Code No: R203103D **R20** SET - 1

III B. Tech I Semester Supplementary Examinations, July – 2023
RENEWABLE ENERGY SOURCES
(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) What are various solar conversion systems? Explain their applications. [7M]
   b) Describe the three zones of vertical configuration of salt gradient solar pond with neat sketch? [7M]

(OR)

2. a) Compare the performance analysis of flat plate and focusing collectors of the solar system? [7M]
   b) Calculate the angle made by the beam radiation with the normal to a flat plate collector, pointing the south location in New Delhi (260 30'N, 74^0 44'E) at 11:00 hour solar time on October 27. The collector is tilted at an angle of 32^0 with the horizontal? Also find the day length? [7M]

UNIT-II

3. a) Illustrate the advantages, disadvantages and utilization aspects of wind energy? [7M]
   b) What is meant by power law index? Analyze its role in the wind energy measurement. [7M]

(OR)

4. a) Develop the block diagram of wind energy conversion system and explain each block? [7M]
   b) Discuss in detail about various hybrid applications of wind energy conversion system? [7M]

UNIT-III

5. a) What are various resources of bio mass? Explain their availability. [7M]
   b) Compare the continuous type and batch type bio gas plant with respect to applications? [7M]

(OR)

6. a) Elaborate the raw materials used and main components of bio gas plants? [7M]
   b) What are various factors affecting the bio gas generation? Explain. [7M]

UNIT-IV

7. a) Memorize the broad division of ocean energy sources? [7M]
   b) A tidal power plant of single basin type has a basin area of 26 km^2. The tide has a range of 8.6m. The turbine stops operation when the head on it falls below 3.2m. Find the average power generated during one filling/ emptying process in kW if the turbine-generator efficiency is 74%. The density of sea water is 1025 kg/m^3 and g=9.8 m/s^2? [7M]

(OR)

8. a) Draw the lay out and explain in detail about the single basin and single effect tidal plant? [7M]
   b) Ocean waves on an Indian coast had amplitude of 1.6m with a period of 5s measured at the surface water 115m deep. Taking the water density as 1025 kg/m^3, calculate the wave length, wave velocity, the energy density and power density of the wave? [7M]

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UNIT-V

9.	a)	Develop the connected steam open system and discuss its characteristic features?	[7M]
	b)	Compare petro thermal systems and molten rock chamber systems of resources in geothermal energy systems?	[7M]
		(OR)	
10.	a)	Draw the binary cycle system and explain the directional flow?	[7M]
	b)	Elaborate the environmental impact of MHD power generation?	[7M]