

SULIT



Second Semester Examination
2024/2025 Academic Session

July/August 2025

EBB 348/3 – Occupational Safety and Health
[Keselamatan dan Kesihatan Pekerjaan]

Duration : 2 hours
[Masa : 2 jam]

Please ensure that this examination paper contains FOURTEEN (14) pages of printed material including TWO (2) APPENDIX before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi EMPAT BELAS (14) muka surat yang bercetak termasuk DUA (2) LAMPIRAN sebelum anda memulakan peperiksaan ini.]

Instructions : Answer **ALL** questions.

[Arahan] : Jawab **SEMUA** soalan.

In the event of any discrepancies, the English version shall be used.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah digunapakai].

Should any candidate be caught cheating or in possession of materials not authorised to be brought into the Examination Hall during the examination, appropriate disciplinary action will be taken against the candidate concerned. In the event a candidate is found guilty of cheating, he/she can be expelled from the University.

[Sekiranya seseorang calon didapati meniru/menipu ataupun mempunyai bahan-bahan yang tidak dibenarkan dibawa ke dalam Dewan Peperiksaan semasa peperiksaan diadakan, tindakan disiplin yang sewajarnya akan dikenakan terhadap calon berkenaan. Jika seseorang calon didapati bersalah meniru/menipu beliau boleh disingkir dari Universiti.]

- (1). On April 1, 2025, a fire incident occurred at the main gas pipeline owned by PETRONAS Gas Berhad (PGB) nearby Putra Heights, Subang Jaya, Selangor. The fire resulted in more than 140 individuals were injured and admitted to hospital for treatment. In total, approximately 200 properties were reported to have been impacted by the incident. Individuals who were not injured were safely evacuated from the affected area and temporarily relocated to designated evacuation centres. Notably, no fatalities were reported. There are excavation works are ongoing, which spanned 30 metres were carried out to access and examine the affected pipeline, which is estimated to be situated at a depth of six to seven metres underground. The excavation involved the deployment of three excavators, a bulldozer, and a backhoe, and was undertaken under the supervision of multiple agencies, including the Royal Malaysia Police, PETRONAS, the Public Works Department (PWD), the Department of Survey and Mapping Malaysia (JUPEM), the Department of Occupational Safety and Health (DOSH), Tenaga Nasional Berhad (TNB), Air Selangor, and the appointed contractor. Initial investigations revealed no obvious signs of physical damage or external disturbance to the pipeline. The affected section of the pipeline was promptly isolated to mitigate further risk, and all relevant stakeholders and regulatory bodies were immediately informed of the situation. As a precautionary measure, three nearby PETRONAS retail stations were temporarily closed to ensure public safety while investigations and remedial actions were underway.

Pada 1 April 2025, satu insiden kebakaran telah berlaku pada saluran paip gas utama milik PETRONAS Gas Berhad (PGB) berhampiran Putra Heights, Subang Jaya, Selangor. Kebakaran tersebut telah mengakibatkan lebih daripada 140 individu mengalami kecederaan dan telah dimasukkan ke hospital untuk mendapatkan rawatan. Secara keseluruhannya, kira-kira 200 hartanah dilaporkan terjejas akibat insiden ini. Penduduk yang tidak mengalami kecederaan telah dipindahkan dengan selamat dari kawasan terjejas dan ditempatkan sementara di pusat pemindahan yang telah ditetapkan. Tiada kematian dilaporkan berikutan insiden ini. Kerja-kerja pengorekan sedang

