

RADIOTHERAPY

PAPER-IV

RTH/D/18/41/IV

Time: 3 hours
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:

- a) What are the occupational dose limits prescribed for radiation workers as per ICRP and AERB? 5+5
 - b) Principle of thermo-luminescent dosimetry.
- a) Radionuclide therapy for bone metastasis. 5+5
 - b) Radio-iodine ablation.
- a) SRS in brain metastasis - discuss indications and doses. 5+5
 - b) Compare the results of whole brain RT with SRS in brain metastasis. Discuss the evidence for same.
- Define the following and include diagrams where necessary: 2+2+2+2+2
 - a) LET.
 - b) OER.
 - c) NSD.
 - d) EQD2.
 - e) BED.
- a) Linear Quadratic model. 5+5
 - b) Direct and indirect actions of ionizing radiation.
- a) What is accelerated repopulation and when does it occur during head and neck radiotherapy? 3+3+4
 - b) What is the estimated tumour doubling time before and after accelerated repopulation in radiotherapy for head and neck squamous cell cancers? What is its impact on cell kill and tumour control?
 - c) What are the strategies to counter accelerated repopulation in head and neck cancer radiotherapy?

P.T.O.

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| 7. | a) Describe the physical properties including half-life, energy, shielding for radioactive Iridium and Cobalt sources used for HDR brachytherapy. | 6+4 |
| | b) Pros and cons of each of the above sources. | |
| 8. | a) Describe the depth dose distribution of Protons and heavy ions with diagram. | 5+5 |
| | b) Clinical situations where proton therapy may be beneficial. | |
| 9. | a) Indications and dose schedules in hypofractionated EBRT in prostate cancer. | 5+5 |
| | b) Discuss indications and describe physical characteristics of radioisotopes used for prostate brachytherapy. | |
| 10. | a) Techniques of on-treatment imaging for IGRT. | 5+5 |
| | b) Cone-beam CT. | |
