

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Programme Name: B. Tech CE+RP

Course Name : Alternate Energy Sources

Course Code : CHCE3022

Nos. of page(s) : 02

Semester : V

Time : 3 Hrs.

Max. Marks: 100

Instructions: 1) Answer the questions section wise in the answer booklet. 2) Assume suitable data wherever necessary. The notations used here have the usual meanings.

SECTION A (Total Marks: 4 x 5 = 20)

➤ Attempt all the questions.

S. No.	Question	Marks	CO
Q 1	What are the advantages and disadvantages of a renewable energy sources?	05	CO1
Q 2	Explain the principle of MHD generation.	05	CO4
Q 3	Discuss the potential of geothermal energy conversion in India.	05	CO1
Q 4	State the Lambert's law of absorption and its application in OTEC.	05	CO3

SECTION B (Total Marks: 3 x 20 = 60)

➤ Attempt any three questions.

Q 5	a) Derive an expression for the average power per unit basin area for a single basin tidal system b) What are the main types of OTEC power plants? Describe their working in brief.	10 10	CO3
Q 6	Describe with a neat sketch the working of a wind energy conversion system with main components.	20	CO2
Q 7	a) Derive the equations for the voltage and power output of an MHD generator. b) Perform the necessary calculations to show that the maximum efficiency for the methane fuel cell is 92% and the ideal cell voltage is 1.15 volts. What flow rate in kg/hr of methane and oxygen would be required to produce a power output of 100 kW? What heat transfer rates would be involved under these circumstances? Given: $\Delta G_{25^\circ\text{C}} = -195,500 \frac{\text{cal}}{\text{gm mole}}$; $\Delta H_{25^\circ\text{C}} = -212,800 \frac{\text{cal}}{\text{gm mole}}$	10 10	CO4
Q 8	a) Describe thermo-chemical method of hydrogen production.	10	CO5

	b) Explain the different methods of hydrogen storage.	10	
SECTION C (Total Marks: 1 x 20 = 20)			
Q 9	a) Describe a Binary cycle system of geothermal energy conversion for liquid dominated system.	10	CO3
	b) Explain about small head hydropower development.	10	CO2