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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2019/2020**

COURSE NAME : OCCUPATIONAL HEALTH AND HYGIENE  
COURSE CODE : BNS 10203  
PROGRAMME CODE : BNS  
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020  
DURATION : 2 HOURS 30 MINUTES  
INSTRUCTION : ANSWERS ALL QUESTIONS

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

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- Q1** (a) As stipulated by the International Occupational Hygiene Association (IOHA), occupational health and hygiene comprises the principle of anticipation, recognition, evaluation and control of health hazards in the working environment.
- (i) In relation to the above statement, briefly describe the main objective of occupational health and hygiene. (2 marks)
- (ii) Differentiate between the principle of anticipation and recognition, accordingly. (4 marks)
- (b) Hazard is an agent or factor, which has the potential to cause harm. The categories of potential health hazards in the workplaces are inclusive of physical agent and psychosocial factor. List **THREE (3)** physical agents and **THREE (3)** psychosocial factors of potential health hazards, respectively. (6 marks)
- (c) The principle of occupational health and hygiene could be mapping with the concept of HIRARC in occupational safety management system. Illustrate the diagram to show the relationship between the principle of occupational health and hygiene with HIRARC. (4 marks)
- (d) In Malaysia, the Department of Occupational Safety and Health (DOSH) is devoted to the function of standardization for hygiene standards and occupational exposure limit (OEL).
- (i) Identify other **TWO (2)** functions of DOSH. (2 marks)
- (ii) Name **TWO (2)** standards or acts related to OEL governed by DOSH. (2 marks)
- Q2** (a) At workplaces, the exposure of ionizing radiation may also contribute to occupational illness. Define ionizing radiation. (2 marks)
- (b) Classify ionizing radiation into **TWO (2)** broad categories, and give **TWO (2)** examples of each of these categories, respectively. (6 marks)
- (c) Identify **FOUR (4)** effects of ionizing radiation to human health. (4 marks)
- (d) Classify ionizing radiation into **TWO (2)** types of application that benefited human beings, and give **THREE (3)** examples of each of these types, respectively. (8 marks)

**Q3** (a) Mr. David works as Safety and Health Officer (SHO) cum Occupational Hygienist at XYZ Construction Enterprise. He is required to do visit in weekly basis at site project as shown in **Figure Q3 (a)**.

(i) Recognize **SEVEN (7)** hazardous activities performed by site workers and predict the health effect of each of the activities, respectively. (7 marks)

(ii) At work area, Mr. David identified potential health hazards includes exposure of welding fume and moulds spores. Classify the category of hazardous agent for welding fume and moulds spores, respectively. (2 marks)

(iii) Predict **TWO (2)** health effects of welding fume and moulds spores, respectively. (4 marks)

(b) Identify **TWO (2)** common workplaces with the potential health effect caused by airborne gas of welding. (2 marks)

(c) Give **TWO (2)** sources or materials, which can grow the moulds. (2 marks)

(d) Suggest **THREE (3)** examples of application related to moulds that benefited human beings. (3 marks)

**Q4** (a) Many people often used the terms noise and sound interchangeably. Differentiate the definition of noise and sound, accordingly. (4 marks)

(b) Decibel (dB) scale is a log-based scale developed to quantify Sound Pressure Level (SPL).

(i) Using the following mathematical equation of SPL, where reference of sound pressure is equal to the threshold of human hearing, determine the SPL if sound pressure is 0.2 Pa.

$$SPL = 20 \times \log (p/p_o)$$

(3 marks)

(ii) Using the following mathematical equation of Total Sound Pressure Level (SPL<sub>T</sub>), find the SPL<sub>T</sub> if four machines producing 20 dB, 19 dB, 21 dB and 25 dB, respectively.

$$SPL_T = 10 \times \log \Sigma (10^{SPL_i/10})$$

(3 marks)

- (c) In evaluating worker exposure to noise, the occupational hygienist should take consideration in fulfilling the requirement of Permissible Exposure Limit (PEL) by referring to OSHA PEL as summarized in **Table Q4 (c)**.
- (i) Using PEL and the following mathematical equation of Percentage Noise Dose (PND), calculate the PND if given four hours of 90 dBA exposure, two hours of 95 dBA exposure, and one hour of 100 dBA exposure.

$$\text{PND} = \Sigma (C_i/T_i) \times 100$$

Where  $C_i$  is actual time exposed, and  $T_i$  is time allowed to be exposed.

