



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CPD22303
COURSE TITLE : INDUSTRIAL SAFETY & HEALTH
PROGRAMME NAME : DIPLOMA IN CHEMICAL ENGINEERING TECHNOLOGY
DATE : 27 JANUARY 2026
TIME : 2:00PM - 4:00PM
DURATION : 2 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. Section A consist 25 MCQ or EMQ questions. Answer ALL questions.
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*

THERE ARE 14 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 25 marks)

Answer ALL questions.

Please use the objective answer sheet provided.

1. Explain when the use of Personal Protective Equipment (PPE) is appropriate within the Hierarchy of Control.
 - A. Only when other control measures are not practical or sufficient
 - B. As the first control option
 - C. Only during training sessions
 - D. For all employees regardless of hazard

2. Apply risk prioritization in situations involving multiple hazards and limited resources.
 - A. Tasks with low potential for injury
 - B. Stable routine activities
 - C. Activities with no human involvement
 - D. New processes or operations

3. State the meaning of the acronym HIRARC.
 - A. Hazard Inspection and Risk Control
 - B. Hazard Identification, Risk Analysis, Risk Calculation
 - C. Hazard Identification, Risk Assessment, Risk Control
 - D. Hazard Isolation, Reduction, and Control

4. Apply proper chemical storage practices in the workplace to ensure safety and compliance.
 - A. Using ordinary domestic refrigerators for flammable chemicals
 - B. Keeping food together with chemicals
 - C. Storing liquids above eye level
 - D. Segregating chemicals according to their compatibility
5. Explain when a supplier is required to provide a Safety Data Sheet (SDS) under the CLASS 2013 Regulations.
 - A. Every chemical, regardless of its hazard classification
 - B. Hazardous chemicals and mixtures that exceed the specified cut-off concentration
 - C. Only substances that are imported
 - D. Only chemicals used in laboratory settings
6. Explain the purpose of containment as a control measure in occupational safety and health.
 - A. Prevent waste
 - B. Restrict a hazard within a closed system
 - C. Store chemicals for future use
 - D. Improve productivity
7. Explain the formula used to calculate the OSHA Incident Rate (IR) for workplace injuries and illnesses.
 - A. $(\text{Number of cases} \times 200,000) / \text{total hours worked}$
 - B. $(\text{Number of employees} \times 100) / \text{total cases}$
 - C. $(\text{Total hours} \times 200,000) / \text{number of cases}$
 - D. $(\text{Number of cases} \times \text{total hours}) / 200,000$

8. Describe the correct sequence of control measures according to the Hierarchy of Control.
- A. Elimination → Substitution → Engineering → Administrative → PPE
 - B. PPE → Administrative → Engineering → Substitution → Elimination
 - C. Engineering → Elimination → PPE → Substitution → Elimination
 - D. Substitution → Elimination → PPE → Administrative
9. Explain the level at which control measures should be applied to achieve the most effective hazard control in occupational safety.
- A. The source of the hazard
 - B. The management level
 - C. The worker level
 - D. The administration office
10. State the DOSH reporting form that is specifically used for occupational poisoning and occupational disease.
- A. JKKP 8
 - B. JKKP 6
 - C. JKKP 7
 - D. JKKP 9
11. Explain the meaning of severity in the context of occupational risk assessment.
- A. Number of employees trained
 - B. Degree of harm or damage caused
 - C. Frequency of exposure
 - D. Duration of task performed

12. Explain the requirement for a hazardous chemical that is transferred into another container under the USECHH 2000 Regulations.
 - A. Kept unlabelled if the transfer is temporary
 - B. Stored in a fume hood
 - C. Discarded after use
 - D. Relabelled immediately

13. State the permissible daily noise exposure limit specified under the Occupational Safety and Health (Noise Exposure) Regulations 2019.
 - A. 75 dB(A)
 - B. 85 dB(A)
 - C. 90 dB(A)
 - D. 65 dB(A)

14. Describe the required appearance of a hazard pictogram under the CLASS 2013 Regulations.
 - A. A green square with a white outline
 - B. A blue circle with black text
 - C. A black symbol on a white background with a red border
 - D. A yellow diamond with black text

15. Recognize the control method that is considered least effective in reducing workplace hazards within the Hierarchy of Control.
 - A. Substitution
 - B. Engineering control
 - C. Personal Protective Equipment (PPE)
 - D. Administrative control

