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UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FOURTH BPHARM PART II EXAMINATION – JUNE /AUGUST 2020

PH 4241 RADIO PHARMACY(SEQ)

TIME: TWOHOURS

### INSTRUCTIONS

- There are **four (04)** questions of SEQ paper.
- Answer **all** questions in the booklet provided.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

1.

- 1.1 What is meant by “radiopharmaceuticals”? (10 marks)
- 1.2 List **two** advantages and **two** drawbacks when prescribing radiopharmaceuticals to patients in nuclear imaging. (20 marks)
- 1.3 Define the term “absorbed dose”. (20 marks)
- 1.4 Discuss the factors that would lead to an increase of absorbed radiation dose to a patient from radiopharmaceuticals that used in nuclear imaging. (20 marks)
- 1.5 Define the following terms in relation to radiopharmaceuticals.
  - 1.5.1. Physical half life (10 marks)
  - 1.5.2. Biological half life (10 marks)
  - 1.5.3. Effective half life (10 marks)

2.

- 2.1 Briefly describe the transient equilibrium of a radioisotope using the time activity graph. (20 marks)
- 2.2 Explain why is the  $^{99m}\text{Tc}$  radioisotope mostly used in nuclear imaging? (20 marks)
- 2.3 Sketch a graph to show how parent and daughter activities of technetium vary with time when eluted on daily basis. (15 marks)
- 2.4 Write down the equation to calculate the activity of a radiopharmaceutical after a certain period. (10 marks)

- 2.5 It has been planned to administer 4 mCi radioactivity of  $^{99m}\text{Tc}$  to a patient at 10.30 am for a gamma imaging examination. The half-life of  $^{99m}\text{Tc}$  is 6 hours. Calculate the minimum activity of  $^{99m}\text{Tc}$  should be eluted to a vial at 8.00 am from the generator. (25 marks)
- 2.6 Convert 4 mCi activity into MBq. (10 marks)

3.

- 3.1 List **four** reasons for performing quality tests in the preparation of radiopharmaceuticals. (20 marks)
- 3.2 Briefly explain **four** types of radionuclide classified based on their toxicity according to International Atomic Energy Agency. (20 marks)
- 3.3 Discuss the personal radiation safety steps to be taken by a radiopharmacist before entering to a radiopharmaceutical laboratory. (25 marks)
- 3.4 List appropriate details that should be included when labeling a radiopharmaceutical syringe. (15 marks)
- 3.5 List **four** radioisotopes with their half lives that are used in Positron Emission Tomography (PET). (20 marks)

4.

- 4.1 Briefly explain the stochastic effect and deterministic effect with regards to ionizing radiation. Give **two** examples for each. (20 marks)
- 4.2 Write down the recommended whole body annual dose limits for occupational and public exposure. (20 marks)
- 4.3 List **three** principles of radiation protection. (15 marks)
- 4.4 Briefly explain the method to decontaminate the skin of hand. (15 marks)
- 4.5 What is meant by “low level radioactive waste”? (10 marks)
- 4.6 Give **four** examples each of solid and liquid wastes generated in a nuclear medicine department. (20 marks)

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