Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

COURSE NAME	:	CHEMICAL INDUSTRY
COURSE CODE	:	BNS 10403
PROGRAMME CODE	:	BNS
EXAMINATION DATE	:	JULY 2024
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER **ALL** QUESTIONS 2. THIS FINAL EXAMINATION IS CONDUCTED VIA ☐ Open book ☒ Closed book 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1

(a) Define the term and give ONE (1) example for these terminologies:

(i) Fume

(ii) Mist

(5 marks)

(b) There are TWO (2) types of air monitoring to evaluate the exposure monitoring. Identify TWO (2) types of air monitoring and explain the difference.

(5 marks)

(c) The purpose of chemical exposure monitoring is to evaluate the chemical hazardous to health entering the body through various routes of exposure. Result from the exposure monitoring can be obtain by collecting the sample required through assessment. Therefore:

(i) Sketch the graph of concentration-duration, by showing the differences between each FOUR (4) types of samples required.

(10 marks)

(ii) Determine FIVE (5) factors to be consider in order to plan and conduct an assessment, to obtain sample required for the exposure monitoring.

(5 marks)

Q2

(a) There are TWO (2) assessments of evaluation exposure for inhalation. Identify these TWO (2) assessments and explain the difference between each assessment

(5 marks)

(b) There are FOUR (4) important factors to be considered when assessing exposure of the potential chemical hazardous to health during normal operation in the workplace. Identify and explain all FOUR (4) important factors

(10 marks)

(c) A worker conducted a partial period consecutive sample of ammonia and the shift duration is 8 hours. Exposure monitoring results of three samples of ammonia are recorded and the Permissible Exposure Limit (PEL) for ammonia is 25ppm. Assuming that there is no exposure during the remainder of the shift, therefore:

(i) By referring to the results of three samples of ammonia shown in Table Q2.1, calculate the 8-hour Time-Weighted Average (TWA) concentration of ammonia

Table Q2.1

Chemical	Sample ID	Duration (minutes)	Concentration (ppm)
Ammonia	1	150	15
	2	130	30
	3	150	11

(6 marks)

(ii) Calculate and determine the Exposure Rating (ER) based on Table Q2.2

Table Q2.2

Time-Weighted Average (TWA) or Short Term Exposure Limit (STEL) or Ceiling Limit	Exposure Rating
≥ PEL	5
≥ 0.75 PEL but < PEL	4
≥ 0.5 PEL but < 0.75 PEL	3
≥ 0.1 PEL but < 0.5 PEL	2
<0.1 PEL	1

(4 marks)

Q3

(a) Give example of these terminologies:

(i) Acute effects

(ii) Chronic effects

(iii) Xenobiotics

(iv) Local effects

(v) Systemic effects

(5 marks)

(b) Explain and give ONE (1) example of these terminologies:

(i) Additive effect

(ii) Independent effects

(iii) Synergistic effects

(iv) Antagonistic effects

(v) Dose

(10 marks)

(c) Dose-response relationships describe the effect on an organism caused by differing levels of exposure or dose. The dose-response curve is a valuable tool for understanding the levels at which substances begin to exert adverse effects and the degree of harm expected at various levels.

Therefore, sketch the graph of dose-response curves by identifying the exact point of LD50, LC50 and NOAEL and explain the differences between them.

(10 marks)

Q4

(a) Identify **FIVE (5)** methods of hazard communication provided in the control measure of organizational controls

(5 marks)

(b) Determine **FIVE (5)** general safe work practices to ensure that hazards are eliminated or risks are minimized at the workplace.

(10 marks)

(c) Chemical hazard communication to workers is crucial to ensure safe daily operation and a part of emergency preparedness element.

(i) Describe **THREE (3)** types of information that need to be communicated to the workers who might be exposed to the chemicals hazardous to health.

(6 marks)

(ii) List **FOUR (4)** group of workers that should be included to be informed on chemical hazards.

(4 marks)

- END OF QUESTIONS -