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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2022/2023**

COURSE NAME : SAFETY IN HVAC ENVIRONMENT

COURSE CODE : BBZ 10204

PROGRAMME CODE : BBZ

EXAMINATION DATE : FEBRUARY 2023

DURATION : 3 HOURS

INSTRUCTION

1. ANSWER 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 **NINE (9)** PAGES

TERBUKA

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- Q1**
- (a) What is workplace incident? (3 marks)

 - (b) Give four (4) methods on how toxic or chemical substances enter the human body. (4 marks)

 - (c) Explain the purpose of grounding all the electrical equipment. (4 marks)

 - (d) Explain the purpose of grounding all the electrical equipment. (6 marks)

 - (e) State four (4) OSHA's requirements for machine guarding. (8 marks)

- Q2** (a) One of the work scope for safety and health officers in the workplace is to monitor and evaluate danger and unsafe situation. Specify five (5) other responsibilities of safety and health officer. (5 marks)
- (b) Alvin and his friends were assigned to do maintenance in the chiller plant room. During the maintenance process in the chiller plant room, one of his friends hit a sharp object and had arm injury(bleeding). What is the emergency first aid approach that Alvin needs to do? Explain the emergency first-aid procedure. (8 marks)
- (c) As a supervisor on the site of a new building construction project, you need to be constantly aware of the hazards and risks involved. Explain the emergency measures in detail that needs to be taken in the event of an accident as follows:
i. Fainting
ii. Eye Injury (12 marks)
- Q3** (a) Your boss has ordered you to lead a new project in which workers need to do some work in confined spaces. There are a few things to be done when preparing to enter the confined space. Discuss the necessary steps before starting work. (7 marks)
- (b) There are a hierarchy to be considered when doing chemical hazard control. Please state and explain the hierarchy beginning from the best step. (8 marks)
- (c) You have been hired as an ESH/OSHA officer consultant in start-up HVAC company. Suggest to the Managing Director on the appropriate OSHA training for his new employees and explain the needs each recommendation. (10 marks)

Q4 (a) A HVAC technician is to work on servicing the rooftop HVAC units such as cooling towers or AHU units. Identify potential hazards while working on a rooftop and recommend a solution for each hazard to the technician.

(10 marks)

(b) Hazard identification, risk assessment and risk control (HIRARC) activities shall be planned and conducted in situation where hazards appear to pose significant threats. The existing controls are uncertain whether adequate or not before implementing corrective or preventive measurement. As one of the workers that involved in the HVAC environment, evaluate the risk assessment related to HVAC building construction hazards with HIRARC procedures in detail. Please refer attachment for guidance to design the HIRARC.

(15 marks)

-END OF QUESTIONS -

- S1**
- (a) Apakah yang dimaksudkan dengan kemalangan tempat kerja? (3 markah)

 - (b) Senaraikan empat (4) cara bagaimana toksik atau bahan kimia masuk ke dalam badan manusia (4 markah)

 - (c) Terangkan tujuan pembumian pada semua peralatan elektrik (4 markah)

 - (d) Berikan tiga (3) punca bahaya elektrik. Terangkan secara ringkas setiap punca. (6 markah)

 - (e) Nyatakan empat (4) keperluan OSHA untuk pengawalan mesin. (8 markah)

