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CBCS SCHEME

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BME755D

Seventh Semester B.E./B.Tech. Degree Examination, June/July 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.

		Module – 1	M	L	C
Q.1	a.	Enlist the merits and demerits of any three non-conventional energy sources.	10	L1	CO1
	b.	Explain Tar sands and oil shale as energy sources and also mention its limitations.	10	L1	CO1
		OR			
Q.2	a.	With a neat sketch, explain the working of pyranometer.	5	L2	CO1
	b.	Write short note on solar constant and solar radiation at the earth's surface.	5	L1	CO1
	c.	Discuss with the help of recent statistics commercial and non-commercial energy reserves and production in India.	10	L2	CO1
		Module – 2			
Q.3	a.	Define the following with proper diagram. i) Declination angle ii) Hour angle iii) Latitude angle iv) Zenith angle v) Surface azimuth angle.	10	L1	CO2
	b.	List the different types of concentrating collectors. Explain any one of them with a neat sketch.	10	L1	CO2
		OR			
Q.4	a.	With a neat sketch, explain the working principle of solar pond.	12	L2	CO2
	b.	Determine the local solar time and declination at a location latitude 23°15'N, longitude 77°30'E at 12.30 IST on June 19. Equation of time correction is = - (1' 01")	8	L3	CO2
		Module – 3			
Q.5	a.	Explain working principle characteristics, and application of photovoltaic conversion.	10	L2	CO3
	b.	Explain any four parameters that affect the performance of the collector.	10	L2	CO3

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		OR			
Q.6	**a.**	Write short note on collector efficiency factor and collector heat removal factor.	**10**	**L1**	**CO3**
	b.	Plot the variation of transmissivity of cover system (τ), transmissivity obtained by considering only reflection (τ_r), only absorption (τ_a) with the angle of incidence for the following cover system. Material : Glass, No. of covers = 2 Thickness of each cover = 4 mm Refractive index of glass relative to air = 1.52 Extinction coefficient of glass = $15m^{-1}$, ($\theta_1 = 15°$)	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	With a neat sketch, explain the horizontal axis wind machine.	**8**	**L2**	**CO4**
	b.	Sketch and explain single basin type tidal power plant operation.	**8**	**L2**	**CO4**
	c.	What are the problems associated with ocean thermal energy conversion?	**4**	**L4**	**CO4**
		OR			
Q.8	**a.**	With a neat sketch, explain the working principle of a OTEC (closed) plant.	**8**	**L2**	**CO4**
	b.	A 10m/s wind is at 1 standard atmospheric pressure at 15°C temperature. Calculate : i) Total power density in wind stream ii) A reasonable obtainable power density in W/m^2 iii) Maximum obtainable power density iv) Total power in (kW) if turbine diameter is 120 m. Assume conversion efficiency 40% (1 atm $\rightarrow$ p ≈ 1.225 Kg/m^3).	**8**	**L3**	**CO4**
	c.	List the limitations of Tidal plants.	**4**	**L1**	**CO4**
		Module – 5			
Q.9	**a.**	Discuss briefly the methods of hydrogen storage.	**5**	**L2**	**CO5**
	b.	Describe constructions and working principle of geothermal energy with schematic diagram.	**10**	**L1**	**CO5**
	c.	Explain the benefits and applications of biogas.	**5**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the biomass sources available for biogas generation.	**4**	**L2**	**CO5**
	b.	List the various sources of geothermal energy. What are the problems associated with geothermal energy conversion?	**8**	**L1**	**CO5**
	c.	Explain the process of electrolytic production of hydrogen, with a neat sketch.	**8**	**L2**	**CO5**

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