

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (RADIOLOGY) PART I (2008 PROSPECTUS) EXAMINATION –
DECEMBER, 2016
ESSAY PAPER

Date: 6th December 2016

Time: 9.30 a.m. – 12.30 p.m.

Answer each part in a separate book, marked A, B and C.
Each part has four (04) questions, of which three (03) have to be answered.
Each question carries 100 marks.

PART A
PHYSICS, APPARATUS, PHOTOGRAPHY AND FILM FAULTS
(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)

2.

- (a) Draw a labeled line diagram of a gamma camera. (25 marks)
- (b) What is the purpose of collimators in a gamma camera? (25 marks)
- (c) How does the hole size of a parallel hole collimator of a gamma camera affect on the spatial resolution and sensitivity? (25 marks)
- (d) Briefly explain how the scattered radiation is rejected by the gamma camera. (25 marks)

Contd..../2-

3.

- (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)

4.

- (a) Sketch the inversion recovery pulse sequence of MRI and explain the principle of it. (40 marks)
- (b) Briefly explain how fat signals are suppressed using STIR pulse sequence in MRI. (20 marks)
- (c) Briefly explain how fluid signals are suppressed using FLAIR pulse sequence in MRI. (20 marks)
- (d) Briefly explain how T1, T2 and PD weighted images are obtained using inversion recovery pulse sequence in MRI. (20 marks)

Contd..../3-

PART B
RADIOLOGICAL ANATOMY 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 (50 marks)
 - (b) Briefly describe the sonographic features of normal right kidney of an adult (40 marks)
 - (c) List the structures developed from the ureteric bud (10 marks)

2.
 - (a) Describe briefly how the middle ear cavity communicates with external ear, mastoid air cells, inner ear and pharynx (40 marks)
 - (b) List the components of the facial nerve within the petrous temporal bone (30 marks)
 - (c) Draw a labeled 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)

3.
 - (a) Draw a labeled line diagram of circle of Willis (30 marks)
 - (b) Briefly describe the radiological anatomy of the fourth ventricle (30 marks)
 - (c) Describe important anatomical relationships of left parotid gland and its duct (40 marks)

4.
 - (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 a haemarthrosis with no evidence of a fracture.
Describe the plain radiographic views you would instruct your radiographer to perform to look for an occult fracture of radial head. (40 marks)

PART C
TECHNIQUES, DRUGS AND CONTRAST MEDIA

1.
 - (a) List the indications, contraindications and contrast media used for double contrast Barium enema (20 marks)
 - (b) Describe the technique of double contrast Barium enema including the standard views (patient preparation is not required) (50 marks)
 - (c) List other imaging modalities available to assess large bowel (30marks)

2.
 - (a) 40 year old female presents with sudden onset of dyspnoea. Briefly discuss the radiological evaluation of this patient with a view to confirm/exclude pulmonary embolism (50 marks)
 - (b) Describe the technique of coeliac axis catheter angiography (patient preparation and complications are not required) (50 marks)

3.
 - (a) Describe briefly the technique of neonatal hip ultrasound to exclude developmental hip dysplasia (50 marks)
 - (b) Describe the ultrasound guided wire localization technique of a suspicious mass lesion in the breast with micro-calcification (50 marks)

4.
 - (a) Describe the pre procedural preparations of patients on long term Aspirin, Enoxaparin and Warfarin prior to performing an image guided core biopsy of liver (40 marks)
 - (b) Write short notes on
 - (i) Gadolinium in MR imaging (30 marks)
 - (ii) Ultrasound contrast media (30 marks)