...3/-

dijalankan, meliputi kawasan sepanjang 30 meter, bagi mendedahkan dan memeriksa saluran paip yang terjejas, yang dianggarkan terletak pada kedalaman enam hingga tujuh meter di bawah tanah. Kerja pengorekan ini melibatkan penggunaan tiga unit jengkaut, sebuah jentolak dan sebuah backhoe, dan dijalankan di bawah pengawasan pelbagai agensi termasuk Polis Diraja Malaysia, PETRONAS, Jabatan Kerja Raya (JKR), Jabatan Ukur dan Pemetaan Malaysia (JUPEM), Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP/DOSH), Tenaga Nasional Berhad (TNB), Air Selangor, serta kontraktor yang dilantik. Siasatan awal mendapati tiada tanda-tanda kerosakan fizikal atau gangguan luaran yang jelas pada saluran paip tersebut. Bahagian paip yang terjejas telah diasingkan dengan segera bagi mengurangkan risiko lanjut, dan semua pihak berkepentingan serta badan pengawal selia yang relevan telah dimaklumkan serta-merta mengenai situasi tersebut. Sebagai langkah berjaga-jaga, tiga stesen minyak PETRONAS berhampiran telah ditutup sementara bagi memastikan keselamatan awam sementara siasatan dan tindakan pemulihan dijalankan.

- (a). Explain FOUR (4) possible causes that could have led to the pipeline fire incident. Consider factors related to pipeline design, operation, maintenance, external influences, and human error.

Jelaskan EMPAT (4) kemungkinan punca yang boleh menyebabkan insiden kebakaran saluran paip tersebut. Pertimbangkan faktor berkaitan reka bentuk saluran paip, operasi, penyelenggaraan, pengaruh luaran, dan kesilapan manusia.

(9 marks/markah)

- (b). Outline the investigation steps that the safety team should carry out following the incident. Your answer should include data and evidence to be collected, stakeholders to be involved and analytical methods/tools used to determine the root cause.

...4/-

Gariskan langkah-langkah siasatan yang perlu dijalankan oleh pasukan keselamatan selepas insiden tersebut. Jawapan anda perlu merangkumi data dan bukti yang perlu dikumpulkan, pihak berkepentingan yang perlu terlibat, serta kaedah/alat analisis yang digunakan untuk menentukan punca utama kejadian.

(8 marks/markah)

- (c). Propose THREE corrective actions to prevent recurrence of such incidents and TWO preventive measures to strengthen overall pipeline safety management.

Cadangkan TIGA (3) tindakan pembetulan untuk mengelakkan kejadian seumpama ini daripada berulang dan DUA (2) langkah pencegahan bagi memperkukuhkan keseluruhan pengurusan keselamatan saluran paip.

(8 marks/markah)

- (2). Materials Precision Manufacturing is a medium-sized company specializing in the production of intricate metal components for the automotive industry. Over the past year, the company has experienced a concerning rise in workplace incidents, including several near misses involving machinery, a few minor hand injuries during assembly, and one more serious incident where an employee slipped and fractured their wrist in a poorly lit storage area.

Following these incidents, senior management recognized the need for a more systematic approach to occupational safety and health (OSH). They decided to implement ISO 45001:2018 to improve their OSH performance and create a safer working environment for their 150 employees. The initial implementation phase involved establishing an OSH policy, identifying hazards and assessing risks across different departments (machining, assembly, storage, and administration), and defining the roles and responsibilities of personnel related to OSH. A management representative was appointed, and a small OSH committee with representatives from different departments was formed.

...5/-

However, challenges arose during the implementation. Some employees were resistant to new procedures, viewing them as time-consuming and bureaucratic. Communication about OSH matters was inconsistent, with information not always reaching all relevant personnel effectively. Furthermore, while risk assessments were conducted, the follow-up actions and implementation of control measures were not always consistently tracked and verified for effectiveness. Internal audits were conducted once, but the findings were not thoroughly addressed, and corrective actions were delayed.

Recently, a follow-up near miss occurred in the machining department due to a malfunctioning safety guard on a lathe, highlighting the ongoing weaknesses in the system's implementation and maintenance. Senior management is now seeking to understand how to strengthen their OSH management system based on ISO 45001:2018 to prevent future incidents and ensure continuous improvement.

Materials Precision Manufacturing ialah sebuah syarikat bersaiz sederhana yang mengkhusus dalam pengeluaran komponen logam rumit untuk industri automotif. Sepanjang tahun lalu, syarikat itu telah mengalami peningkatan yang membimbangkan dalam insiden di tempat kerja, termasuk beberapa kawasan kemalangan melibatkan jentera, beberapa kecederaan tangan ringan semasa pemasangan, dan satu insiden yang lebih serius di mana seorang pekerja tergelincir dan patah pergelangan tangannya di kawasan penyimpanan yang kurang terang.

