CBCS SCHEME

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BME755D

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Non Conventional Energy Resources

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Briefly explain the need for Non-Conventional Energy Sources.	**05**	**L2**	**CO1**
	b.	Illustrate and describe the principle of operation of a Water Power Plant.	**07**	**L2**	**CO1**
	c.	Discuss tar sands and oil shale as alternative sources of energy.	**08**	**L2**	**CO1**
		OR			
Q.2	**a.**	What are beam, diffuse and global radiations? How does the atmosphere influence solar radiation?	**10**	**L2**	**CO2**
	b.	With a neat sketch, describe the structure and operation of a pyranometer in measuring global and diffuse radiation.	**10**	**L2**	**CO2**
		Module – 2			
Q.3	**a.**	Define the following terms with respect to solar radiation: i) Latitude angle ii) Declination angle iii) Surface azimuth angle iv) Hour angle v) Zenith angle	**10**	**L1**	**CO2**
	b.	Determine the Local Solar time, declination and day length at a location with latitude 23° 15' N, longitude 77° 30' E at 12:30 IST on June 19. Consider the equation of time correction as - (1' 01")	**10**	**L3**	**CO2**
		OR			
Q.4	**a.**	Describe the working principles of cylindrical parabolic concentrators and paraboloidal dish collectors with neat sketches.	**10**	**L2**	**CO2**
	b.	With a neat sketch, explain the working principle and operation of a solar pond.	**10**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	With a neat sketch, explain the main components of a Liquid flat plate collector.	**08**	**L2**	**CO2**
	b.	Briefly explain the basic energy balance equation.	**05**	**L1**	**CO2**
	c.	Discuss the significance of the transmissivity - absorptivity product in the performance of a Liquid flat plate collector.	**07**	**L1**	**CO2**
		OR			
Q.6	**a.**	List and explain the various parameters that affect the performance of a solar collector.	**10**	**L2**	**CO2**
	b.	Explain the working principle of a solar PV cell and list its applications.	**10**	**L2**	**CO2**
		Module – 4			
Q.7	**a.**	Discuss the major problems associated with wind power generation.	**04**	**L2**	**CO3**
	b.	Briefly explain the working of a Vertical axis Windmill with a neat sketch.	**06**	**L2**	**CO3**
	c.	The following data were measured for a HAWT : Speed of wind = 20 m/s at 1 atm and 27°C Diameter of rotor = 80 m Speed of rotor = 40 rpm Given that Coefficient for a Maximum output = 0.593 and specific Gas Constant R = 287 J/kg K Calculate the torque produced at the shaft for maximum output of the turbine.	**10**	**L3**	**CO3**

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		OR			
Q.8	**a.**	With a neat sketch, describe the closed-cycle OTEC System.	**08**	**L2**	**CO5**
	b.	Explain the method of harnessing tidal energy with a neat sketch.	**08**	**L2**	**CO5**
	c.	List the limitations of tidal power generation.	**04**	**L1**	**CO5**
		Module – 5			
Q.9	**a.**	With a neat sketch, describe the production of hydrogen by electrolysis of water.	**07**	**L2**	**CO5**
	b.	Briefly explain : i) Safe Utilization of hydrogen ii) Storage methods of hydrogen	**08**	**L2**	**CO5**
	c.	List the problems associated with geothermal energy conversion.	**05**	**L1**	**CO5**
		OR			
Q.10	**a.**	Explain with a neat sketch the construction details of a floating drum-type (KVIC) biogas plant.	**10**	**L2**	**CO4**
	b.	Discuss the applications of bio-gas in engines.	**06**	**L2**	**CO4**
	c.	List the advantages of bio-gas energy.	**04**	**L1**	**CO4**

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