16. Describe the two fundamental dimensions used to define risk in occupational safety.
- A. Probability and Time
 - B. Accident and Damage
 - C. Likelihood and Severity
 - D. Hazard and Control
17. Recognize the situation that requires an incident to be classified as a recordable case according to OSHA's injury and illness recording criteria.
- A. An employee receives medical treatment beyond first aid following a work-related injury
 - B. An employee receives only first aid for a minor cut
 - C. An employee attends a routine medical check-up with no injury
 - D. An employee experiences minor bruises that do not require treatment
18. Explain the meaning of a Safe Work Permit (SWP).
- A. A checklist issued after the work is completed
 - B. An informal agreement between a contractor and a worker
 - C. A formal written authorization for specific work at a defined location and time
 - D. A verbal instruction to perform work safely
19. State the definition of LD₅₀ in toxicology.
- A. A dose that produces death in 50% of a test animal population
 - B. A dose that is lethal to all test animals
 - C. The maximum tolerable dose of a substance
 - D. A dose that causes illness in 50% of humans

20. Identify the type of control measure illustrated by replacing a hazardous chemical with another chemical that presents a lower level of risk.
- A. Substitution
 - B. Personal Protective Equipment (PPE)
 - C. Administrative control
 - D. Elimination
21. Identify the first step in an effective approach to ensuring chemical safety in the workplace.
- A. Storing all chemicals together to improve efficiency
 - B. Eliminating all chemicals from use
 - C. Relying on individual experience when handling chemicals
 - D. Identifying chemical hazards and understanding appropriate control measures
22. Identify the appropriate signal word to be displayed on a chemical label when more than one hazard classification applies under the CLASS 2013 Regulations.
- A. "Danger" only
 - B. Both terms
 - C. "Warning" only
 - D. Neither term
23. Identify the characteristics of a hazard pictogram specified under the CLASS 2013 Regulations.
- A. A yellow diamond with black text
 - B. A black symbol on a white background with a red border
 - C. A blue circle with black text
 - D. A green square with a white outline

24. Identify activities that generate heat or sparks and therefore require a Hot Work Permit.
- A. Excavation of soil
 - B. Welding and cutting operations
 - C. Manual lifting and carrying
 - D. Working with asbestos
25. Chemical exposure in the workplace may occur through various recognized pathways. Identify the option below that does *not* represent a route of chemical exposure.
- A. Inhalation
 - B. Visual contact
 - C. Absorption through the skin
 - D. Injection

SECTION B (Total: 75 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Answer the following questions

- (a) Explain FIVE (5) factors that influence toxicological to humans. Provide a brief explanation for each factor.

(10 marks)

- (b) Karen Sdn. Bhd. is a plastic manufacturing company that produces high-quality products. In the year 2000, the company employed 1,320 workers, and each worker followed an annual work schedule of 2,400 hours, giving a total annual exposure of man-hours worked for the organization.

Based on the accident information provided, perform an accident data analysis for Karen Sdn. Bhd. for the year 2000 and complete the JKPP 8 report.

Data provided: Total number of incidents per month.

January: While repairing a conveyor belt motor, Hafiz slipped on an oil patch and fell sideways onto the metal frame. Medical assessment confirmed a shoulder contusion, and he was placed on 18 days of medical leave.

February: While mixing two incompatible cleaning agents in the maintenance room, Faizal was caught in a sudden chemical reaction that produced an explosive release of pressure. He sustained extensive burn injuries and tragically passed away at the scene.

April: While performing inspection on an over-pressurized air compressor, Hakim was struck by flying metal fragments when the unit suddenly ruptured. He sustained multiple lacerations and a fractured wrist, requiring 28 days of medical leave.

May: While installing a new PVC pipeline above the mixing area, Roslan lost his footing and landed awkwardly on his arm. Examination revealed a minor fracture, and he was granted 25 days of medical leave.

June: While unloading goods at the loading bay, Haziq slipped on loose plastic wrapping, causing him to fall and twist his ankle. He received immediate medical attention and was allowed to return home the same day.

August: During material transfer in the warehouse, Danial lost control of a pallet jack, which rolled forward and struck his lower leg. He suffered mild bruising and required outpatient treatment.

September: While replacing a light fixture above the packing area, Ariff slipped on the ladder due to a loose rung and fell backward. He suffered a lower-back muscle sprain and was granted 20 days of medical leave.

