

CBCS SCHEME



Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Non Conventional Energy Resources

BME755D

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.	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
