Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech. Winter 2019 - 20 Examination

Semester: 1 **Date: 18/12/2019**
Subject Code: 203210130 **Time: 10:30 am to 01:00 pm**
Subject Name: Renewable Energy Engineering **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Explain design principle and operation of any one type of fuel cell. **(05)**
B) Which factor should be considered during the design of digester? **(05)**
C) Discuss the main consideration in selecting a site for wind turbine. **(05)**

Q.2 Answer the following questions. (Attempt any three) (Each five mark) **(15)**
A) Describe the closed cycle OTEC system. State its advantages and limitations.
B) Discuss the factors which affect the production of biogas in detail.
C) Explain need for alternate energy sources. State advantages and disadvantages of Non-Conventional energy sources.
D) Determine the number of day light hours in Vadodara (Latitude = 22.30^0 N) on 1^{st} April in 2016.

Q.3 A) Describe the working of a floating drum type KVIC biogas plant with the help of neat sketch. **(07)**
B) Estimate the monthly average daily global radiation on a horizontal surface at Vadodara (22^0 00' N, 73^0 10' E) during the month of March if the average sunshine hours per day is 9.5. Assume a = 0.28 and b= 0.48. **(08)**

OR

B) Explain Solar desalination with the help of neat sketch. **(08)**

Q.4 A) 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

A) Write the advantages of Geothermal Energy. Explain any geothermal power plant in brief. **(07)**
B) Write name of solar radiation measuring instruments. Explain sun shine recorder with neat sketch. **(08)**