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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : RADIATION PROTECTION
COURSE CODE : BWC 41703
PROGRAMME CODE : BWC
EXAMINATION DATE : JANUARY / FEBRUARY 2022
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS.
2. THIS FINAL EXAMINATION IS AN
ONLINE ASSESSMENT AND
CONDUCTED VIA CLOSED
BOOK.

TERBUKA

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

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- Q1 (a) Lead and water were utilized as radiation shielding in the exposure room. Compare the physical and chemical properties of water and lead. (5 marks)
- (b) Explain the related factors for the ideal design of the X-ray room as follows:
- (i) Radiation shielding design. (5 marks)
 - (ii) Radiation safety design. (5 marks)
 - (iii) The basic design of radiation facility. (5 marks)
- Q2 (a) Describe the safety precautions that should be taken in the following situations.
- (i) A female radiation worker suspected of being pregnant. (5 marks)
 - (ii) An Industrial Trainer who does not understand the "as low as reasonably achievable" (ALARA) principle when working with radioactive materials. (5 marks)
 - (iii) A radiation worker used an uncalibrated personal dosimeter. (5 marks)
- (b) Although the exposure room is built-in shielded. There is a probability that the radiographer can be exposed to radiation as a result of a beam that can be absorbed, scattered or reflected. Deduce the situation briefly. (5 marks)
- Q3 (a) The public is concerned about the construction of a nuclear reactor in a certain location, particularly the radiation risk. Discuss several approaches to dealing with this issue in terms of radiation hazards to the public via stochastic and deterministic effects. (6 marks)
- (b) The spent fuel pool for nuclear reactor has been designed to defend against potential threats. Explain with examples the threats below.
- (i) Loss of coolant accidents. (3 marks)
 - (ii) Criticality accidents. (3 marks)
- (c) One of the sealed sources is suspected of leaking while being kept in the radioactive storage room. Highlight the leak testing procedures for sealed sources. (8 marks)

- Q4 (a) The radioactive materials were transported from Singapore to Malaysia by truck. Outline the safety precautions that should be followed for before, during, and after the transportation process. (12 marks)
- (b) Mishandling of radioactive material during the transportation process can cause a potential hazard. Point out safety regulations for radioactive material transport via
- (i) truck. (2 marks)
 - (ii) train. (3 marks)
 - (iii) ship. (3 marks)
- Q5 (a) A Radiation Protection Officer (RPO) received 1 gram of radioactive material and decided to keep it in the storage room. From this situation, determine the best approach based on the International Atomic Energy Agency (IAEA) safety standard storage of radioactive materials. (10 marks)
- (b) An unknown amount of radioactive material was suspected lost during the unloading process at Port Klang. Share a description of each member of the radiation emergency team's responsibilities in this case. (10 marks)

-END OF QUESTIONS -