- S2** (a) Salah satu skop kerja pegawai keselamatan dan kesihatan di tempat kerja adalah memantau dan menilai keadaan bahaya dan tidak selamat. Nyatakan lima (5) tanggungjawab lain pegawai keselamatan dan kesihatan. (5 markah)
- (b) Alvin dan rakan-rakannya ditugaskan untuk membuat penyelenggaraan di bilik *chiller plant*. Semasa proses penyelenggaraan di dalam bilik *chiller plant*, salah seorang rakannya terlanggar objek tajam dan mengalami kecederaan lengan(berdarah). Apakah pendekatan pertolongan cemas kecemasan yang perlu Alvin lakukan. Terangkan prosedur pertolongan kecemasan. (8 markah)
- (c) Sebagai penyelia di tapak projek pembinaan bangunan baru, anda perlu sentiasa mengetahui bahaya dan risiko yang terlibat. Terangkan langkah-langkah kecemasan secara terperinci yang perlu diambil sekiranya berlaku kemalangan yang melibatkan pekerja seperti berikut:
- I. Pingsan
 - II. Kecederaan pada mata
- (12 markah)
- S3** (a) Bos anda telah mengarahkan anda mengetuai projek baharu di mana pekerja perlu melakukan beberapa kerja dalam ruang terkurung. Terdapat beberapa perkara yang perlu dilakukan semasa bersiap untuk memasuki ruang terkurung. Bincangkan langkah-langkah yang perlu sebelum memulakan kerja. (7 markah)
- (b) Terdapat hierarki yang perlu dipertimbangkan semasa melakukan kawalan bahaya kimia. Sila nyatakan dan jelaskan hierarki bermula dari langkah yang terbaik (8markah)
- (c) Anda telah dilantik sebagai pegawai perundingan ESH/OSHA di sebuah syarikat HVAC yang baru ditubuhkan. Cadangkan ke Pengarah Urusan syarika tersebut tentang latihan yang sesuai dan terangkan keperluan setiap cadangan. (10 markah)

- S4** (a) Seorang juruteknik HVAC akan menservis unit HVAC atas bumbung seperti menara penyejuk atau unit AHU. Kenal pasti potensi bahaya semasa bekerja di atas bumbung dan cadangkan penyelesaian bagi setiap bahaya kepada juruteknik tersebut. (10 markah)
- (b) Aktiviti mengenal pasti bahaya, penilaian risiko dan kawalan risiko (HIRARC) harus dirancang dan dijalankan untuk situasi di mana risiko bahaya muncul dan memberi ancaman yang besar. Kawalan sedia ada tidak pasti mencukupi atau tidak sebelum melaksanakan langkah pembetulan atau pencegahan. Sebagai salah seorang pekerja yang terlibat dalam persekitaran HVAC, sediakan penilaian risiko yang berkaitan dengan bahaya HVAC di kawasan pembinaan bangunan dengan kaedah HIRARC secara terperinci. Sila rujuk pada lampiran untuk panduan merangka HIRARC. (15 markah)

-SOALAN TAMAT -

PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I 2022/2023
 NAMA KURSUS : SAFETY IN HVAC
 ENVIROMENT

KOD PROGRAM : BBZ
 KOD KURSUS : BBZ10204

Attachments

Table 1: Risk Matrix

Likelihood(L)	Severity(S)				
	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5




High 
 Medium 
 Low 

Table 2: Likelihood of Occurrence

LIKELIHOOD(L)	EXAMPLE	RATING
Most Likely	The most likely result of the hazards/event being realized	5
Possible	has a good chance of occurring and is not unusual	4
Conceivable	Might be occur at sometime in future	3
Remote	Has not been known to occur after many years	2
Inconceivable	Is practically impossible and has never occurred	1

Table 3: Severity of Hazard

SEVERITY(S)	EXAMPLE	RATING
Catastrophic	Numerous fatalities, irrecoverable property damage and productivity	5
Fatal	Approximately one single fatality major property damage if hazard is realized	4
Serious	Non-fatal injury, permanent disability	3
Minor	Disabling but not permanent injury	2
Negligible	Minor abrasions, bruises, cuts, first aid injury	1

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Table 4: Example HIRARC Form

No.	1. Hazards Identification			2. Risk Analysis			3. Risk Control		
	Work Activity	Hazard	Which can cause/effect	Existing Risk Control (if any)	Likelihood	Severity	Risk	Recommended Control Measures	PIC (Due date/Status)
1									
2									
3									