

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2021

Programme Name: B. Tech CE+RP

Course Name : Alternative Energy Sources

Course Code : CHCE3022P

Nos. of page(s) : 02

Semester : VII

Time : 3 Hrs.

Max. Marks: 100

Instructions: 1) Answer the questions section wise in the answer booklet. 2) Assume suitable data wherever necessary. 3) The notations used here have the usual meanings.

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

➤ Attempt all the questions.

S. No.	Question	Marks	CO
Q 1	Fossil fuel sources are a) Increasing b) Depleting c) Constant d) None	04	CO1
Q 2	Francis turbine is a/an a) Reaction turbine b) Impulse turbine c) Friction turbine d) Friction and impulse turbine both	04	CO2
Q 3	The motion of wave is a) Steady state b) Transient c) Periodic d) None	04	CO3
Q 4	The standard emf is _____ for hydrogen-oxygen fuel cells. a) 3.96 V b) 1.23 V c) 0.58 V d) 2.54 V	04	CO4
Q 5	In terms of greenhouse gas emissions, how good or bad is hydrogen fuel? a) Major contributor of greenhouse gas emissions b) Zero-emission fuel c) Lowest contributor of greenhouse gas emissions d) Hydrogen cannot be used as fuel	04	CO5

SECTION B (Total Marks: 4 x 10 = 40)➤ Attempt all questions.

Q 6	Discuss the advantages and disadvantages of the alternate energy sources.	10	CO1
Q 7	Explain the components of a wind power system.	10	CO2
Q 8	Derive an expression for the average power per unit basin area for a single basin tidal system. <i>OR</i> Illustrate the working of a closed cycle system of OTEC with a neat diagram.	10	CO3
Q 9	A hydrogen-oxygen fuel cell operates at 25°C. Calculate the voltage output of the cell, the efficiency and the electric work output per mole of H ₂ consumed and per mole of H ₂ O produced. Also compute the heat transferred to the surroundings. Given: $\Delta G_{25^\circ\text{C}}^\circ = -237191 \frac{\text{kJ}}{\text{kg mole}}$ $\Delta H_{25^\circ\text{C}}^\circ = -285838 \frac{\text{kJ}}{\text{kg mole}}$	10	CO4

SECTION C (Total Marks: 2 x 20 = 40)Attempt all questions.

Q 10	Describe the working of the MHD generator. <i>OR</i> What are the different types of a fuel cell? Explain the working of a hydrogen fuel cell.	20	CO4
Q 11	a) Discuss about a steam methane reforming process of hydrogen production. b) Explain in brief about the methods available for hydrogen storage.	10 10	CO5