Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)
END SEMESTER EXAMINATIONS, NOVEMBER 2022

RENEWABLE ENERGY [ELE-4306] (OPEN ELECTIVE)

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 25 NOV 2022** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Explain the role of central load dispatch center in the Indian scenario ***(04)***

1B. Explain the working of a parabolic solar collector with the help of a diagram. ***(03)***

1C. Describe the effect of parallel connection of mismatched cells. ***(03)***

2A. Choose the average value of solar radiation on a horizontal surface for June 20, at the latitude of 100 N, if constants a and b are given as equal to 0.50 and 0.61 respectively, and the ratio La/Lm=0.65.. ***(02)***

2B. The load use pattern of a domestic house is given in the table below.

Load	Quantity	Rating (KW)	Time of use (h)
Fan	4	0.06	8
CFL	6	0.009	5
TV	1	0.15	2
Heater	1	2	1
Refrigerator	1	0.15	8

Estimate the PV system with a battery to supply reliable power to the load. ***(04)***

2C. Describe an closed cycle OTEC system with the help of a block diagram. ***(04)***

3A. Explain a Liquid dominated-High temperature single-flash steam geothermal plant with the help of neat diagram ***(04)***

3B. Explain the Torque-speed characteristics of Variable speed wind turbine. ***(03)***

3C. A horizontal axis wind turbine has a diameter of 5m. when the wind speed unaffected by the turbine is 10m/s. The turbine rotation at 300rpm and produce 5kW of mechanical power. Find the tip speed ratio and power coefficient. ***(03)***

4A. What are the characteristics of floating drum type biogas plant? With the help of neat diagram explain floating drum type biogas plant. ***(04)***

4B. What are the different types of control mechanisms used in wind energy conversion system? Explain pitch angle control mechanism. ***(03)***

4C. With the help of neat block diagram, explain the control strategy of wind and solar hybrid system connected to stand alone mode of operation. ***(03)***

5A. Explain the process of photosynthesis. How much energy is stored in this process? ***(02)***

5B. A wind developer acquires a 10 × 10 km land to install WTs of 40 m blade length. To achieve a separation of 8, how many WTs can be installed at the site? compute the power production per land area when the wind power density at the hub is 500 W/m2, the coefficient of performance is 0.3, and the overall efficiency of the turbine-generator system is 85%. Assume the array efficiency is 74%. Consider the number of turbines 150. ***(04)***

5C. With the help of neat diagram explain the Squirrel Cage Induction Generator (SCIG) based wind turbine system connected to the grid. ***(04)***