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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2016/2017**

COURSE NAME : INTRODUCTION TO CHEMICAL  
ENGINEERING TECHNOLOGY /  
FOUNDATION OF CHEMICAL  
ENGINEERING TECHNOLOGY

COURSE CODE : DAK 10202 / DAK 12302

PROGRAMME CODE : 1 DAK

EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017

DURATION : 2 HOURS 30 MINUTES

INSTRUCTION : ANSWERS ALL QUESTIONS IN  
**TERBUKA** SECTION A AND TWO (2)  
QUESTIONS IN SECTION B

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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**SECTION A**

- Q1** (a) Identify the types of hazards for the warning signs based on **Figure Q1 (a)**.  
(9 marks)
- (b) Summarizes **SEVEN (7)** steps involved in Hazards and Operability (HAZOP) studies.  
(7 marks)
- (c) Complete the table below with all the relevant consequences for all **THREE (3)** types of chemical plant accidents below.

**Table 1 : Types of chemical plant accidents**

Type of chemical plant accidents	Probability of occurrence	Potential for fatalities	Potential for economic loss
Toxic release			
Fire			
Explosion			

(9 marks)

- Q2** (a) Define bioremediations.  
(3 marks)
- (b) List **TWO (2)** types of cells in microbial divisions and give **TWO (2)** examples for each type.  
(6 marks)
- (c) There are **TWO (2)** main types of in-situ bioremediation. Differentiate both types.  
(6 marks)
- (d) Phytoremediation is the use of plants to clean up potentially damaging spills. Explain **FIVE (5)** classification of phytoremediation based on the contaminant fate.  
(10 marks)

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**SECTION B**

- Q3** (a) Solve the value of E, C3 and C4 based on **Figure Q3 (a)**. (10 marks)
- (b) One hundred kilograms per minute of a mixture containing 60% oil and 40% water by mass are fed into a settling tank that operates at a steady state. **TWO (2)** products streams emerge from the settler, the top contains pure oil, and the bottom is 90% water by mass.
- i. Construct a diagram for this process. (6 marks)
- ii. Calculate the flowrate for the **TWO (2)** product streams. (9 marks)

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**Q4** (a) Define:

- (i) Element
- (ii) Compound
- (iii) Accuracy

(6 marks)

(b) Identify the **SEVEN (7)** base of SI units.

**Table 2 : The seven base SI units**

Quantity	Unit
Length	
Mass	
Temperature	
Time	
Amount of Substance	
Luminous Intensity	
Electric Current	

(7 marks)

(c) Consider separate 100.0 gram samples of each of the following:

H <sub>2</sub> O	N <sub>2</sub> O	C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>	CO <sub>2</sub>
18gm	34gm	24gm	24gm

Solves them from the lowest to the highest percent oxygen by mass.

(12 marks)

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- Q5** (a) (i) Define chemical engineering. (2 marks)
- (ii) State **FIVE (5)** field chemical engineer does for a living. (5 marks)
- (b) Briefly describe **FOUR (4)** roles of chemical engineering technologist. (8 marks)
- (c) Explain **FIVE (5)** future challenges of engineering. (10 marks)

- Q6** (a) Define process flow diagram (PFD). (2 marks)
- (b) Explain **FOUR (4)** purposes for drawing process flow diagram (PFD). (8 marks)
- (c) (i) Briefly explain about chemical process technology. (5 marks)
- (ii) Relate the equipment used in the operation of chemical process technology.

Operation	Equipment

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(10 marks)

**-END OF QUESTIONS -**

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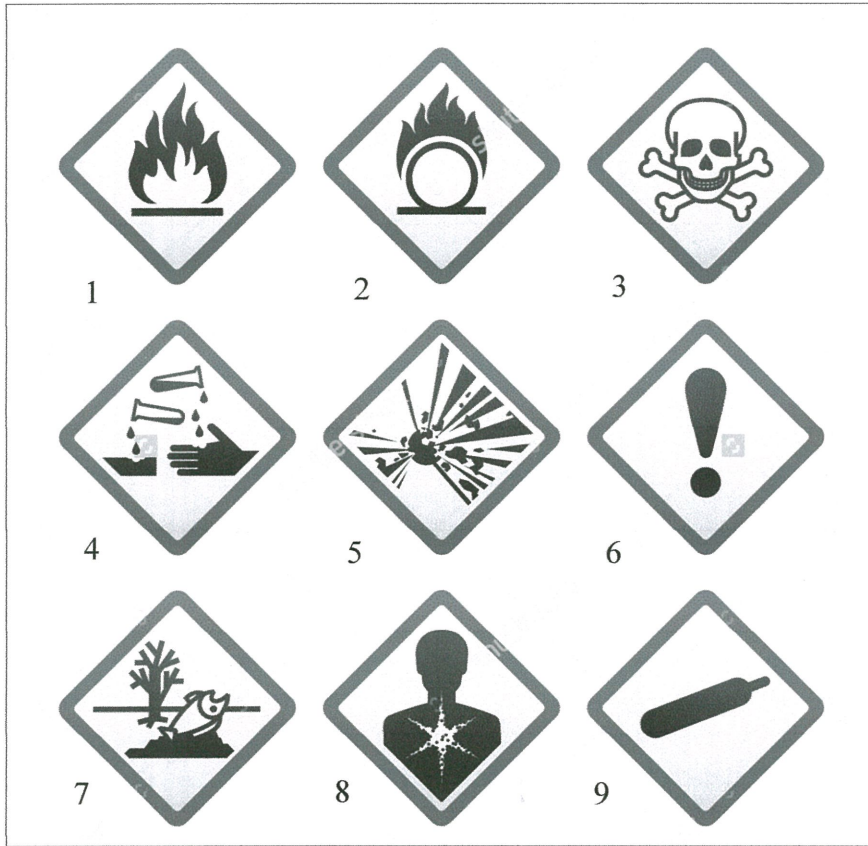


Figure Q1 (a)

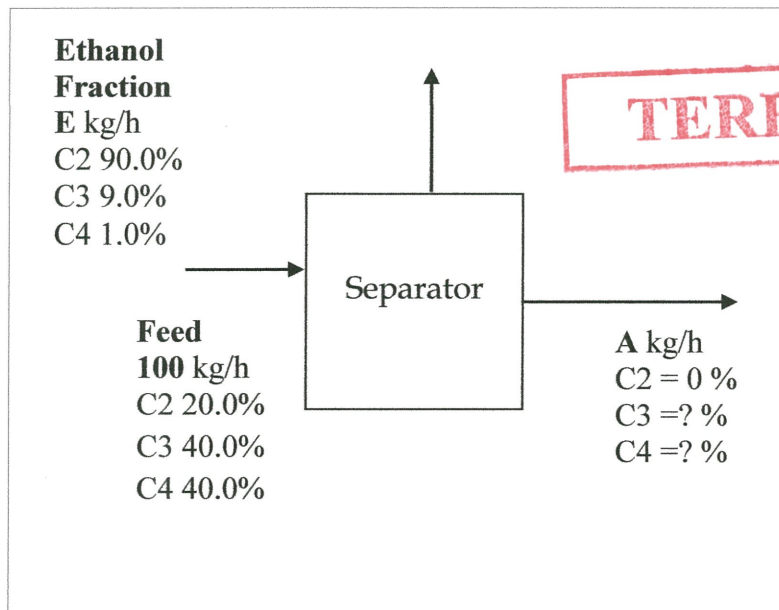


Figure Q3 (a)