**R13**

**Code No: 118EE**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year II Semester Examinations, May - 2017**
**RENEWABLE ENERGY SOURCES**
**(Common to ME, AME)**

**Time: 3 hours** **Max. Marks: 75**

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

## PART - A

**(25 Marks)**

1.a) Define altitude angle, zenith angle and Azimuth angle. [2]
b) Why do use pyranometer and its uses? [3]
c) Explain electro magnetic energy storage method. [2]
d) What is meant by solar green house? [3]
e) What the significance of strip chart and magnetic tap. [2]
f) Explain what is meant by tip speed ratio. [3]
g) Draw the hydrothermal convective region. [2]
h) What is meant by Bio fouling. [3]
i) What are the Limitations of Carnot cycle in DEC? [2]
j) Explain the concept of see beck effect. [3]

## PART - B

**(50 Marks)**

2.a) What are the reasons for variation in solar radiation reaching the earth than received at the onside of the atmosphere?
b) Calculate the angle made by the beam radiation with normal to a flat plate collector, pointing due south located New Delhi ($28^0$ 38′N, $77^0$ 17’E) at 9:00 hr, solar time on December 1. The collector is tilted at an angle of $36^0$ with the horizontal. [5+5]

OR

3.a) How do you calculate solar radiation on tilted surfaces?
b) List out the steps involved in the calculation of local solar time and day length and give needed formulae. [5+5]

4.a) Derive the equation for solar energy balance equation and collector efficiency their advantages and limitations.
b) Enumerate different types of concentrating collectors and also list out advantages and limitations. [5+5]

OR

5.a) Describe the layout and working of a continuous solar cooling system.
b) Explain the principle of solar photovoltaic power generation. [5+5]

6.a) Explain the advantages and limitations of wind energy conversion systems.
b) Derive the expression for power developed due to wind. [5+5]

OR

7.a) Compare and contrast the biomass and biogass.
b) What is a community biogas plant? Explain the problems encountered in it.[5+5]

8.a) With line diagram, explain the heat extraction from hot dry rocks.
b) What are the possible sources of geothermal pollution? How to avoid them?[5+5]

OR

9.a) Draw the line diagram and explain the working of hybrid OTEC cycle.
b) Explain the working of single basin tidal power plant. [5+5]

10.a) Explain the concept of joule Thompson effect and its applications.
b) Explain the working details of MHD accelerator. [5+5]

OR

11.a) Draw the line diagram and explain the working of hydrogen fuel cell.
b) What is meant by Electron gas dynamic conversion and where do you use this principle. [5+5]

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