Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022

COURSE NAME	:	PLANT AND CONSTRUCTION SAFETY
COURSE CODE	:	BNS 20603
PROGRAMME CODE	:	BNS
EXAMINATION DATE	:	JULY 2022
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	1. ANSWERS **ALL** QUESTIONS 2. THIS FINAL EXAMINATION IS CONDUCTED VIA **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 **SIX (6)** PAGES

Q1 (a) Describe the meaning of accident and state the differences between accident and incident terminology.

(5 marks)

(b) In June 1974, there was an explosion and fire at the NYPRO plant in North Lincolnshire, near Flixborough, United Kingdom (UK) which caused 28 fatalities, severe injury to the public, significant damage to many structures in the surrounding countryside and scattered debris around 32 km away.

(i) Analyze the basic principles of combustion concept by using fire triangle and chemical reaction theory based on fire accident at NYPRO plant.

(4 marks)

(ii) Classify **FIVE (5)** classes of fire and provide an example of each class.

(5 marks)

(iii) Discover **FIVE (5)** potential sources of ignition in petrochemical industry.

(5 marks)

(c) Describe the meaning of elimination and substitution as mentioned in hierarchy of control approach. You may use appropriate examples to elaborate each of them.

(6 marks)

Q2 (a) Explain **FOUR (4)** safety and health officer roles in managing emergency situations at construction site.

(4 marks)

(b) Identify **THREE (3)** main functions of safety and health committee in strengthening OSH practices at construction industry in Malaysia.

(6 marks)

(c) Safety and wellbeing of workers must be safeguard against hazards. Work should be carried out in a safe manner, including building construction workplace. Referring to the picture illustrated in **Figure Q2(c)**;

(i) Identify **THREE (3)** physical hazards and **TWO (2)** chemical hazards shown in the **Figure Q2(c).**

(5 marks)

(ii) Recommend control measures for the hazards found based on your answer in **Q2(c)(i).** You may use the hierarchy of control approaches as a control measure.

(10 marks)

Q3 (a) Permit to Work (PTW) is an example of safe systems of work to ensure safe operations in the oil, gas and petrochemical businesses. There are two types of PTW being implemented which are hot work permit and cold work permit. Differentiate between both permits and give **ONE (1)** examples each of PTW type.

(4 marks)

(b) Physical isolation refers to the mechanical isolation of an equipment. It is typically applied in the process involving chemical or thermal energy sources. Mechanism for isolation depends on the nature of work and type of energy. Physical isolation includes positive isolation, double block and bleed and single valve isolation. Explain the purpose of physical isolation and how it is implemented at workplace.

(6 marks)

(c) Confined space is an enclosed or partially enclosed space at atmospheric pressure during occupancy and not intended or designated primarily as a place of work.It contains potential harmful contaminants, deficiency or excess of oxygen level and may cause engulfment. Confined space could have restricted means for entry and exit (Industrial Code of Practice for Safe Working in a Confined Space 2010). Referring to the **Figure Q3 (c)**;

(i) Analyze **FIVE (5)** safety measure shall be taken by the employer before permitted any persons to enter confined space as mentioned in Regulation 13, Safety, Health and Welfare Regulations 1970.

(10 marks)

(ii) Determine **FIVE (5)** main hazards could be presented during performing works in the confined space area.

(5 marks)

Q4 (a) Discover appropriate factors to be considered while choosing the correct Personal Hearing Protector (PHP).

(5 marks)

(b) A Hazard Operability Study (HAZOP) is an examination procedure. Its purpose is to identify all possible deviation from the way in which a design is expected to work and to identify all the hazards associated with these deviations. When a deviation arises that results in hazards, action is generated requiring design engineers to review and suggest solutions to remove the hazard or to reduce its risk to an acceptable level.

(i) Determine **FOUR (4)** situations where the members of an organization should conduct the HAZOP study.

(8 marks)

(ii) Defend **FIVE (5)** required information's prior to conducting the HAZOP study.

(5 marks)

(iii) Give **THREE (3)** examples of process parameter frequently used in HAZOP study.

(3 marks)

(c) Identify **FOUR (4)** risks of electrical hazard existed in oil and gas industry.

(4 marks)

