

GANPAT UNIVERSITY**B. Tech. Semester: VIII (Mechanical Engineering)****Regular Examination April – June 2015****Alternative Energy Sources (2ME801)****Time: 3 Hours****Total Marks: 70**

- Instruction:** (1) Use of Scientific calculator is permitted.
 (2) Assume suitable data if necessary.

Section - I**Que. – 1**

- (a) What is meant by renewable energy sources? What are the prospects of non-conventional energy sources in India? (6)
- (b) Define following terms with necessary figure. (6)
- | | |
|-------------------------------|---------------------------|
| (1) Sunrise/Sunset hour angle | (2) Solar tilt angle |
| (3) Solar altitude angle | (4) Declination Angle |
| (5) Day length | (6) Surface azimuth angle |

OR**Que. – 1**

- (a) Define: “Energy Management”. Write note on “Energy Audit”. (6)
- (b) Calculate number of daylight hours at Mehsana on Dec 21st and June 21st in year 2015. (6)

Que. – 2

- (a) Write name of solar radiation measuring instruments. Explain sun shine recorder with figure. (6)
- (b) List different types of concentrating collectors. Explain any one with figure. (5)

OR**Que. – 2**

- (a) What are the main components of a flat plate collector? Explain ‘Solar Water Heating System’ with neat sketch. (6)
- (b) What is the principle of solar photovoltaic power generation? State the advantages and disadvantages of photovoltaic system. (5)

Que. – 3 Explain any **three** of the following short notes. (12)

- (a) Working of Domestic Solar Cooker (Box Type)
- (b) Working of Solar Pond.
- (c) Working of a continuous Solar Cooling System.
- (d) Magnus effect.

Section – II**Que. – 4**

- (a) Classify the Wind Mills and explain Horizontal Axis Wind Mill. (6)
- (b) Classify Biogas plant. Explain KVIC digester with a neat sketch (6)

OR

- Que. - 4 (a) The following data refer to a wind mill of a wind farm in Gujarat. (6)
Average wind speed = 23.5 km/hr
Atmospheric pressure = 1.01 bar
Atmospheric temperature = 30 °C
Power coefficient = 0.41
Total power output capacity of wind farm = 1 MW
Determine,
(1) Available power density of wind.
(2) Actual power density of wind mill.
(3) Number of wind mills in the farm if the rotor diameter is 25 m.
- (b) Explain with sketch the various methods of tidal power generation. What are the limitations of each method? (6)
- Que. - 5 (a) Discuss open cycle OTEC system with the help of a neat diagram. (5)
(b) Define Fuel cell and state the advantages of Fuel cell over conventional power plants. (6)
- Que. - 5 (a) Write scope for Geothermal plant in India and discuss dry steam type Geothermal power plant. (5)
(b) Describe an MHD open cycle system. What are the main advantages of an MHD power generation? (6)
- Que. - 6 Explain any **three** of the following short notes. (12)
(a) Devious rotor.
(b) Factors which affect the Biogas Production in detail.
(c) Advantages and Disadvantages of Wave Energy.
(d) Savonius Rotor.

END OF PAPER