

**POSTGRADUATE INSTITUTE OF MEDICINE**  
**UNIVERSITY OF COLOMBO**

**MD (RADIOLOGY) PART I (2015 PROSPECTUS) EXAMINATION –**  
**DECEMBER, 2016**  
**ESSAY PAPER**

**Date:** 6<sup>th</sup> December 2016

**Time:** 9.30 a.m. – 11.30 a.m.

Answer each part in a separate book, marked A, B and C.  
Each part has two (02) questions, of which all have to be answered.  
Each question carries 100 marks.

**PART A**  
**RADIATION PHYSICS AND RADIATION PROTECTION**  
**(BOOK A)**

1.

- (a) Draw a labeled characteristic curve of an x-ray film (20 marks)
- (b) Briefly explain the following parameters using the above characteristic curve
- (i) speed (10 marks)
  - (ii) latitude (10 marks)
  - (iii) film gamma (10 marks)
  - (iv) base + fog (10 marks)
- (c) Briefly explain how the increase of tube voltage (kVp) and intensifying screen thickness affect the following in film screen radiography.
- (i) image contrast (10 marks)
  - (ii) spatial resolution (10 marks)
  - (iii) image sharpness (10 marks)
  - (iv) patient dose (10 marks)

Contd...../2-

2.

- (a) Briefly explain how the range gating is done in pulsed wave Doppler duplex ultrasound. (25 marks)
- (b) What is a pulsed wave Doppler spectral display? (10 marks)
- (c) Briefly explain how the signals are processed to make a spectral display in pulsed wave Doppler duplex ultrasound. (25 marks)
- (d) List the flow information that can be obtained using pulsed wave Doppler duplex ultrasound. (15 marks)
- (e) What steps can be taken to minimize errors associated with pulsed wave Doppler duplex ultrasound? (25 marks)

Contd..../3-

**ANATOMY, TECHNIQUES AND RADIOGRAPHY  
(BOOK B)**

1.

- (a) Draw a labeled line diagram of axial section of CT of upper abdomen at L1 level, depicting major organs, blood vessels and their anatomical relations (40 marks)
- (b) List the structures developed from the ureteric bud (10 marks)
- (c) A 60yr old man sonographically diagnosed as having a right renal cell carcinoma is referred to you for a CT urography. He is a diabetic patient on metformin. There is no history of allergy, asthma or other co-morbidities. His eGFR is 40 mls/min/1.73 m<sup>2</sup>  
Describe briefly
- (i) Patient preparation
- (ii) CT protocol (50 marks)

2.

- (a) Describe briefly how the middle ear cavity communicates with external ear, mastoid air cells, inner ear and pharynx. (40 marks)
- (b) Draw a labeled of line diagram of distal internal auditory canal to show the anatomical arrangement of the major nerves, as seen in sagittal oblique T2W MR image. (30 marks)
- (c) List the important points in HRCT protocol of petrous temporal bones which are useful in improving anatomical details. (30 marks)

3.

- (a) List the articulations at the elbow which form the elbow joint (20 marks)
- (b) What is the sequence of appearance of elbow ossification centers? (age of appearance of epiphyseal centers is not required) (20 marks)
- (c) Describe the two anatomical lines which are helpful in plain radiographic evaluation of elbow trauma. (20 marks)
- (d) A 16 year old boy presented following elbow trauma. Preliminary AP/LAT plain radiographs of the elbow showed evidence of haemarthrosis without a visible fracture  
Describe the plain radiographic views you would instruct your radiographer to perform to look for an occult fracture of radial head (40 marks)

4.

(a) 60 year old patient is admitted to the surgical ward with jaundice. He has biochemical evidence of biliary obstruction.

(i) Briefly describe the Radiologist's role in diagnosis and management of this patient (60 marks)

(ii) Discuss advantages and disadvantages of MRCP in evaluation of pancreatico- biliary system (40 marks)