-END OF QUESTIONS –

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SEMESTER / SESSION : SEM II / 2021/2022
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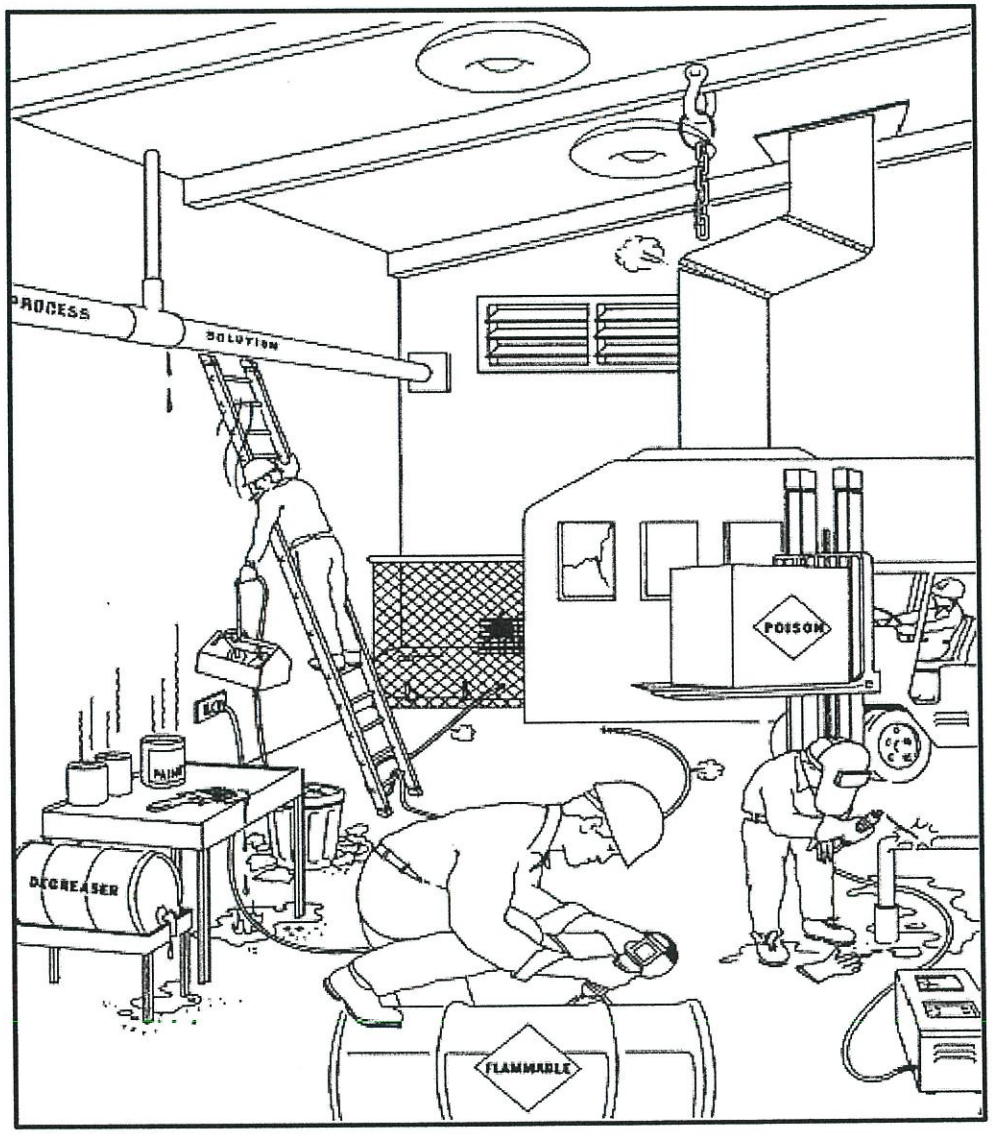

Figure Q2(c)

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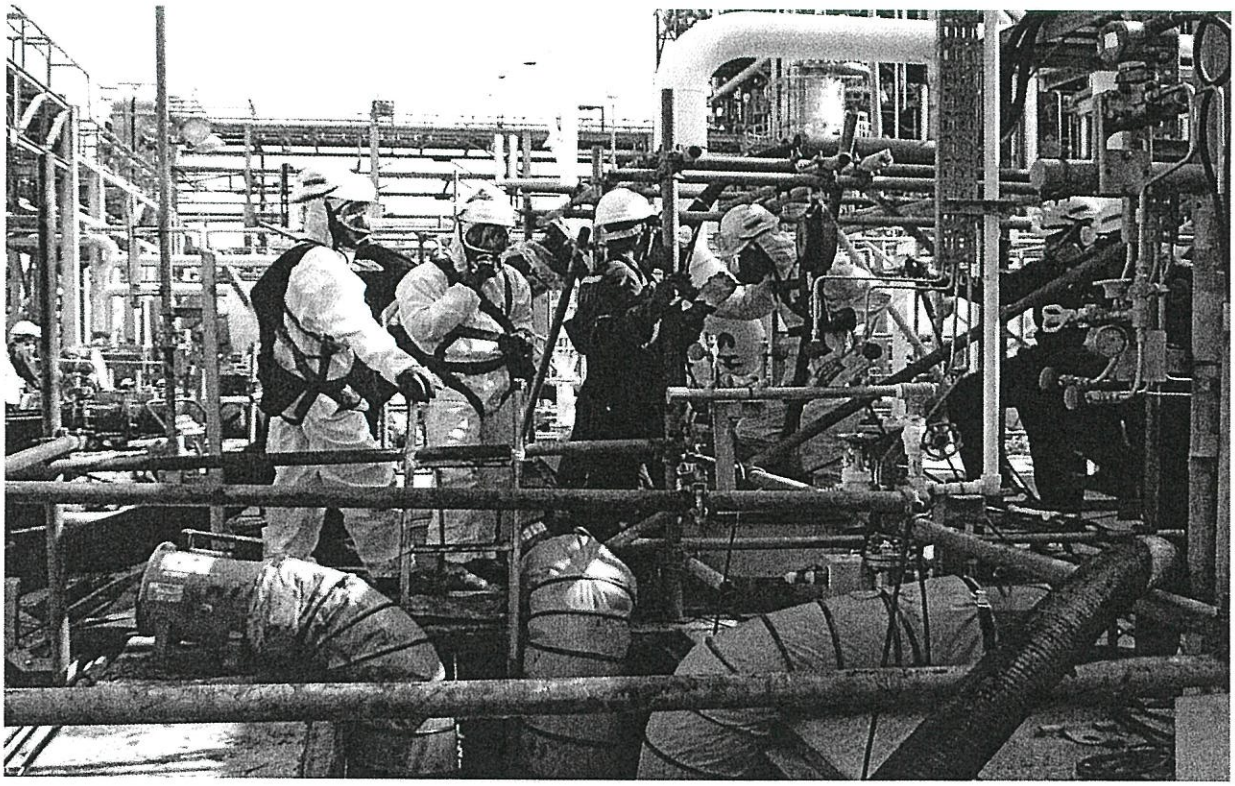

Figure Q3(c)