Berikutan insiden ini, pihak pengurusan kanan menyedari keperluan untuk pendekatan yang lebih sistematik terhadap keselamatan dan kesihatan pekerjaan (KKP). Mereka memutuskan untuk melaksanakan ISO 45001:2018 untuk meningkatkan prestasi KKP mereka dan mewujudkan persekitaran kerja yang lebih selamat untuk 150 pekerja mereka. Fasa pelaksanaan awal melibatkan penetapan dasar KKP, mengenal pasti bahaya dan menilai risiko di

seluruh jabatan yang berbeza (pemesinan, pemasangan, penyimpanan, dan pentadbiran), dan menentukan peranan dan tanggungjawab kakitangan yang berkaitan dengan KKP. Seorang wakil pengurusan telah dilantik, dan sebuah jawatankuasa KKP kecil dengan wakil dari jabatan yang berbeza telah dibentuk.

Walau bagaimanapun, cabaran timbul semasa pelaksanaan. Sesetengah pekerja menentang prosedur baharu, menganggapnya memakan masa dan birokratik. Komunikasi mengenai hal ehwal KKP tidak konsisten, dengan maklumat tidak selalu sampai kepada semua kakitangan yang berkaitan dengan berkesan. Tambahan pula, walaupun penilaian risiko telah dijalankan, tindakan susulan dan pelaksanaan langkah-langkah kawalan tidak selalu dipantau dan disahkan keberkesanannya secara konsisten. Audit dalaman telah dijalankan sekali, tetapi penemuannya tidak ditangani dengan teliti, dan tindakan pembetulan ditangguhkan.

Baru-baru ini, satu lagi hampir kemalangan berlaku di jabatan pemesinan disebabkan oleh pelindung keselamatan yang rosak pada mesin larik, yang menyoroti kelemahan berterusan dalam pelaksanaan dan penyelenggaraan sistem. Pihak pengurusan kanan kini berusaha untuk memahami bagaimana untuk memperkukuhkan sistem pengurusan KKP mereka berdasarkan ISO 45001:2018 untuk mencegah insiden masa depan dan memastikan penambahbaikan berterusan.

- (a). Based on the case study, identify three specific requirements of ISO 45001:2018 that Materials Precision Manufacturing is currently struggling to effectively implement. For each identified requirement, provide a brief explanation of how the case study demonstrates this struggle and suggest one specific action the company could take to address this weakness in alignment with the standard.

...7/-

Berdasarkan kajian kes, kenal pasti tiga keperluan khusus ISO 45001:2018 yang kini Materials Precision Manufacturing sedang berjuang untuk melaksanakannya dengan berkesan. Bagi setiap keperluan yang dikenal pasti, berikan penjelasan ringkas tentang bagaimana kajian kes menunjukkan perjuangan ini dan cadangkan satu tindakan khusus yang boleh diambil syarikat untuk menangani kelemahan ini selaras dengan standard tersebut.

(10 marks/markah)

- (b). The case study mentions employee resistance to new procedures and inconsistent communication. Explain how Materials Precision Manufacturing could leverage the requirements related to "Consultation and Participation of Workers" (Clause 5.4) and "Communication" (Clause 7.4) of ISO 45001:2018 to address these issues and foster a more positive safety culture. Provide at least two examples for each requirement.

Kajian kes menyebut tentang penentangan pekerja terhadap prosedur baharu dan komunikasi yang tidak konsisten. Jelaskan bagaimana Materials Precision Manufacturing boleh memanfaatkan keperluan yang berkaitan dengan "Perundingan dan Penyertaan Pekerja" (Klaus 5.4) dan "Komunikasi" (Klaus 7.4) ISO 45001:2018 untuk menangani isu-isu ini dan memupuk budaya keselamatan yang lebih positif. Berikan sekurang-kurangnya dua contoh bagi setiap keperluan.

