

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Catalyst design and Catalysis (CHEG 462)	Semester: VII
Programme: B.Tech (CE+RP)	
Time: 03 hrs.	Max. Marks: 100
Instructions:	

SECTION A **5 X 4 = 20**

S. No.		Marks	CO
Q 1	Give any two advantages and disadvantages of heterogeneous catalysis over homogeneous catalysis.	4	CO1
Q 2	Name the refining processes and catalyst used to meet the specifications of gasoline.	4	CO2
Q 3	Name any two methods each to characterize chemical composition, structure, texture and active center of the catalyst.	4	CO3
Q 4	How is reforming catalyst regenerated?	4	CO4
Q 5	What are the emerging trends in catalysis to meet the Sulphur specification of diesel?	4	CO5

SECTION B **5 X 8 = 40**

Q 6	Describe the mechanism of reaction catalyzed by organometallic catalysts with an example. <div style="text-align: center;">(Or)</div> Explain the various selectivity shown by organometallic catalysts with suitable examples	8	CO1
Q 7	Explain the role of catalysts or adsorbents in any four petrochemical industries and advantages they bring in.	8	CO2
Q 8	Name and explain the method of determination of acidity of solid acid catalyst with the help of diagram.	8	CO3
Q 9	What is the active catalytic component of the FCC catalyst and explain the steps involved in its manufacturing. <div style="text-align: center;">(Or)</div> Explain briefly the various changes that take place during calcination and specify when it has to precede or succeed the forming step.	8	CO4
Q 10	Describe the role of catalysis and catalysts in emerging trends of producing petrochemicals from syngas.	8	CO5

SECTION-C **2 X 20 = 40**

Q 11	(i) Discuss the mechanism of heterogeneous catalysis and different factors influencing each step of it. (ii) Give a brief account of similarities and differences in catalyst design for alkylation process to manufacture ethylbenzene, cumene and linear alkyl	12	CO1
		8	CO2

		benzene.		
Q12	(i)	Describe the choice of active species, support, additives and manufacture of hydrotreating catalyst.	10	CO4
	(ii)	Explain the determination of surface area and pore size distribution by nitrogen adsorption over solid catalysts.	10	CO3
		(Or)		
	(i)	Analyze the reactions to be catalyzed in catalytic reforming and explain the steps involved in the manufacture of catalyst for the same.	10	CO4
	(ii)	Mention the surface spectroscopy techniques and explain any three of them in detail.	10	CO3