Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

V SEMESTER B.TECH. (MECHANICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: NON CONVENTIONAL ENERGY SOURCES [MME 4025]

REVISED CREDIT SYSTEM
(03/12/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	With the aid of a neat sketch explain the working principle of 'Trombe Wall'.	**04**
1B.	Sketch and explain the working of a pyrheliometer.	**04**
1C.	"Solar Power is the need of the hour". Justify.	**02**
2A.	Sketch and explain the working of a Fixed Dome Type Biogas plant	**04**
2B.	Calculate the angle of incidence of beam radiation on a flat plate collector for the following situation: Location: Nagpur (21° 06′N, 79°03′E). Slope of collector : 31° Surface Azimuth Angle :15° Date : December 1, 1979 Time: 0900h (LAT)	**03**
2C.	Explain any two factors that affect biogas production.	**03**
3A.	Write the significance of the terms plate effectivenessϕ, collector efficiency factor F', collector heat removal factor $F_{R.}$	**03**
3B.	Show that a wind turbine cannot extract more than 59.3% of wind energy.	**04**
3C.	List out any three merits and demerits of VAWT over HAWT.	**03**
4A.	Sketch and explain the working principle of the binary cycle vapor dominated geothermal plant.	**04**
4B.	Explain with neat sketch the bulb type turbine used in small scale hydroelectric power plants.	**02**
4C.	Sketch and explain the working of an updraft gasifier.	**04**

5A. A thermoelectric generator that operates between 35°C and 550°C is constructed of n-p semiconductors with the following data:

	n-type	**p-type**
Seebeck coefficient (V/K)	-190×10^{-6}	190×10^{-6}
Specific resistivity (Ωm)	1.5×10^{-5}	2.7×10^{-5}
Figure of merit (K^{-1})	1.7×10^{-3}	1.2×10^{-3}

04

Find the maximum generator efficiency.

5B. Sketch and explain the working of a Float Type Wave Energy Converter or Buoys. **03**

5C. Sketch and explain the working principle of Anderson Cycle OTEC plant. **03**