0204N21

Candidate's Seat No : _____

M.Sc Semester-4 Examination
507
Medical Physics

Time : 2-30 Hours]

April-2024

[Max. Marks : 70

Q.1 Explain the principle of electron acceleration in a linear accelerator [14] (Linac). Describe the various components available in the source head and give reasons why they are present there?

OR

Q.1 a) Estimate a relationship between tissue-maximum ratio and [14] percentage depth dose for a square and an irregular field of any geometric configuration.

b) Calculate the MU required to deliver a tumour dose of 200 rads at the isocenter which is located at a depth of 10 cm, given: 10 MV x-ray beam, field size at the isocentre, 8x8 cm, Sc (8x8) = 0.970, Sp (8x8) =0.99, machine calibrated at SCD = 100 cm and TMR (10, 8x8) = 0.832.

Q.2 How oblique incidence, presence of inhomogeneity, irregular surface effect the electron beam? How these situations can be corrected? [14]

OR

Q.2 Explain in vivo dosimetry. Write short note on heavy ion therapy. [14]

Q.3 Write a note on Manchester System and Paris System. [14]

OR

Q.3 What are the recommendations as per ICRU 58 protocol? Also write a short note on ocular brachytherapy. [14]

Q.4 What is algorithm. What are different algorithms used for treatment [14] planning computation?

P.T.O

OR

Q.4 Explain in detail the Intensity Modulated Radiation Therapy (IMRT) [14] and the patient specific quality assurance (PSQA) associated with IMRT treatment.

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

(i) Define isodose curves.

(ii) Define Tissue Air Ratio.

(iii) Define Off-axis ratio.

(iv) Write any two QA for cobalt unit.

(v) Write two advantages of electron beam.

(vi) Define virtual source.

(vii) What is Air Kerma Strength?

(viii) What is Intravascular Brachytherapy?

(ix) What are the advantages and disadvantages of Co-60 source over Ir-192 for brachytherapy?

(x) What is the full form of DICOM, where it is used?

(xi) Mention any two Treatment Planning System (TPS) quality assurance tests.

(xii) Write the full forms of SRS and SBRT. What is the difference between them.

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