

Dr Papers Palay

82 2/12/2022

Roll No. _____

M



National Institute of Technology Hamirpur

Department of Chemical Engineering

End Semester Examination, December 2022

Branch: Chemical Engineering

Subject: CH 412 – Petroleum Refining & Petrochemical Engineering

Class: B. Tech. | **Semester:** VII | **Full Marks:** 50 | **Time:** 3 hours

Instructions:

- Answer all the questions. All parts (a, b, c) of any question must be answered in same place.
- Missing data may suitably be assumed, if any.

1. a) Explain the working principle of fractional distillation. (2)
 - b) What are the major reasons for decrease in reservoir pressure? What are the possible ways to maintain the pressure? (4)
 - c) Explain the effect viscosity on crude oil production rate from reservoir. Explain recoverability of oil. (4)
2. a) Define °API Gravity. What should be the minimum value of °API for petroleum and why? (3)
 - b) What is the composition of crude oil? (3)
 - c) Why vacuum distillation column is required in refinery? Mention the products obtained from the ADU along with their approximate temperature ranges. (4)
3. a) Define aniline point and diesel index. What is their significance? (3)
 - b) Why knocking occurs in a spark ignition (SI) engine? What are the ways to decrease the knocking characteristics of a diesel fuel? (3)
 - c) Why is hydro-finishing required? Explain hydrodesulphurization process for kerosene. (4)
4. a) What are the major reactions occur during catalytic reforming process? (2)
 - b) Explain the fluidized catalytic cracking process with a simplified diagram and mention the operating parameters and catalyst, if any. (4)
 - c) Explain delayed coking process with the help of a simplified flow-sheet diagram. (4)
5. a) What are the major refinery feedstocks used in petrochemicals industry? (2)
 - b) What is the composition of synthesis gas? Explain hydrogen production from synthesis gas using a simplified block diagram. (4)
 - c) What are various types of polyethylene available in the market? Explain the catalyst used and the reaction steps to produce polyethylene from ethylene. (4)

***** All the Best *****