


Name:	
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2020**

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

**Semester: V**

**Programme: BTech (FSE)**

**Time: 03 hrs.**

**Max. Marks: 100**

**Instructions: All questions in Section A, B and C are compulsory. Question no. 12 in section C has an internal choice. Give to the point answer. Preferably, use A4 Sheets to write your answer.**

**SECTION A (Maximum marks 30)**

S. No.		Marks	COs
Q 1	Give Full forms of (a) P&ID (b) TSP (c) SCC (d) MHD (e) RTD	5	CO3
Q2	Oil is removed from plant tissue using _____, _____, and _____. Whereas, animal fats are separated from fatty tissues by _____ or _____ rendering. (Type your answers in the sequence of appearance of blanks)	5	CO4
Q3	What factors determine the life of an equipment?	5	CO1
Q4	Name the four processes used for manufacture of soda ash. Which of the processes is the cheapest?	5	CO4
Q5	Fermentation is a process of _____ change caused by _____ or their _____, usually producing _____ and _____.	5	CO2
Q6	List the type of fermenters (design) used in process industries.	5	CO2

**SECTION B (Maximum marks 50)**

Q7	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.	10	CO4
Q8	Ethanol is feed to continuous reactor in the presence of Sulphuric Acid catalyzer to produce ethylene. Distillation process is then applied to separate ethylene-H <sub>2</sub> O mixture. Ethylene as a top product is then cooled with a condenser to produce liquid ethylene. Hydrogenation (addition of H <sub>2</sub> ) of ethylene is done in another reactor in the presence of Nickel catalyzer to produce ethane as a final product. Develop BFD for this process.	10	CO5
Q9	What are the various environmental impacts of chlor-alkali industry? What can be done to minimize its impact?	10	CO4
Q10	Give complete classification of various types of furnaces. What is the role of excess air in furnaces?	10	CO3
Q11	Explain various elements in a basic control loop with the help of a diagram.	10	CO5

**SECTION-C (Maximum marks 20) - Question 12 has an internal choice**

Q12

- (a) Give classification of biological process.
- (b) In a number of separate runs different concentrations of substrate and enzyme are introduced into a batch reactor and allowed to react. After a certain time the reaction is quenched and the vessel contents analyzed. From the results found below find a rate equation to represent the action of enzyme on substrate.

<i>Run</i>	$C_{E0}, \text{mol/m}^3$	$C_{A0}, \text{mol/m}^3$	$C_A, \text{mol/m}^3$	<i>t, hr</i>
1	3	400	10	1
2	2	200	5	1
3	1	20	1	1

**OR**

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.

**20****CO2/3**