

Name:		
Enrolment No:		
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES Online End Semester Examination, MAY 2021		
Course: Plant Utilities (Elective)		Semester: VIII
Program: B. Tech. CE+RP		Time 03 hrs.
Course Code: CHCE 3017P		Max. Marks: 100
<u>SECTION A (6Q x 5 = 30 marks)</u>		
Each Question will carry 5 Marks		
1. Instruction: Complete the statement / Type the answer in 20-100 words.		
S. No.	Question	CO
Q 1	List some differences between soft and hard water. List advantages of ion exchange in few words.	CO1
Q2	Give some prominent uses of centrifugal compressors.	CO2
Q3	Write the formula of CoP and explain its meaning.	CO1
Q4	List some advantages of using bio-diesel as fuel.	CO4
Q5	53% of India's installed power capacity uses coal as its fuel. Agree or disagree while giving explanations if use of coal is desirable, and safe.	CO3
Q6	Give the importance of water as process plant utility.	CO1
<u>SECTION B (5Q x 10 = 50 marks)</u>		
1. Each question will carry 10 marks		
2. Instruction: Write full notes		
Q 7	Write a full note on humidification/ dehumidification. (10 Marks)	CO2
Q 8	What are the potential hazards of industrial waste and describe some methods of disposal. If possible correlate this with safety of an important Chemical industry of your choice. (10 Marks)	CO3
Q 9	Give a classification of compressors and explain the logic behind this classification. How does velocity diagram correlate to blade shape? (10 Marks)	CO2
Q 10	Elaborate some methods of Water Treatment by Reverse Osmosis, with the viewpoint of demineralization. (10 Marks)	CO2

Q 11	What is a steam trap. Give application of steam trap. Describe bimetallic steam trap. (10 Marks)	CO3
<p><u>Section C (1Q x 20 = 20 marks)</u></p> <p>1. Attempt ONLY ONE. 2. Instruction: Write critical notes.</p>		
Q12	<p>Write in full details about about types of steam generators. Give the drum diagram of a waste heat fired boiler. Waste heat boilers are available in a variety of capacities, allowing for gas intakes from 1000 to 1 million ft³/min. In cases where the waste heat is not sufficient for producing desired levels of steam, auxiliary burners or an afterburner can be added to attain higher steam output. The steam can be used for process heating or for power generation. How can you correlate this information given to your description of waste heat boiler, What are the engineering advantages of this this design. Will you use water tube or fire tube boilers in this design?. (20 Marks)</p> <p>OR</p> <p>Write in full details about vapor compression refrigeration system. Also show the process on T-S and P-V diagram. Analyze the process using enthalpy expressions and how will you analyze energy requirements. What kind of refrigerants will be used in such a system? Are there any harms of using refrigerants? (20 Marks)</p>	CO4