Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL / MAY 2019

SUBJECT: RENEWABLE ENERGY [ELE 4024]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 03 May 2019** **Max. Marks: 50**

Instructions to Candidates:

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

1A Explain the following with respect to solar geometry :

a. Latitude of location b. Declination angle c. Hour angle

d. Inclination angle e. solar Azimuth angle **(05)**

1B How does sun tracking help in energy collection by a Liquid flat-plate solar collector. Also list the advantages of concentrating collectors over flat plate solar collector? **(05)**

2A Draw and explain an equivalent circuit of a practical solar PV cell with current and voltage expressions. **(04)**

2B Explain the terms with respect to Wind turbine Airfoil Nomenclature: (i) Drag force (ii) Lift force (iii) Angle of attack & (iv) Chord. **(04)**

2C Explain the function of Horizontal axis wind turbine main components. **(02)**

3A Explain the functions of various components of Wound rotor Induction generator & Squirrel cage Induction generator in wind turbine system with the help of neat diagrams. **(04)**

3B Compare the relative performances of a floating drum and fixed dome type biogas plants. **(03)**

3C Explain Combustion process of thermo-chemical Biomass conversion method. **(03)**

4A Explain the operation of Updraft & Cross draft gasifiers with neat diagrams. **(05)**

4B Explain Dry steam and Binary cycle geothermal power plants with neat diagrams. **(05)**

5A A community biogas plant is used for the following needs of a village having 100 adults. (a) Cooking needs of the people of the village (b) Two lamps of 100 CP per family used for 1hour in the evening.

Calculate the volume of slurry in the digester and the number of cows required to feed the plant.

Use the following data : Biogas required for cooking is about 0.227 m^3/person/day, Gas required for lighting a 100 Candle Power mantle lamp is 0.126 m^3/hour. Retention time = 50 days, collectable cow dung = 10 kg/day/head, Biogas yield = 0.34 m^3/kg of dry matter, percentage of dry matter in cow dung = 18%, Density of slurry = 1090 kg/m^3.

(Note : Assume 4 Adults and two children in a family, two children may be considered as equivalent to one adult)

(03)

5B Explain the working principle of Open or Claude Ocean Thermal Energy conversion Cycle Power Plant technology. **(04)**

5C Explain Linked-basin tidal-energy conversion scheme with a neat sketch. **(03)**