	Utech
Name :	
Roll No.:	To Specially Exercising and Explana
Invigilator's Signature :	

## CS/M.Tech (CHE)/SEM-1/CHE-5C/2010-11 2010-11

#### PETROLEUM REFINERY ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

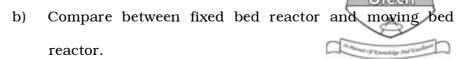
Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions.  $5 \times 14 = 70$ 

- 1. a) Write the characteristics of crude oil composition.
  - b) What is the motivation behind the shifting of focuses from oil to gas?
  - c) Write a short note on crude oil treatment and storage. 3 + 3 + 8
- 2. a) Draw the sketch of CDU and VDU with all accessories and also discuss the merits and demerits of different reflux arrangements in CDU.

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c) Write the important factors for catalyst selection.

8 + 3 + 3

- 3. a) How many techniques you may suggest to minimize the catalyst deactivation?
  - b) What are adverse conditions that may arise due to catalyst deactivation?
  - c) Write the process parameters which significantly influence catalyst deactivation. 5+5+4
- 4. a) Write the objective of fluid coking operation along with process flow-sheet.
  - b) Write a short note on soaker type visbreaking operation.
  - c) What is the objective of reforming process?
  - d) Why is the reforming process getting importance in modern refinery? 5+4+2+3

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- 5. a) Design a process flow-sheet of FCC unit based or process requirement.
  - b) Construct a comparative presentation of coking, catalytic cracking, visbreaking, hydrovisbreaking, hydrocracking and hydrotreating in a temperature (°C) vs pressure (bar) plot based on their process conditions.
- 6. Write short notes on the following: 5 + 5 + 4
  - a) Sintering of catalyst
  - b) Hydroprocessing
  - c) Cetane number.
- 7. a) Write the definition of fire point, flash point, aniline point, smoke point, pour point, cloud point, grease point and viscosity index.
  - b) Why cetane number and octane number are important for diesel oil and petroleum respectively. 8 + 6

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- 8. a) Why does diesel and petrol car give maximum mileage between 40 to 60 km/h speed?
  - b) Why are °API gravity and viscosity index important parameter for liquid and instead of specific gravity and viscosity?
  - c) What are the precautions to be taken during liquid oil storage and transportation?
  - d) 'A oil sample shows very high aniline point.' What does it mean? 5+3+3+3

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