

2/21

1504E207

Candidate's Seat No : _____

M.Sc. Sem.-4 Examination

509

Medical Physics

Time : 2-30 Hours]

April-2025

[Max. Marks : 70

Q.1 Explain in detail how X-ray beam interacts with human body. What is differential transmission of X-ray beam. [14]

OR

Q.1 Write down the application of contrast media and projections at different angles to overcome superimposition of overlying structures. [14]

Q.2 Write is the influence of kVp, mAs and SFD on image quality. Explain in detail selection criteria of these influencing factors for different imaging modalities. [14]

OR

Q.2 What are the different types of imaging modalities in radiodiagnosis. Explain how patient dose and image quality are related. [14]

Q.3 What is filtration? Explain two types of filtration. Draw diagram showing unfiltered and filtered X-ray spectrum. Explain the QA of total filtration for X-ray equipment. [14]

Explain any two X-ray equipment QA with tolerance.

OR

Q.3 Explain the sources of scatter production in X-ray. Explain the ways to reduce the scatter. What is grid? Name the artifacts caused by grid placing errors. [14]

Q.4 What is Spin Echo method in MRI imaging. What is the Transducer in Ultrasound imaging. Explain its component briefly. [14]

OR

E207-2

Q.4 Explain direct and indirect Digital Radiography with diagram. [14]
Explain in brief the working of Computed Radiography.

Q.5 Attempt any seven out of twelve from the following (Each question is [14]
of two marks):

- (i) What is the purpose of Hounsfield Unit?
- (ii) Explain Linear attenuation coefficient with its unit.
- (iii) What are the main sources of scattered radiation?
- (iv) What is the use of CTDI?
- (v) What is the influence of anti-scatter grid on image quality and patient dose?
- (vi) What are different techniques to reduce patient dose in diagnostic radiology?
- (vii) What is the function of an intensifying screen in radiography?
- (viii) Explain briefly indirect Charged Coupled device DR system.
- (ix) What is grid ratio and grid frequency.
- (x) What is the main difference between T1 and T2 relaxation times in MRI?
- (xi) What is direct piezoelectric effect and converse or reverse piezoelectric effect?
- (xii) Explain why Rh/Mo target -filter combination cannot be used in Mammography.