(5 marks/markah)

- (c). Materials Precision Manufacturing conducted risk assessments but struggled with the follow-up and verification of control measures. According to ISO 45001:2018, what are the key elements involved in "Planning to Achieve the OSH Objectives" (Clause 6.2) and "Operational Planning and Control" (Clause 8.1) that the company needs to strengthen to ensure effective implementation of risk control measures and achieve its OSH objectives? Explain the importance of monitoring, measurement, analysis, and evaluation in this context.

...8/-

Materials Precision Manufacturing telah menjalankan penilaian risiko tetapi menghadapi kesukaran dengan tindakan susulan dan pengesahan langkah-langkah kawalan. Menurut ISO 45001:2018, apakah elemen-elemen utama yang terlibat dalam "Perancangan untuk Mencapai Objektif KKP" (Klaus 6.2) dan "Perancangan dan Kawalan Operasi" (Klaus 8.1) yang perlu diperkukuhkan oleh syarikat untuk memastikan pelaksanaan langkah-langkah kawalan risiko yang berkesan dan mencapai objektif KKPnya? Jelaskan kepentingan pemantauan, pengukuran, analisis, dan penilaian dalam konteks ini.

(5 marks/markah)

- (d) The internal audit findings were not thoroughly addressed, and corrective actions were delayed. Explain the purpose of "Internal Audit" (Clause 9.2) and "Management Review" (Clause 9.3) within the framework of ISO 45001:2018. Based on the case study, what specific aspects should Materials Precision Manufacturing focus on during their next internal audit and management review to drive improvement in their OSH management system and prevent recurrence of incidents like the near miss with the lathe's safety guard.

Penemuan audit dalaman tidak ditangani dengan teliti, dan tindakan pembetulan ditangguhkan. Jelaskan tujuan "Audit Dalaman" (Klaus 9.2) dan "Tinjauan Pengurusan" (Klaus 9.3) dalam kerangka ISO 45001:2018. Berdasarkan kajian kes, aspek-aspek khusus apakah yang perlu difokuskan oleh Materials Precision Manufacturing semasa audit dalaman dan tinjauan pengurusan mereka yang seterusnya untuk memacu peningkatan dalam sistem pengurusan KKP mereka dan mencegah berulangnya insiden seperti hampir kemalangan dengan pelindung keselamatan mesin larik.

(5 marks/markah)

- (3). (a). During maintenance of a cutting machine, a worker bypassed the safety interlock and suffered a deep cut injury. Discuss what went wrong and suggest ONE engineering and ONE administrative control that could prevent such an incident.

Semasa menjalankan kerja penyelenggaraan mesin pemotong, seorang pekerja telah memintas sistem kunci keselamatan (safety interlock) dan mengalami kecederaan luka yang dalam. Bincangkan punca masalah dan cadangkan SATU kawalan kejuruteraan dan SATU kawalan pentadbiran yang boleh mencegah insiden tersebut.

(7 marks/markah)

- (b). The picture in Figure 1 shows a workshop floor with electrical wires loosely spread out, an exposed plug, a socket box with multiple connections, metal materials on the ground, and a glove lying nearby. A power tool and hand tools are also seen around the area. Identify TWO (2) hazards posed, including their classification and justify your observations. Thereafter, recommend ONE (1) control measures to mitigate each hazard identified above and evaluate the hierarchy of risk control for your recommended control measures.

Gambar di Rajah 1 menunjukkan lantai bengkel dengan wayar elektrik yang berselerak, palam yang terdedah, kotak soket dengan pelbagai sambungan, bahan logam di atas lantai, dan sarung tangan yang terletak berhampiran. Sebuah peralatan kuasa dan beberapa alatan tangan juga kelihatan di sekitar kawasan tersebut. Kenalpastikan DUA (2) hazard yang wujud, termasuk pengelasan hazard tersebut dan berikan justifikasi terhadap pemerhatian anda. Seterusnya, cadangkan SATU (1) langkah kawalan bagi setiap hazard yang telah dikenalpasti di atas dan buat penilaian terhadap hierarki kawalan risiko bagi langkah kawalan yang dicadangkan.

