

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (OLD) EXAMINATION – WINTER 2018****Subject Code:141904****Date: 12/12/2018****Subject Name: Non - Conventional Energy Sources****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is meant by renewable energy sources? Explain in brief these energy resources with special reference to Indian context. **07**
- (b) Define following terms with neat sketches: beam radiation, air mass, solar tilt angle, day length, declination angle. **07**
- Q.2** (a) Describe with neat sketch the construction and working of solar pond. **07**
- (b) Calculate the local solar time and declination at a location latitude $23^{\circ}15'N$, Longitude $77^{\circ}30'E$ at 12:30 IST on June 19, 2010. Equation of time correction is given from standard table or chart is $1^{\circ}01''$. **07**
- OR**
- (b) Which instruments are used for solar radiation measurements? Explain construction and working of Pyranometer. **07**
- Q.3** (a) Prove that for a horizontal axis propeller type wind mill. **07**
 $P_{max} = 0.595 P_{total}$
- (b) Explain construction and working of horizontal axis wind turbine with neat sketch. **07**
- OR**
- Q.3** (a) Describe the main Considerations in selecting site for wind energy conversion system. **07**
- (b) Atmospheric air having the wind velocity of 20 m/s has the density of 1.22 kg/m^3 at high altitude where the wind mill is installed. The rotor diameter is 20 m and it runs at 60 rpm. The actual efficiency of wind mill is 35%. Find the actual power produced, the maximum torque and axial thrust on turbine shaft. **07**
- Q.4** (a) Describe a Binary cycle system for liquid dominated system. **07**
- (b) Describe the closed cycle OTEC power plant and state its advantages over open cycle system. **07**
- OR**
- Q.4** (a) Explain the constructional detail and working of KVIC digester. **07**
- (b) Discuss the factors which affect the bio gas production in detail. **07**
- Q.5** (a) Describe an MHD open cycle system. What are the main advantages of an MHD power generation? **07**
- (b) Define the term 'energy management' write note on energy audit classify the energy audit and discuss them in brief. **07**
- OR**
- Q.5** (a) Write short note on: Tidal power plant with double basin system. **07**
- (b) How are fuel cells classified? Explain any one with neat sketch. **07**
