UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Petrochemical Process Technology   Semester: VI
Program: B. Tech (CE+RP)   Time : 03 Hrs.
Course code: CHCE3012   Max. Marks: 100

Instructions: All questions are to be answered. In problems wherever you are asked to use particular number of digits of your SAP ID, strictly use the digits of your SAP ID.

5 X 20 = 100 Marks

S. No.		Marks	CO
Q 1	Petrochemical industry in India has recorded a study growth over the last three decades .The industry offers a wide scope for development that contributes positively to economic growth and regional development. The outlook of the industry is bright and positive developments anticipated in various chemical subsectors. To promote investment in this sector and make the country an important hub for both domestic and international markets, GOI has decided to attract major investment from both domestic and foreign companies, by providing a transparent and investment friendly policy i.e. Petroleum, Chemicals & petrochemical investment regions PCPIRs. **Take a typical case of Indian Petrochemical industry to resolve & response the following in view of introduction of PCPIR**. **a**. Does the policy contradict the SEZ policy of the state govt.? What will be the legal authority of SEZ developer in PCPIR complex.. **b**. Impact of PCPIR to gain ground in the international market. **c**. Model of the petroleum Refinery, Petrochemical and Polymer industry in terms of levels of integration to improve the business prospective.	20	CO1
Q 2	(i)Calculate the relative rate (r_1/r_2) of the two following reactions at T (K). Temperature (T) is the last three digits of your SAP ID and R = 8.319 J/mol K.	10	
	Reaction $\qquad$ A (s^{-1}) $\qquad$ E (kJ/mole) $1 - \overset{\bullet}{C}_3H_7 \rightarrow C_2H_4 + \overset{\bullet}{C}H_3 \qquad 4.0 \times 10^{13} \qquad 136.5$ ---- **(1)** $1 - \overset{\bullet}{C}_3H_7 \rightarrow C_3H_6 + \overset{\bullet}{H} \qquad 2.0 \times 10^{13} \qquad 160.8$ ---- **(2)**		CO2
	(ii)Compare the advantages and disadvantages of different mechanisms of addition polymerization.	10	

Q 3	**(i)Calculate** how much propylene approximately would be available from a Naphtha cracker producing x Million tons Per annum of ethylene? Value of x is the last two digits of your SAP ID.	**5**	
	(ii) **Calculate** how much light naphtha is required to produce y ton of ethylene by steam cracking with normal severity? Value of y is last three digits of your SAP ID	**5**	**CO3**
	(iii) Describe the different unit process and unit operations used in an aromatic plant.	**10**	
Q 4	(i)What are engineering resins? Give five examples. Describe the process conditions and the process units used in the manufacture of any two of them.	**12**	
	(ii)Which synthetic rubber is used for producing inner tubes? Why? What are the monomers used to produce them?	**8**	**CO4**
Q 5	Describe the levels of refining and petrochemicals **(R&PC)** Integration, in context with Indian R&PC business perspective. Describe drivers, challenges for R&PC integration and how to overcome these challenges to improve profitability.	**20**	**CO5**