(10 marks/markah)

...10/-

SULIT



Figure 1 / Rajah 1

- (c). In general, ergonomic hazard can be divided into 2 main categories: physical and mental stress. Explain TWO (2) types of working environment that contribute to physical stress and suggest TWO (2) ways to minimize the hazard.

Secara umum, hazard ergonomik boleh dibahagikan kepada 2 kategori utama: tekanan fizikal dan tekanan mental. Terangkan DUA (2) jenis persekitaran kerja yang menyumbang kepada tekanan fizikal dan cadangkan DUA (2) cara untuk mengurangkan bahaya tersebut.

(8 marks/markah)

- (4). (a). Under the Occupational Safety and Health (Amendment) Act 2022, the roles of Safety and Health Officer (SHO) and Occupational Safety and Health Coordinator (OSHC) are clearly defined and are required based on the size and risk level of the workplace. Based on the OSHA Amendment 2022, describe FIVE (5) key differences between the SHO and the OSHC.

Di bawah Akta Keselamatan dan Kesihatan Pekerjaan (Pindaan) 2022, peranan Pegawai Keselamatan dan Kesihatan (SHO) dan Penyelaras Keselamatan dan Kesihatan Pekerjaan (OSHC) telah ditakrifkan dengan jelas dan diperlukan berdasarkan saiz serta tahap risiko tempat kerja. Berdasarkan Pindaan OSHA 2022, huraikan LIMA (5) perbezaan utama antara SHO dan OSHC.

(10 marks/markah)

...11/-

- (b). On July 11, 1992, a Malaysian court ordered Asian Rare Earth (ARE), which is 35% owned by Mitsubishi Kasei in Japan, to immediately close its plant in Bukit Merah. The court also ordered the company to remove all its radioactive waste and toxic chemicals from the factory.

The Malaysian government, together with the members from International Atomic Energy Agency (IAEA) visited the factory. It was found that the waste channel are totally not safe for the public. Another expert from Japan were called thereafter to gather further evidence where he found that the radiation levels were 800 times the permitted maximum level. The ARE case had been called “Japanese pollution export” by environmentalists.

From the investigation, it was found that the radioactive waste and toxic chemicals were dumped virtually in the villagers’ backyard, without any signs or fences to protect them. The residents of the nearby town have complained about the stinky smell and smoke from the factory, and many health cases had been reported associated with the processing of radioactive materials at Bukit Merah.

Explain how this case relates with the requirements of Acts and Regulations related to environmental, health and safety in Malaysia. (Appendix is given as reference)

Pada 11 Julai 1992, mahkamah Malaysia telah mengarahkan syarikat Asian Rare Earth (ARE), yang dimiliki sebanyak 35% oleh Mitsubishi Kasei dari Jepun, supaya menutup segera kilangnya di Bukit Merah. Mahkamah juga mengarahkan syarikat tersebut untuk membuang semua sisa radioaktif dan bahan kimia toksik dari kilang tersebut.

Kerajaan Malaysia bersama wakil dari Agensi Tenaga Atom Antarabangsa (IAEA) telah melawat kilang tersebut. Didapati bahawa saluran sisa buangan adalah tidak selamat langsung untuk orang awam. Seorang pakar dari Jepun juga telah dipanggil untuk mendapatkan bukti tambahan dan beliau mendapati bahawa tahap radiasi adalah 800 kali lebih tinggi daripada paras maksimum yang dibenarkan. Kes ARE ini telah digelar sebagai "eksport pencemaran Jepun" oleh para pencinta alam sekitar.

Hasil siasatan mendapati bahawa sisa radioaktif dan bahan kimia toksik telah dibuang hampir di kawasan belakang rumah penduduk kampung, tanpa sebarang papan tanda atau pagar keselamatan. Penduduk di bandar berhampiran telah mengadu tentang bau busuk dan asap dari kilang tersebut, dan banyak kes kesihatan telah dilaporkan berkaitan dengan pemprosesan bahan radioaktif di Bukit Merah.

