UNIVERSITI KUALA LUMPUR

MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	CPB30503
COURSE TITLE	:	PETROCHEMICALS & PETROLEUM REFINING TECHNOLOGY
PROGRAMME NAME	:	BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PROCESS) WITH HONOURS
DATE	:	02 FEBRUARY 2026
TIME	:	9:00AM - 12:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

Answer the following questions

(a) Compare the process operation of Alkylation and Catalytic Reforming process.

(10 marks)

(b) Describe **FIVE (5)** chemicals derived from the petrochemical industry.

(10 marks)

Question 2

Answer the following questions

(a) Compare the process operation of Cascade and Mixed Refrigerant in liquefaction of natural gas.

(10 marks)

(b) Describe the analysis of Reid Vapor Pressure according to standard ASTM D323.

(10 marks)

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

The process in Figure is one of the processing unit in the refinery plant. According to the figure, answer the following questions.

Refer Below - Figure1 : 1 .

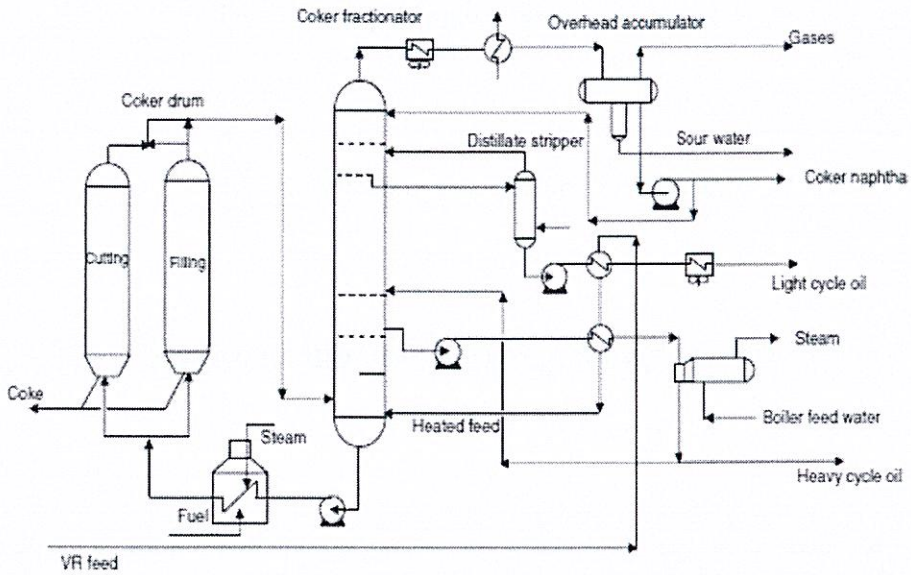

Figure 1: 1

(a) Name the process shown in Figure 1

(2 marks)

(b) Evaluate the effectiveness of the main equipment in the process and justify their functions in achieving the desired operation.

(6 marks)

(c) Analyze the operation of the process depicted in Figure 1.

(12 marks)

Question 2

Natural gas plays several important roles in modern society, contributing to various aspects of energy production, industry, and everyday life. It is a versatile fossil fuel primarily composed of methane along with small amounts of other hydrocarbons like ethane, propane, and butane. It is often found in underground reservoirs formed from decomposed organic matter like plankton and algae, which were buried and subjected to heat and pressure over millions of years.

(a) State FIVE (5) physical properties of natural gas.

(5 marks)

(b) Lists FIVE (5) applications of natural gas in daily life.

(5 marks)

(c) Evaluate the process involved in liquified natural gas production.

(10 marks)

Question 3

The process in Figure 1 is one of the processing unit in the refinery plant. According to the figure, answer the following questions.

Refer Below - Figure2 : 1 .

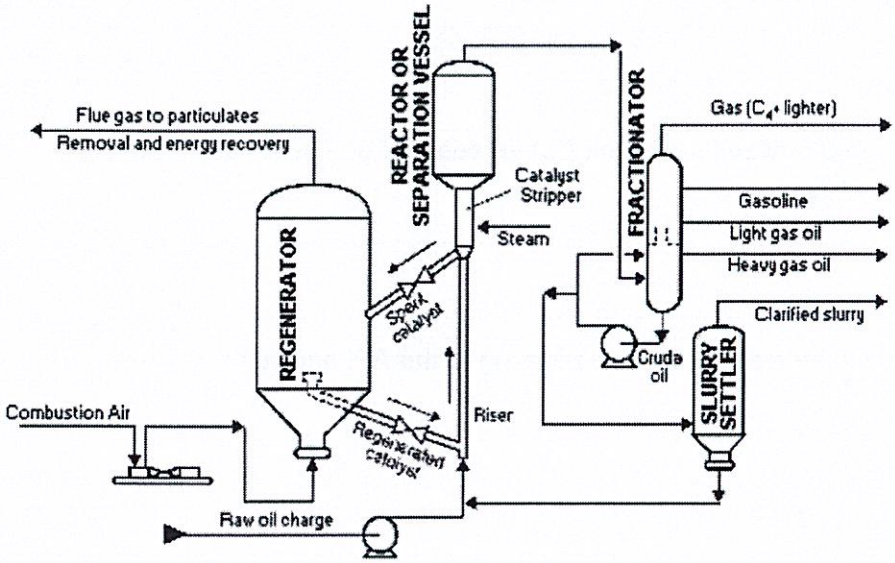

Figure 2: 1

(a) State the process shown in Figure 1.

(2 marks)

(b) Describe the operation of the process depicted in Figure 1.

(12 marks)

(c) Describe the main equipment in the process and describe their functions.

(6 marks)

Question 4

The crude oil quality of FIVE (5) sources are;

i. Banyu Urip [API: 32.0, sulfur: 0.30%],
ii. Ebok [API: 19.8, sulfur: 0.40%],
iii. Thunder Horse [API:31.7, sulfur: 1.13%]
iv. Kutubu [API: 51.4, sulfur: 0.02%]
v. Basrah Light [API: 29.9, sulfur: 2.93%].

(a) Plot a graph of sulfur content (%) versus API gravity for all crude oils and compare their quality.

(10 marks)

(b) Evaluate the types of crude according to the API and sulfur content.

(10 marks)

END OF EXAMINATION PAPER