

Code No: 158DR

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year II Semester Examinations, September - 2022****NON-CONVENTIONAL SOURCES OF ENERGY****(Common to CE, EEE, ECE, CSE, IT, PTM)****Time: 3 Hours****Max.Marks:75****Answer any five questions****All questions carry equal marks**

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- 1.a) What are the reasons for variation in solar radiation reaching the earth than received at the outside of the atmosphere?  
b) Calculate the angle made by the beam radiation with the normal to a flat plate collector, pointing due south located in New Delhi ( $28^{\circ}38'$ North,  $77^{\circ}17'$ East) at 9:00 hour, solar time on December 1<sup>st</sup>. The collector is tilted at angle of  $36^{\circ}$  with the horizontal. [7+8]
- 2.a) Define the terms: Solar constant, Latitude angle, and Incident angle.  
b) List out the advantages of flat plate collectors. [7+8]
- 3.a) Classify the methods of solar energy storage. Describe thermal energy storage systems.  
b) Describe a passive solar space heating system. [7+8]
- 4.a) Briefly explain about sensible heat and latent heat storage techniques.  
b) Write a short note on Betz criteria and explain how it is relevant to power generation.[7+8]
- 5.a) What are the techniques suggested for maintaining the biogas production? Briefly explain any one technique.  
b) What are the merits and demerits of floating drum plant? [7+8]
- 6.a) Explain the process of biomass conversion process.  
b) With the help of neat sketch, explain the working principle of I.C engine. [7+8]
- 7.a) Describe the main types of turbines in brief, which may be used for geothermal energy conversion.  
b) Differentiate between tidal and wave energy generations. [7+8]
- 8.a) Write a short note on power generation system.  
b) Explain the Carnot cycle with its limitations. [7+8]

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