Jelaskan bagaimana kes ini berkaitan dengan keperluan Akta dan Peraturan yang melibatkan alam sekitar, kesihatan dan keselamatan di Malaysia. (Rujukan disediakan dalam Lampiran)

(15 marks/markah)

-oooOooo-

Appendix List of Relevant EHS Rules and Regulations**A. Environmental Quality Act 1974 (EQA 1974)**List of Rules

Environmental Quality (Compounding of Offences) (Open Burning) Rules 2000

Environmental Quality (Compounding of Offences) (Amendment) Rules 1999

List of Regulations

Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996 (Amendment 2000)

Environmental Quality (Clean Air) Regulations 1978 (Amendment 2000)

Environmental Quality (Scheduled Wastes) Regulations 2005 (Amendment 2007)

Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977 (Amendment 1982)

Environmental Quality (Prescribed Premises Scheduled Wastes Treatment and Disposal Facilities) Regulations 1989 (Amendment 2006)

Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations 1978

Environmental Quality (Refrigerant Management) Regulations 1999

Environmental Quality (Halon Management) Regulations 1999

Environmental Quality (Scheduled Wastes) Regulations 2005

Environmental Quality (Motor Vehicle Noise) Regulations 1987

Environmental Quality (Industrial Effluent) Regulations 2009

Environmental Quality (Control of Petrol and Diesel Properties) Regulations 2007

Environmental Quality (Control of Lead Concentration in Motor Gasoline) Regulations 1985

Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996

Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996

Environmental Quality (Control of Emission from Motorcycles) Regulations 2003

Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009

Environmental Quality (Sewage) Regulations 2009

Environmental Quality (Appeal Board) Regulations 2003

Environmental Quality (Licensing) Regulations 1977

List of Orders

Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015

Environmental Quality (Prescribed Activities) (Open Burning) Order 2003

Environmental Quality (Prohibition on The Use of Chlorofluorocarbons and Other Gases as Propellants and Blowing Agents) Order 1993

Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities Order) (Amendment) 2006

Environmental Quality (Prescribed Conveyance) (Scheduled Wastes) Order 2005

Environmental Quality (Delegation of Powers on Marine Pollution Control) Order 1994

Environmental Quality (Delegation of Powers Halon Management) Order 2000

Environmental Quality (Delegation of Powers) (Investigation of Open Burning) Order 2000

Environmental Quality (Delegation of Powers) Order 2005

Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order 1978

Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order 1977

B. Occupational Safety and Health Act (OSHA 1994) and OSHA Amendment Act 2022List of Regulations

Occupational Safety and Health (Noise Exposure) Regulations 2019
Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013
Occupational Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004
Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000
Occupational Safety and Health (Classification, Packaging and Labelling of Hazardous Chemicals) Regulations 1997 (Revoked)
Occupational Safety and Health (Safety and Health Committee) Regulations 1996
Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996
Occupational Safety and Health (Employers' Safety and Health General Policy Statements) (Exception) Regulations 1995

List of Orders

Occupational Safety and Health (Prohibition of Use of Substances) Order 1999
Occupational Safety and Health (Safety and Health Officer) Order 1997

Code of Practices

ICOP on Indoor Air Quality, 2010
ICOP for Chemicals Classification and Hazard Communication (CLASS Regulations), 2014 (rev 2019)
ICOP for Safe Working in a Confined Space, 2010
ICOP for Management of Occupational Noise Exposure and Hearing Conservation, 2019
COP on Prevention and Eradication of Drug, Alcohol and Substance Abuse in the Workplace, 2005
COP on Prevention and Management of HIV/AIDS at the Workplace, 2001
Code of Practice for Road Transport Activities, 2010

C. Atomic Energy Licensing Act 1984 (AELA 1984)List of Regulations

Radiation Protection (Licensing) Regulations 1986
Radiation Protection (Basic Safety Standards) Regulations 2010
Radiation Protection (Transport) Regulations 1989