

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3161914****Date:11-12-2023****Subject Name:Renewable Energy Engineering****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Explain brief present scenario of conventional and renewable energy sources in India.	03
	(b) Explain the following terms with neat sketches: Air Mass, solar azimuth, Hour angle, solar altitude.	04
	(c) Explain construction and working of Pyrheliometer with a neat sketch.	07
Q.2	(a) Explain basic operational principles of solar cell.	03
	(b) Explain working of solar still with neat sketch.	04
	(c) What are the main components of flat plate Collector ? Explain the working of a liquid flat Plate Collector	07
OR		
	(c) Define Sun rise Hour Angle and Declination Angle also calculate the day length in Ahmedabad (23 ⁰ N) on 22 nd December.	07
Q.3	(a) List the basic component of wind mill and draw the wind energy conservation system.	03
	(b) Explain importance of drag and lift force in wind power generation.	04
	(c) Prove that in case of Horizontal Axis Wind Turbine maximum power can develop when exit velocity = 1/3 of wind velocity and $P_{max} = 8 * (\rho A V_i^3 / 27)$	07
OR		
Q.3	(a) Explain solidity, tip speed ratio and power co-efficient for wind mill	03
	(b) Describe the Biomass conversion technologies.	04
	(c) Explain Construction & working of Floating drum type biogas plant with neat sketch	07
Q.4	(a) Write a short note on any one wave energy conversion devices.	03
	(b) Draw neat sketches of Open and Closed cycle OTEC systems.	04
	(c) Explain with sketches the various methods of tidal power generation What are the limitations of each method ?	07
OR		
Q.4	(a) Explain principle of OTEC.	03
	(b) Explain basic principle of Magneto Hydro Dynamic generation.	04

- (c) What are the advantages and applications of geothermal energy. Explain with neat sketch the vapour dominated geothermal system. **07**
- Q.5** (a) Define: Net present value, Internal rate of return, Return on Investment **03**
- (b) Explain method of simple payback period. What are its limitations? **04**
- (c) What are solar ponds? Discuss the working of a solar pond with help of a neat sketch. **07**
- OR**
- Q.5** (a) What is present worth? How it can be calculated? **03**
- (b) Explain initial and annual cost for renewable energy system. **04**
- (c) Write a short note on clean development mechanisms **07**
