

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Course: Catalyst Design and Catalysis

Program: B.Tech (CE+RP)

Course Code: CHEG 462

Semester: VII

Time 03 hrs.

Max. Marks: 100

Instructions:

SECTION A

5 X 4 = 20 Marks

S. No.	Question	Marks	CO
Q 1	Demonstrate how catalyst increases the atom efficiency of the process with a suitable example.	4	CO1
Q 2	Give any one mechanism of formation of carbocation in catalytic cracking and the active center involved in it.	4	CO2
Q 3	Name any two methods each for the determination of bulk and surface composition of the catalyst.	4	CO3
Q 4	List out any eight important properties of an industrial catalyst.	4	CO4
Q 5	Give any four important reasons for bioethanol blending with petrol.	4	CO5

SECTION B

4 X 10 = 40 Marks

Q 6	Name the factors that influence the chemisorption of reactants by the heterogeneous catalysts and explain any two of them in detail.	10	CO1
Q 7	Describe the general steps involved in designing the catalyst for a chemical process.	10	CO2
Q 8	With the help of diagram, explain the method of determination of acidity of catalyst. (Or) Explain the determination of surface area and pore size distribution of a catalyst from nitrogen adsorption measurements.	10	CO3
Q 9	Give an account of manufacture of catalyst for catalytic reforming.	10	CO4

SECTION C

2 X 20 = 40 Marks

Q 10	(a) Give the type of reactions catalyzed by mineral acids and give any one of its mechanism.	5	CO1
	(b) Explain the various transformations involved in the calcination step of the catalyst.	8	CO4
	(c) Describe the formation of catalyst into pellet and operating variables involved.	7	CO4
	(Or)		
	(a) Give any two selectivities shown by homogenous catalysts with an example for each.	5	CO1

	(b) With the help of diagram, explain a method of producing microgranules. (c) Explain the ordinary drying and particulate drying of wet precipitates.	8 7	CO4 CO4
Q 11	(a) Explain a method of determination of surface structure of the catalyst. (b) Describe the IH ² shell process for the conversion of municipal solid sewage to auto fuel and biomass to mono ethylene glycol process along with the catalysts involved.	8 12	CO3 CO5