RADIOTHERAPY

PAPER-IV

Time: 3 hours RTH/J/20/41/IV
Max. Marks:100

Important Instructions:

- *Attempt all questions in order.*
- *Each question carries 10 marks.*
- *Read the question carefully and answer to the point neatly and legibly.*
- *Do not leave any blank pages between two answers.*
- *Indicate the question number correctly for the answer in the margin space.*
- *Answer all the parts of a single question together.*
- *Start the answer to a question on a fresh page or leave adequate space between two answers.*
- *Draw table/diagrams/flowcharts wherever appropriate.*

Write short notes on:

1. a) Major interactions of ionizing radiation with matter. 5+5
   b) Cellular and molecular basis of radiation damage.

2. a) Linear energy transfer. 2+3+2+3
   b) Stochastic and deterministic effects of radiation.
   c) Deep inspiration breath hold technique.
   d) 2-D matching of photon-photon and photon electron fields.

3. a) Discuss the 4 Rs of Radiobiology. 6+2+2
   b) Abscopal Effect.
   c) Radiotherapy & Immunotherapy.

4. a) Hyperthermia and Radiation. 6+4
   b) What is thermal dose equivalent?

5. Clinical relevance of liquid biopsy in malignant tumours – mechanism, indications and its role in monitoring disease. 3+3+4

6. a) $I^{125.}$ 3+3+4
   b) OER and LET.
   c) Vaccines in cancer.

7. a) 18 F-PSMA PET/CT. 5+5
   b) 68Ga-DOTATOC.

8. a) Fraction size and overall treatment time. 5+5
   b) Clinical application of IORT in breast cancer.

9. a) QUANTEC values of structures of the eye ball. 5+5
   b) Design of a Gamma knife.

10. Rationale and indications for using radio-immunoglobulins in malignant disease. 10

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