



**UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**FINAL EXAMINATION
JANUARY 2016 SEMESTER**

COURSE CODE : JFB 10403
COURSE TITLE : INDUSTRY CHEMICAL HANDLING
PROGRAMME LEVEL : BACHELOR
DATE : 30 MAY 2016
TIME : 2.30 PM – 5.30 PM
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 consists of TWO (2) sections.
 4. Answer ALL questions in Section A. Choose ONE (1) question in Section B.
 5. Please write your answers on the answer booklet provided.
 6. Please answer all questions in English only.
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THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 80 Marks)**INSTRUCTION: Answer ALL questions.****Please use the answer sheet provided.****Question 1**

- (a) Explain the Chemical Agent and give **THREE (3)** examples of chemical agent used widely in industry. (4 marks)
- (b) Specific reference parameters used in assessing risks due to exposure to chemical agents in the workplace are Threshold Limit Value (TLV), Short Term Exposure Limit (STEL), and Lethal Dose 50 (LD₅₀). Elaborate each of them. (6 marks)
- (c) Define biological hazard. (2 marks)
- (d) Explain **THREE (3)** types of standard biohazard procedures in industry. (3 marks)

Question 2

- (a) The data and information of each chemical can be found in Material Safety Data Sheet (MSDS). Suggest **SIX (6)** information that should be included in MSDS. (6 marks)
- (b) List hazard categories based on physicochemical properties in MSDS. (4 marks)

Question 3

- (a) Corrosion is the electrochemical deterioration of a metal because of its chemical reaction with the surrounding environment. This reaction occurs because of the tendency of metals to return to their naturally oxidized states. Write the **FOUR (4)** chemical equations in corrosion steps. (4 marks)
- (b) Elaborate the effect of corrosion to the quality of a material. (2 marks)
- (c) State the formula of Rust (product of corrosion) and its unit (2 marks)
- (d) There are six types of corrosion; uniform, galvanic, pitting, stress, microbial and erosion. Explain **THREE (3)** of them. (6 marks)
- (e) Give **ONE (1)** application of corrosion evaluation in industry. (1 marks)

Question 4

- (a) Emergency Response Plan (ERP) is essential to control emergencies. There are some general principles in an Emergency Response Plan (ERP) to develop a complete emergency procedures. List **SIX (6)** of the principles that should be included in an ERP (6 marks)
- (b) In your word, explain the procedure to execute the Medical Emergency Plan. (4 marks)

Question 5

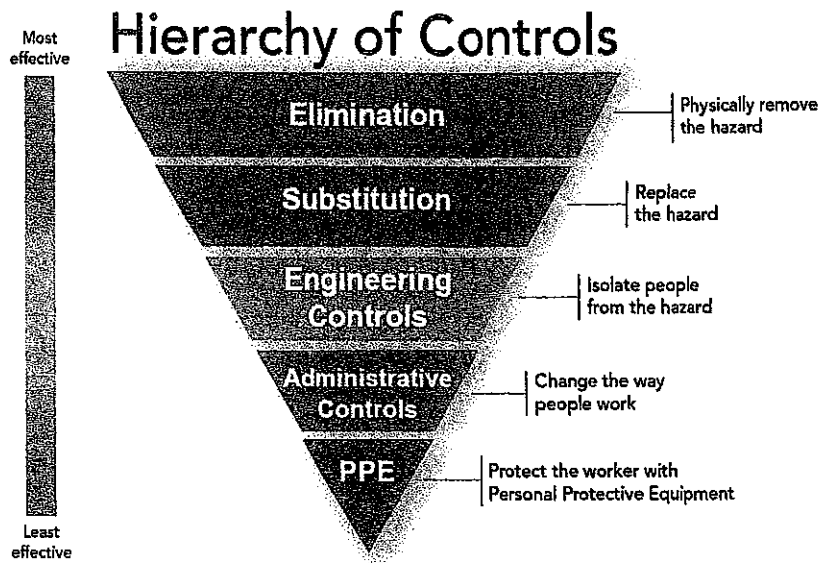


Figure 1: Hierarchy of Controls of Risk Evaluation

- (a) Figure 1 shows the level of control in order to prevent the risk and hazards at workplace. Give **TWO (2)** examples of Engineering Control methods. (2 marks)
- (b) The least desirable control method is Personal Protective Equipment (PPE). List the equipment for eye, face, head, feet, hand, body, hearing and respiratory. (8 marks)

