1204E019

Candidate's Seat No :_____

M.Sc. Sem-4 Examination

507

Med. Physics

April 2022

Time : 2-00 Hours] **[Max. Marks : 50**

Instructions: All questions in **Section – I** carry equal marks.
Attempt any **Three** questions in **Section – I.**
Questions in **Section – II** is **COMPULSORY.**

Section – I

Q-I	A.	Describe major sub-systems of a telecobalt machine and define isocentre.	7
	B.	Explain the effects of source size and source to diaphragm distance (SDD) on the geometric penumbra of a telecobalt beam. What will be the width of geometric penumbra at a depth of 10 cm from a telecobalt machine (NTD 80 cm and collimator to isocentre distance 35 cm) loaded with a source of size 2 cm?	7
Q-II	A.	Define and discuss PDD, TAR and BSF.	7
	B.	Define tissue maximum ratio (TMR) and tissue phantom ratio (TPR) and explain their uses.	7
Q-III	A.	Write the characteristics of electron beam.	7
	B.	How variation in output as a function of air gap between the electron applicator end and the patient can be corrected?	7
Q-IV	A.	Write any seven-dosimetry photon test perform during the commissioning of a linear accelerator.	7
	B.	Explain the construction and working of electronic portal imaging device.	7
Q-V	A.	Explain the classification of brachytherapy techniques on the basis of dose rate and type of implant.	7
	B.	What are the advantages and disadvantages of a remote after loading unit over manual after loading unit?	7
Q-VI	A.	Explain any three quality assurance checks performed monthly for remote after loading brachytherapy unit?	7

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B. List down some radioactive sources used on brachytherapy with details and write down decay scheme of any two of them. 7

Q-VII A. Describe patient specific quality assurance for IMRT/VMAT treatment. 7

B. Write a note on total body irradiation (TBI). 7

Q-VIII A. Described IMRT and types of IMRT. 7

B. Write a note on IGRT, KV-CBCT, MV-CT. 7

Section – II

Q-IX MCQs 8

1. Dose distribution outside the field boundaries is significantly affected by

A. Geometric Penumbra
B. Scattering foil
C. Flattening Filter
D. Dmax

2. When a linac calibration is performed with an ion chamber, temperature and pressure corrections are applied to account for expansion or contraction of

A. Chamber wall material
B. Gas in the ion chamber
C. Phantom
D. Changes in the cables between chamber and electrometer

3. The percent surface dose for electrons ----- with energy.

A. decreases
B. increases
C. not change
D. none

4. Radiation field penumbra at d_{max} for 10x10 cm^2 applicator size for all electron energies.

A. $\leq$ 15 mm
B. $\leq$ 10 mm
C. <15 mm
D. <10 mm

5. Which of the following is not used in permanent implants?

A. Au-198
B. I-125
C. Pd-103
D. None of the above

6. Which of the following radioisotope is used in eye plaques?

A. Pd-103
B. Au-198
C. I-125
D. Cs-137

7. In Clarkson method which special quantity is used to calculate the scattering dose

A. SAR
B. PDD
C. MU
D. Dose

8. What is DICOM

A. Digital imaging and communications in medicine
B. Digital imaging and computer of medicine
C. Digital communication
D. None

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