

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (RADIOLOGY PART I) EXAMINATION – DECEMBER 2020

ESSAY PAPER

Date: 2nd December 2020

Time: 9.30 a.m. – 11.30 a.m.

Answer each question in a separate book.

Answer all questions.

Each question carries 100 marks.

PART A

RADIATION PHYSICS AND RADIATION PROTECTION

1.
 - 1.1. List three (03) advantages and two (02) disadvantages of using Technetium-99m in nuclear imaging. (15 marks)
 - 1.2. Explain why the Technetium is eluted daily from the generator. (15 marks)
 - 1.3. Briefly explain the main functions of the following components of a gamma camera
 - 1.3.1. Collimator (10 marks)
 - 1.3.2. Thallium activated sodium iodide crystal (10 marks)
 - 1.3.3. Photomultiplier tubes (10 marks)
 - 1.3.4. Pulse height analyzer (10 marks)
 - 1.4. How do the following parameters influence on the spatial resolution and sensitivity of a gamma camera?
 - 1.4.1. Increasing the distance from the patient to the parallel hole collimator. (10 marks)
 - 1.4.2. Increasing the thickness of the sodium iodide crystal (10 marks)
 - 1.4.3. Reducing the energy window level of the pulse height analyzer (10 marks)

Contd...../2-

2.

- 2.1. What is meant by piezoelectric effect? (10 marks)
- 2.2. Defining the symbols, write down an expression for the ultrasound intensity reflection coefficient at an interface between two media. (10 marks)
- 2.3. Explain why it is difficult to image through air and bone in ultrasound imaging. (20 marks)
- 2.4. Explain how an ultrasound transducer is designed to
- 2.4.1 generate and detect ultrasound efficiently (15 marks)
 - 2.4.2 transmit ultrasound efficiently to the patient (15 marks)
- 2.5. Explain why short ultrasound pulses are used in B-mode imaging. (10 marks)
- 2.6. Explain how an ultrasound transducer is producing short ultrasound pulses. (20 marks)

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PART B
ANATOMY, TECHNIQUES AND RADIOGRAPHY

1.
 - 1.1. Describe the technique of ultrasound scanning of thyroid gland including the probe selection. (25 marks)
 - 1.2. Briefly describe the sonographic anatomy of adult thyroid gland and its relationships to the neighbouring structures. (25 marks)
 - 1.3. Briefly discuss the levels of cervical lymph nodes and their draining areas. (50 marks)

2. 50 years old female patient has presented to the radiology department with a swollen and painful right ankle following RTA.
 - 2.1. Enumerate the X-Ray views to assess the ankle joint. (15 marks)
 - 2.2. Briefly describe the radiography of one of the above views. (35 marks)
 - 2.3. Draw a labeled line diagram of a coronal section through the ankle mortis (joint cavity) as seen on T2W MR image. (MRI signal characteristics are not expected). (50 marks)

3.
 - 3.1. Outline the hepatic portal venous system anatomy including its relationships, tributaries and branches. May use labelled diagrams. (70 marks)
 - 3.2. List the imaging methods useful to assess the portal venous system. (30 marks)

4.
 - 4.1. Draw a labeled line diagram of the brain at the level of the mid pituitary gland as seen in coronal T2W MR image (50 marks)
 - 4.2. What is contrast induced nephropathy? (10 marks)
 - 4.3. Describe the patient preparation of
 - 4.3.1. 60 year old Diabetic lady awaiting a contrast CT abdomen and pelvis having a serum creatinine 1.8 and eGFR 38ml/min. (30 marks)
 - 4.3.2. 50 year old gentleman awaiting a contrast CT of brain on the following day, having a H/O bronchial asthma. (10 marks)