

Code: 20ME4701C

IV B.Tech - I Semester – Regular Examinations - DECEMBER 2023

**ALTERNATIVE SOURCES OF ENERGY
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Explain the following with respect to Solar radiation Geometry: i) Solar Altitude; ii) Zenith angle; iii) Solar Azimuth angle.	L2	CO2	6M
	b)	List the advantages and disadvantages of concentrating collectors over Flat–plate collectors.	L2	CO2	8M
OR					
2	a)	Differentiate between extraterrestrial and terrestrial solar radiation.	L2	CO2	6M
	b)	Draw the schematic and give functional description of cylindrical parabolic collector.	L2	CO2	8M
UNIT-II					
3	a)	With a neat sketch explain the working of VAWT, and illustrate the functions of its main Components.	L2	CO3	7M

	b)	Explain the process of production of biogas from biomass. What are the main advantages of anaerobic digestion of biomass?	L2	CO3	7M
OR					
4	a)	Derive the expression for maximum wind power extracted by a wind turbine.	L3	CO3	7M
	b)	What are the different factors which affect the size of the bio gas plants?	L2	CO3	7M
UNIT-III					
5	a)	Explain the various technologies of harnessing the geothermal energy.	L2	CO3	7M
	b)	What is a tidal power plant and what factors are considered in order to install it?	L2	CO3	7M
OR					
6	a)	Describe various advantages and disadvantages of geothermal energy forms.	L2	CO3	7M
	b)	Describe in detail the operation of double basin type tidal power plant.	L2	CO3	7M
UNIT-IV					
7	a)	Write a technical note on polarization in fuel cells.	L2	CO4	7M
	b)	Explain the operation of Redox fuel cell (RFC) with neat sketch.	L2	CO4	7M
OR					
8	a)	Explain the thermo dynamic aspects of fuel cell.	L2	CO4	7M

	b)	Explain the operation of proton-exchange membrane fuel cell (PEMFC) with a neat diagram.	L2	CO4	7M
UNIT-V					
9	a)	Explain working principle of direct energy conversions and its limitations.	L2	CO4	7M
	b)	Explain the construction and working of MHD generator.	L2	CO4	7M
OR					
10	a)	Write a short note on: i) hall effect ii) Faraday's laws.	L2	CO4	7M
	b)	Explain the working of Thermo Electric Generator.	L2	CO4	7M