Name: **Enrolment No:**	**UPES SAP ID:**

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online end Semester Examination, December, 2020

Course: Renewable energy Technology –II **Semester: III**
Program: M.Tech– Energy systems **Duration: 3 hrs.**
Course Code: EPEC 8003 **Max. Marks: 100**
No. of Pages: 02

Note:

Section A (Attempt the following)			
Q1.	Enumerate the limitations of micro hydroelectric power stations.	**5**	**CO4**
Q2.	List out the factors led to the accelerated development of wind power.	**5**	**CO2**
Q3.	A wind farm is being considered for a ridge top site. Name ten or more issues that might be considered in evaluating this site.	**5**	**CO2**
Q4.	Comment on the status of non-conventional energy sources in India and their future prospect	**5**	**CO1**
Q5.	A 1 cm^2 silicon solar cell has a saturation current of 10-12 A and is illuminated with sunlight yielding a short-circuit photocurrent of 25 mA. Calculate the solar cell efficiency and fill factor.	**5**	**CO5**
Q6.	Comment on the tidal energy potential in India.	**5**	**CO1**
Section B(Attempt the following)			
Q7.	Prove that in case horizontal axis wind turbine maximum-power can be obtained when Exit velocity= 1/3 wind velocity.	**10**	**CO3**
Q8.	Explain the concept of wet steam geothermal system and its effect on environment	**10**	**CO5**
Q9.	Explain the necessity of using maximum power point tracking with the help of PV and I-V curves and describe on which factors efficiency of PV cell depends?	**10**	**CO2**
Q10.	Draw the electrical layout of a typical solar PV system, state the functions of essential equipment. OR Describe different types of hydro turbines that can work with larger water flow.	**10**	**CO3**
Q11	Explain the working of an open cycle and closed cycle OTEC plant.	**10**	**CO5**
Section C (Attempt the following)			

Q12.	The low-speed shaft of a wind turbine has a length, l, of 10mand a diameter, D, of 0.5 m. It is made of steel with a modulus of elasticity of E=160 GPa. It is rotating at 12.1 rpm and the turbine is generating 5MW. Find: (a) The applied rotor torque, assuming an overall drive train efficiency of 90% (b)The angle of deflection (c) The energy stored in the shaft (d) The maximum stress in the shaft. **OR** A geothermal power plant uses geothermal water extracted at 160°C at a rate of 440 kg/s as the heat source and produces 22 MW of net power. If the environment temperature is 25°C, determine (a) the actual thermal efficiency, (b) the maximum possible thermal efficiency, and (c) the actual rate of heat rejection from this power plant	**20**	**CO4**