UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2019

Course: Renewable Energy Technologies - II   Semester: III
Program: M. Tech. - ES   Time 03 hrs.
Course Code: EPEC 8003   Max. Marks: 100

SECTION A

S. No.		Marks	CO
Q 1	Find the size of wind turbine rotor (diameter in m) that will generate 1MW of electrical power in a steady wind of 8.5 m/s. Assume ρ = 1.216 kg/m^3 C_p = 0.47. Assume $\eta_m = \eta_e = 0.95$.	4	CO1
Q 2	Estimate the power available from a proposed micro hydro scheme at a site having a small stream with 100 litres per second flow at a head of 30 m. Assume density of fresh water as 996 kg/m^3 and overall efficiency of the whole system as 55%.	4	CO2
Q 3	Write short note on "Utilization of biogas in IC Engine".	4	CO3
Q 4	What are the environmental impacts of OTEC?	4	CO4
Q 5	What are the major advantages of mini/micro hydro resources?	4	CO2

SECTION B

Q 6	Derive the expression for maximum power generated in a Wind Turbine.	10	CO1
Q 7	List the different methods of measuring the head and flow for a open diversion system. Explain them in brief.	10	CO2
Q 8	Draw and explain Bio-ethanol production flowchart.	10	CO3
Q 9	Explain the details of a landfill reactor. What is the optimal moisture content in the MSW and what is the percentage (dry basis) of biodegradable part in the MSW? What is the gas-production rate in a landfill?	10	CO3

SECTION-C

Q 10	A biomass gasifier is used to run a compression-ignition engine. The engine operates in the dual-fuel mode with 80% diesel replacement. The gasifier-engine system produces 350 kW of power. Calculate the biomass-feeding rate to the gasifier if the efficiency of the engine is 35 percent and the calorific value of biomass is 16,800 kJ/kg. Given that, the efficiency of the gasifier is 0.75.	20	CO3
Q 11	With the help of diagram, explain in detail the double flash high temperature wet steam system hydrothermal Geo resource.	20	CO4