(3 marks)

- (ii) Based on the above results, conclude the noise exposure level of the worker as compared to PEL.
- (2 marks)
- (d) When evaluating exposure of noise, the hygienist should also consider the need for hearing conservation program in accordance with OSHA Noise Hearing Conservation Amendment (HCA) to PEL as depicted in **Table Q4 (d)**.
- (i) Using HCA and mathematical equation of Percentage Noise Dose (PND), compute the PND if given four hours of 80 dBA exposure, two hours of 90 dBA exposure, and two hours of 95 dBA exposure.
- (3 marks)
- (ii) Based on the above results, conclude the need of the worker to undergo hearing conservation program.
- (2 marks)

- Q5** (a) The “Hierarchy of Hazard Control” contains several control methods, which include administrative control, substitution, personal protective equipment (PPE), elimination, and engineering control. Produce a complete “Hierarchy of Hazard Control” using inverted pyramid diagram in the order of the most to the least effective control method.
- (9 marks)
- (b) Briefly explain **FIVE (5)** methods of hazard control.
- (5 marks)
- (c) **Table Q5 (c)** summarizes hazardous task and health effect in a workplace. Propose the hazard control using substitution control method.
- (3 marks)
- (d) Briefly discuss the reason for Personal Protective Equipment (PPE) to be considered not highly effective hazard control method.
- (3 marks)

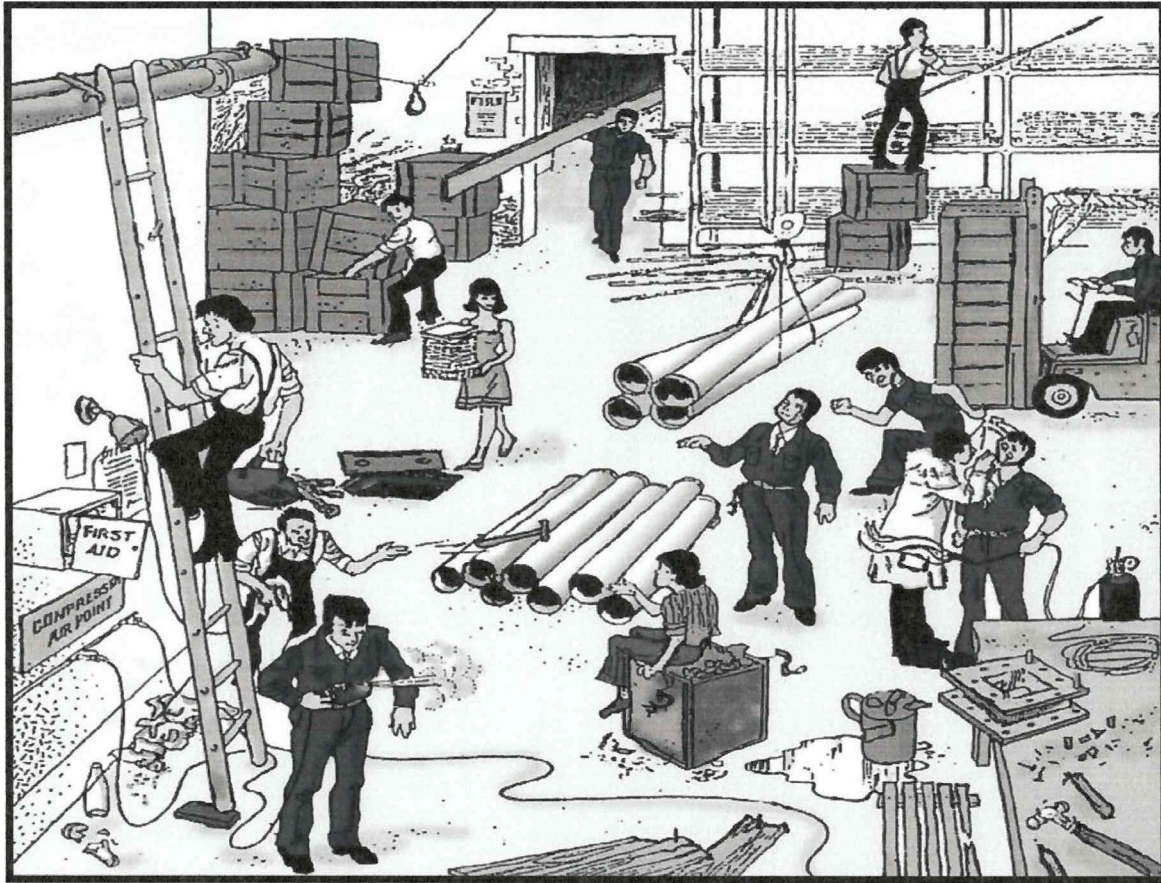
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- END OF QUESTIONS -

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**Figure Q3 (a): Construction Site Project**

**Table Q4 (c): Permissible Exposure Limit (PEL)**

Exposure Time (Hours)	PEL (dBA)
No time limit	< 90
89	0
49	5
2	100
1	105
0.5	110

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**Table Q4 (d): Noise Hearing Conservation Amendment (HCA) to PEL**

Exposure Time (Hours)	PEL (dBA)
32	80
16	85
8	90
4	95
2	100
1	105
0.5	110

**Table Q5 (c): Substitution Control Method**

Hazardous Task & Health Effect	Proposed Hazard Control Method
Cleaning foam causing allergic reactions and nausea	Substitution

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