October: Three workers were hospitalized for two weeks after consuming contaminated food provided by the company's caterer. The cause was suspected to be salmonella infection.

November: While carrying equipment down the maintenance staircase, Rashdan missed a step and fell, landing awkwardly on his lower back. He was diagnosed with soft-tissue injury and received 18 days of medical leave.

(15 marks)

Question 2

Answer the following questions

- (a) Workers in a metal fabrication workshop are continuously exposed to noise levels of 94 dB(A) during machine operation. The normal working shift is 8 hours, and the employer provides three rest breaks during the shift as follows:

Morning break: 20 minutes

Lunch break: 45 minutes

Afternoon break: 15 minutes

Some breaks are taken inside the noisy work area, while others are taken in a designated quiet rest area outside the workshop.

Based on the noise exposure information provided, determine the following for each scenario:

Effective exposure duration, T_e

Daily noise exposure level, L_{ex}

Daily personal noise dose

- i. Morning and afternoon breaks are taken inside the workshop, while lunch is taken in the quiet rest area outside the workshop.
(5 marks)
 - ii. Only the morning break is taken inside the workshop, while both lunch and afternoon breaks are taken in the quiet rest area.
(5 marks)
 - iii. All breaks (morning, lunch, and afternoon) are taken inside the workshop.
(5 marks)
- (b) Explain the following terms as used in occupational safety and health.
- i. Occupational injury
(2 marks)
 - ii. Occupational illness
(2 marks)

- iii. Hazard (2 marks)
- iv. Risk (2 marks)
- v. Accident (2 marks)

Question 3

Answer the following questions

- (a) Analyze the chemical hazard classifications under the CLASS 2013 Regulations and provide **THREE (3)** relevant examples for each category. (15 marks)
- (b) Explain **FIVE (5)** key requirements for the effective implementation of Lockout–Tagout (LOTO) procedures for equipment, highlighting the purpose of each requirement. (10 marks)

Question 4

Answer the following questions

- (a) Determine the failure characteristics of a reactor shown in Figure 1 as labeled as A, B, C, D and E.

Refer Below - Figure1 : 1 .

(15 marks)

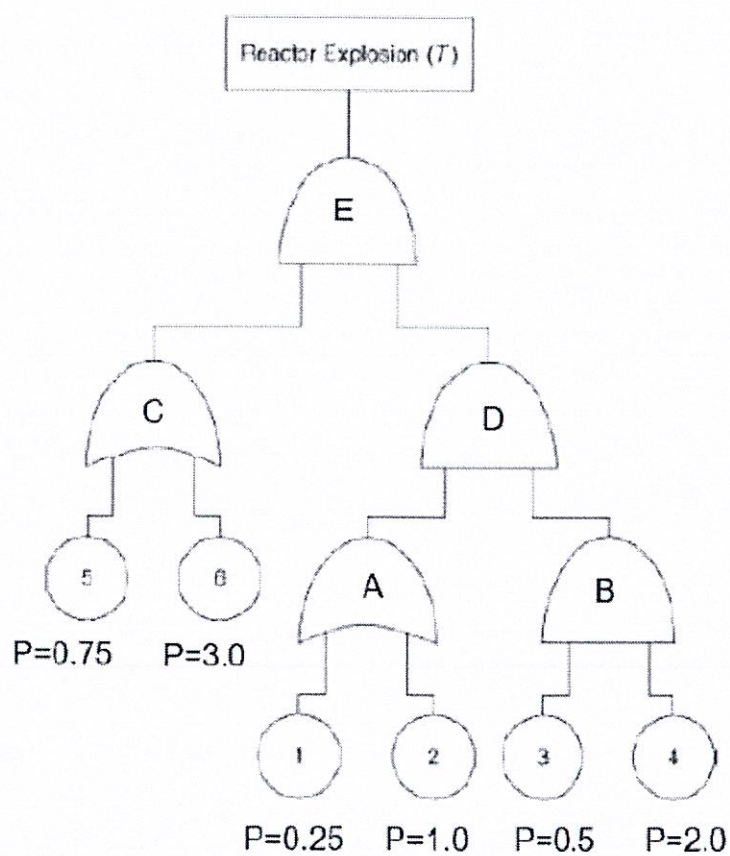


Figure 1: 1

- (b) According to Regulation 8(1) of the CLASS 2013 Regulations, explain **SIX (6)** requirements for chemical labelling on hazardous chemicals.

(10 marks)

END OF EXAMINATION PAPER