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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (RADIOLOGY) PART I (2015 PROSPECTUS) EXAMINATION – DECEMBER, 2017

ESSAY PAPER

Date : 5th December 2017 Time: 9.30 a.m. – 11.30 p.m.

Answer each question in a separate book.
Answer all questions.
Each question carries 100 marks.

PART A
RADIATION PHYSICS AND RADIATION PROTECTION

1.

(a). Sketch a labeled typical graph of the energy spectrum of a Tungsten target X ray tube operated at 80 kVp. Indicate the values of K_α, K_β and maximum photon energy in the graph. (20 marks)

(b). What is meant by inherent filtration and added filtration in radiography? (10 marks)

(c). Why is the filtration essential in radiography? (10 marks)

(d). Explain the influence of following parameters in film screen radiography

(i) Tube voltage on subject contrast (15 marks)

(ii) Line focus principle on image quality (15 marks)

(iii) Heel effect on beam intensity (15marks)

(iv) Beam collimation on patient radiation dose (15 marks)

2.

(a). Explain the use of following in helical computed tomography (CT)

(i) Slip ring technology (25 marks)

(ii) Interpolation of data (25 marks)

(b). Define the CT number and explain why the linear attenuation coefficients are converted into CT numbers. (25 marks)

(c). Explain how the windowing technique is used to improve the contrast of CT images. (25 marks)

Contd...../2-

PART B
ANATOMY, TECHNIQUES AND RADIOGRAPHY

1.

(a). Draw a labeled line diagram of a coronal section through the shoulder joint as seen on a T2W MR image. (MRI signal characteristics are not expected.) (50 marks)

(b). A patient presents to the emergency department with a painful right shoulder after a fall.
Enumerate the x-ray views that can be used to assess the shoulder joint. (20 marks)

(c). Briefly describe the radiography of two of the above views. (30 marks)

2.

(a). A 50 year old male patient presented to the accident service with a history of acute blunt trauma to the abdomen.
On physical examination he was found to be having a tender abdomen but haemodynamically stable.
Outline your imaging protocol of this patient within the first 24 hours? (20 marks)

(b). Describe the radiological investigations to demonstrate the presence of pneumoperitoneum mentioning the limitations/disadvantages of selected imaging techniques. (40 marks)

(c). Briefly describe the CT technique with appropriate protocol to demonstrate an acute traumatic pancreatic injury. (40 marks)

Contd...../3-

3.

(a). Describe briefly the sonographic anatomy of the adult female breast. (30 marks)

(b). Describe the technique of ultrasound and mammography of female breast highlighting the advantages and disadvantages of each technique. (50 marks)

(c). Do a brief comparison of film screen mammography and digital mammography. (20 marks)

4.

(a). A patient presented with hepatomegaly and clinical suspicion of a focal liver mass.
Briefly discuss the radiological investigations to arrive at a diagnosis. (60 marks)

(b). (i) . What is contrast induced nephropathy (CIN). (10 marks)

(ii) . Describe the patient preparation of a diabetic patient awaiting a contrast CT study, having a persistent eGFR of 40 ml/min/1.73 m^2. (30 marks)