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Total Number of Pages: 02

**B.TECH**  
**PEME5308**

**Sixth Semester Examination – 2017**

**NONCONVENTIONAL ENERGY SOURCES**  
**BRANCH: MECHANICAL**

**Time: 3 Hours**

**Max marks: 70**  
**Q.CODE: Z290**

**Answer Question No.1 which is compulsory and any five from the rest.**

**The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)
- a) What is solar time? How is it different from LAT?
  - b) Differentiate between solar azimuth angle and surface azimuth angle.
  - c) Calculate the number of daylight hours in Bhubaneswar on May 2<sup>nd</sup> 2017.
  - d) Why a tall tower is essential for mounting a horizontal axis wind turbine ?
  - e) What is meant by pitch angle in wind energy system?
  - f) What do you mean by hybrid systems? Why is this necessary?
  - g) Draw the I-V characteristics of a solar cell.
  - h) Draw a geothermal power plant..
  - i) What are the spring and neap tides?
  - j) Mention four factors affecting biogas generation.
- Q2 a) Differentiate between renewable and non-reneable sources of energy. (5)
- b) Explain any one type of solar radiation measuring instrument with neat diagram. (5)
- Q3 a) With a skectch, explain the working of a solar air heater.. (6)
- b) Witha skectch, write working of a flat plate solar collector. (4)
- Q4 What do you understand by concentrating solar collector? Explain two types of conectrating solar collectors used with neat sketch. (10)
- Q5 a) Explain the principle of building integrated PV system with suitable sketch. (5)

- b) Explain the equivalent circuit for solar PV panel. (5)
- Q6 a) Differentiate between horizontal and vertical axis wind turbines with neat sketch of both. (5)
- b) Write short notes on Fuel cell. (5)
- Q7 a) Explain with neat sketches, the operation of a OTEC system. (5)
- b) Briefly describe Bio energy production from agriculture waste (5)
- Q8 Write short notes on (any two) (5+5)
- a) Prospects of renewable energy sources in India.
- b) Wave and Tidal energy
- c) Kyoto protocol