Reg. No.										

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

IV SEMESTER B.TECH (Open Elective-I)

END SEMESTER EXAMINATIONS, APRIL- 2018

Subject: Energy Engineering (MME 3282)

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **all** the questions.
- Missing data may be suitable assumed.

1A) Explain the features of high and super critical pressure boilers. **(03)**

1B) Differentiate supercharging and turbocharging engine. **(03)**

1C) With neat sketch of layout briefly explain the working of steam power plant. **(04)**

2A) With neat sketch explain the working of diesel engine power plant. **(03)**

2B) 300 MW of electrical power is required for a city. If this is to be supplied by a nuclear reactor of efficiency 30%, using U^{235} as the nuclear fuel, calculate the amount of fuel required for one day operation. **(03)**

Assume that energy released per fusion of U^{235} nuclide = 200MeV.

2C) With neat sketch explain the working of Pressurized Water Reactor (PWR). Mention the advantages and disadvantages of PWR compared to the Boiling Water Reactor (BWR). **(04)**

3A) State the Betz's law and calculate the maximum possible power extraction from the wind turbine per unit area if wind blows at 5 m/s at normal atmospheric condition. **(03)**

3B) Calculate the maximum day length at Udupi (13^0.20' N, $74{\cdot}74^0$ E) on 30/04/2018 **(03)**

3C) With neat sketch explain the working principle of a suitable instrument for measuring diffuse solar radiation. **(04)**

4A) Derive the equation for estimation of power in a simple single basin tidal system in terms of range(R) of the tides ($P_{av}/A = 0.225R^2$). **(03)**

4B) With neat sketch explain the working principle of Flash steam geothermal power plant. **(03)**

4C) At particular site the mean monthly average discharge is as follows: **(04)**

Month	**Discharge in millions of cubic meter / month**		**Month**	**Discharge in millions of cubic meter / month**
January	30		July	80
February	25		August	100
March	20		September	110
April	0		October	65
May	10		November	45
June	50		December	30

(a) Draw Hydrograph and find the average discharge available for the whole period.

(b) Draw Flow duration curve.

5A) With neat sketch explain Fixed dome type biogas plant. **(03)**

5B) With neat sketch explain the working of the closed cycle OTEC power plant. **(03)**

5C) Write a note on **(04)**

(a) Energy plantation (b) Nuclear waste.