

**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 ( $28^{\circ} 38'N$ ,  $77^{\circ} 17'E$ ) at 9:00 hr, solar time on December 1. The collector is tilted at an angle of  $36^{\circ}$  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 biogas.
- 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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