Question 6

- (a) Occupational Safety and Health Administration is an agency of the United States Department of Labor. Explain the mission of OSHA and its evolution of legislation in Malaysia. (4 marks)
- (b) Elaborate the **THREE (3)** main principles of OSHA in drafting its law. (3 marks)
- (c) Evaluate the industries enshrined under OSHA in our country. (3 marks)

Question 7

- (a) Handling and storage of a chemical needs proper management in order to maintain safe workplaces and to reduce accident/injury risks. As a safety officer in an industry, explain the steps taken to handle corrosive and flammable chemicals.

(6 marks)

- (b) Toxic or irritating solids/powders can potentially generate airborne particles during the cleanup process. If not controlled, these airborne particles may become an inhalation hazard. Care is needed to use a cleaning method that suppresses dust/particle generation. Explain your action in handling the spill of these type of chemical materials.

(4 marks)

SECTION B (Total: 20 Marks)

INSTRUCTION: Answer ONE (1) Question only
Please use the answer booklet provided.

Question 1

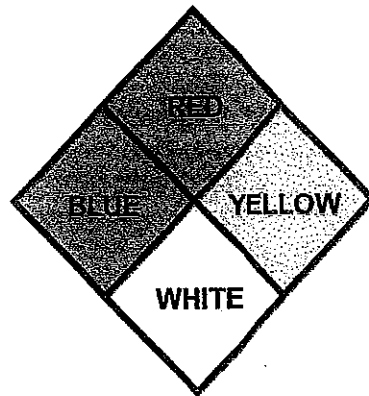


Figure 2: Fire diamond

- (a) Figure 2 shows NFPA (national Fire Protection Association) Hazard Classifications of material for emergency response. Analyze the meaning of color-coded in the four divisions of the "fire diamond".
(4 marks)
- (b) In every column of "fire diamond" there are number or symbol stated in order to indicate the hazard level. Evaluate the value of the number and symbol in each column.
(8 marks)

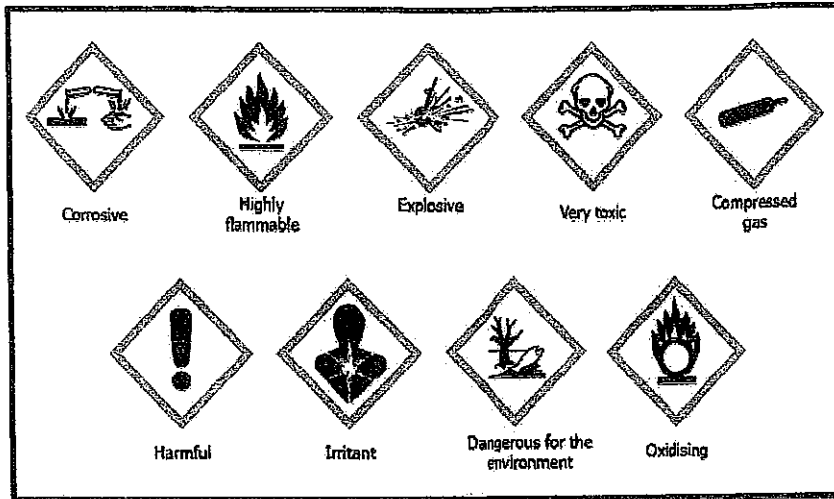


Figure 3: Hazard Symbol

- (c) Figure 3 shows the hazard symbols available at the chemical labelling. Explain **FOUR (4)** of them. Give an example for each symbol.

(8 marks)

Question 2

- (a) Define Lethal Dose 50, its test and the unit
(4 marks)
- (b) Explain the purpose of calculating Lethal Dose for each person.
(4 marks)
- (c) If a pesticide has an oral LD_{50} value of 10 mg/kg, and the test animals each weigh 1 kg, 50% of the animals would die of poisoning if each ate 10 mg of the pesticide. If the test animals weigh 25 kg each, calculate the lethal dose to kill 50% of these animals.
(4 marks)
- (d) Analyze **ONE (1)** ethical concern regarding research for lethal dose.
(2 marks)
- (e) Evaluate the relationship between toxicity and lethal dose of a substance.
(6 marks)

END OF EXAMINATION PAPER

