assumed.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Zenith angle.
2. List out the applications of solar ponds.
3. Define : Furling wind velocity.
4. What do you mean power co-efficient?
5. Define : Photosynthesis.
6. Write down the raw materials for Bio gas.
7. Give a classification of small hydro power plants.
8. List out the limitations of OTEC power plants.
9. Explain how solar energy can be stored.
10. Define Zero energy building.

PART B — (5 × 16 = 80 marks)

11. (a) A flat plate collector is working under the following conditions :
- (i) The intensity of solar radiation on the collector surface = 760 W/m^2
 - (ii) Inlet temperature of fluid = 43°C
 - (iii) Ambient temperature = 26°C
 - (iv) Effective optical efficiency = 0.82
 - (v) Effective heat loss coefficient = $4.1 \text{ W/m}^2\text{-K}$
 - (vi) Mass flow rate of water = 0.017 kg/s/m^2
 - (vii) C_p for water = 4187 J/kg-K .
- Calculate outlet temperature of water, stagnation temperature and useful heat output.

Or

- (b) Describe the principle of solar PV cells with neat sketch. List out some applications.
12. (a) Explain the following :
- (i) Forces acting on the blades of a wind turbine. (8)
 - (ii) Power coefficients of windmills. (8)

Or

- (b) Discuss wind characteristics. How these characteristics are used for the following :
- (i) Site selection (5)
 - (ii) Selection of type of wind rotor (5)
 - (iii) Performance analysis of wind power plant. (6)
13. (a) (i) What are the factors that affect the generation of Bio-gas? (10)
- (ii) Compare the fixed dome and movable drum type bio gas plant. (6)

Or

- (b) (i) What are bio-fuel? Explain with a neat sketch of manufacture of methanol. (10)
- (ii) What is bio mass gasification technology? List out its applications. (6)

14. (a) Classify Tidal power plant. Explain with a neat sketch of any one type. List out its advantage and limitations.

Or

- (b) (i) Discuss various types of liquid dominated geothermal power plant. (10)
- (ii) Explain the difference between a geothermal power plant and thermal power plant. (6)
15. (a) Write a short notes on :
- (i) Electromagnetic energy store (5)
- (ii) Thermal energy store (5)
- (iii) Compressed air storage. (6)

Or

- (b) What is fuel cell? Describe the principle of working Proton Exchange membrane fuel cell. List out its advantages.
-