Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

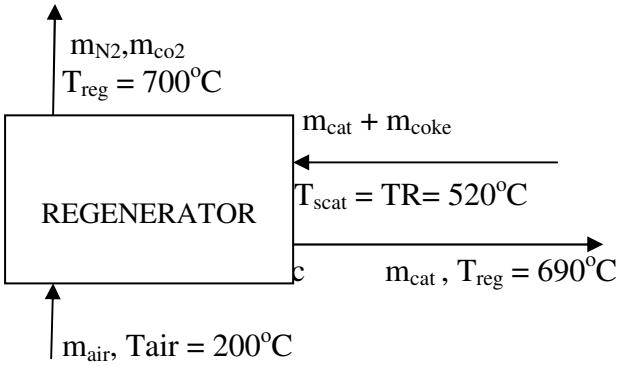
ME Semester –I Examination Feb. - 2012

Subject code: 713004N **Date: 21/02/2012**
Subject Name: Advance Petroleum Refining
Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Find the catalyst circulation rate for the FCC unit by carrying out a heat balance around the regenerator. A sketch of the stream flows and temperature around the regenerator is presented in the figure below. **10**



Data:-
Coke produced = 13550 kg/hr
Heat of combustion of coke ΔHc = -0.393 * 10^6 kJ/kmol k
$Cp,_{cat}$ = 1.11 kJ/kg K , $Cp,_{air}$ = 29.6 kJ/kmol K,
$Cp,_{N2}$ = 32.6 kJ/kmol K, $Cp,_{co2}$ = 46.9 kJ/kmol K,
$Cp,_{coke}$ = 21.1 kJ/ kg K

(b) Draw the neat sketch of Fluid Catalytic cracking unit and carryout the material balance around the reactor and regenerator. **04**

Q.2 **(a)** Explain in brief the role of reformer in the refinery. **07**
(b) Discuss the sources of waste from refinery unit. **07**

OR

(b) Discuss the about the process variables of CCR platforming process. **07**

Q.3 **(a)** Explain the reactor section & distillation system for HF Alkylation process. **07**
(b) Explain the physico-chemical unit operations involved in deasphalting process for lube oil production. **07**

OR

Q.3 **(a)** Explain the claus process for the sulfur recovery from gaseous H_2S with a neat sketch. **07**
(b) Discuss the process variable of Fluid Catalytic cracking unit. **07**

Q.4	**(a)**	List out and compare different types of reactor beds involved in hydro processing method for residue up gradation in refinery.	**07**
	(b)	Explain with neat sketch Soaker Visbreaker.	**07**
		OR	
Q.4	**(a)**	Write a short note on Biofules.	**07**
	(b)	Explain the objectives and role of hydro treating process in refinery.	**07**
Q.5	**(a)**	Explain Steam Reforming process with CO_2 absorber and methanator for H_2 production with neat flow sheet.	**07**
	(b)	Discuss the safety programmes and regulation used in refinery unit.	**07**
		OR	
Q.5	**(a)**	List out the various ways of producing clean fuels and discuss any one in detail.	**07**
	(b)	Explain the catalyst used in hydro treating and hydro processing processes.	**07**

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