

Name:	
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2019**

**Course: ChE III (Process Technology)**

**Semester: V**

**Programme: BTech (FSE)**

**Time: 03 hrs.**

**Max. Marks: 100**

**Instructions:**

**SECTION A (Maximum marks 20)**

S. No.		Marks	COs
Q 1	Flow diagrams may be divided into three general types _____, _____ and _____	3	CO4
Q2	Explain wet rendering and dry rendering used for processing of animal fat.	4	CO1
Q3	Briefly describe any five type of metal corrosion.	5	CO1
Q4	Explain the chemical and mechanical pulping process in pulp and paper making process.	4	CO4
Q5	Draw diagrams for the two type of vertical axis wind turbines.	4	CO4

**SECTION B (Maximum marks 40) Question 10 has an internal choice**

Q6	Give complete classification of various types of furnaces. What is the role of excess air in furnaces?	8	CO3
Q7	Ammonia-air mixture is feed to the bottom stream of an absorber with flow rate of 10L/min. Water then feed to the upper stream of the same absorber with desired flow rate of 5L/min. There are two outputs from the absorber where upper stream is insoluble NH <sub>3</sub> and bottom stream is NH <sub>3</sub> -Water mixture. This NH <sub>3</sub> -water mixture then feed up to a batch distillation column. The column produces ammonia gas as a top product which this product then will be condensate with a condenser to produce liquid ammonia. Develop Block Flow Diagram (BFD) for this process.	8	CO4
Q8	What are the various environmental impacts of chlor-alkali industry? What can be done to minimize its impact?	8	CO2,4
Q9	What is the role of position of an element in the reactivity series on the choice of method used for its manufacture/purification? Describe the problems associated with traditional copper mining and the remedial methods.	8	CO1,4
Q10	Explain various elements in a basic control loop with the help of a diagram.  <b>Or</b> For a pressure vessel V-100, draw a control loop to show that a pneumatically controlled PRV-100 will be activated to relief pressure when the pressure in the V-100 is higher than desired value.	8	CO4

**SECTION-C (Maximum marks 40) - Question 12 has an internal choice**

Q11	(a) Give classification of biological process. (b) Substrate A and enzyme E flow through a mixed flow reactor (V = 6 liter), From the entering and leaving concentrations and flow rate find a rate equation to represent the action of enzyme on substrate.	20	CO2
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	$C_{E0}, \text{mol/m}^3$	$C_{A0}, \text{mol/m}^3$	$C_A, \text{mol/liter}$	$V, \text{liter/h}$		
	0.02	0.2	0.04	3.0		
	0.01	0.3	0.15	4.0		
	0.001	0.69	0.60	1.2		
Q12	<p>What is the role of fertilizer in agriculture industry? Describe in detail the process used for manufacture of Urea. Additionally, describe the various organic alternatives available for fertilizers.</p> <p style="text-align: center;"><b>OR</b></p> <p>Name the various process used for manufacture of soda ash. Which process is the most economical and why? Explain Solvay Process with the help of a neat diagram. What are the uses of sodium carbonate?</p>				<b>20</b>	<b>CO4</b>