

RADIOTHERAPY

PAPER – I

Time : 3 hours

Max. Marks : 100

RTH/D/12/41/I

Attempt all questions in order.
Each question carries 10 marks.

1. What are the functions of following components of a linear accelerator: 2+2+3+3
 - a) Wave guide
 - b) Modulator
 - c) Magnetron
 - d) Flattening filter
2. Explain the characteristics of electron beams used in radiation therapy. Discuss briefly the various parameters to quantify the electron beam. 4+6
3. What is ALARA principle? Explain how this concept has been used for radiation protection. 2+8
4. Describe the indications, radiation dose, target volumes and result of radiation therapy in Wilm's tumor. 2+2+3+3
5. Describe various dose rates used in brachytherapy. What are the advantages of high dose rate brachytherapy as compared to low dose rate? 4+6
6. Describe the various tumor & target volumes as defined by ICRU report no 62. What is a dose volume histogram? Why it is important in radiation treatment planning? 5+2+3
7. Describe the dose prescription and reporting parameters in intracavitary brachytherapy of carcinoma cervix as per the ICRU report no 38. What is the relevance of these parameters in modern brachytherapy? 7+3
8. Describe the indications, dose schedules, radiation techniques and results of prophylactic cranial irradiation. 3+3+2+2
9. Describe the terms 'sensitivity, specificity, positive predictive value, negative predictive value and odds ratio' as used in statistical analysis. 2x5
10. Compare various dose schedules for palliative radiation therapy of metastasis in bones. Describe the primary sites commonly responsible for metastasis to bones. 8+2

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PAPER – II

Time : 3 hours

RTH/D/12/41/II

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1. Write the T-staging of anal canal carcinoma. Which chemoradiotherapy schedule should be the first choice for localized anal canal cancer and why? What is the preferred chemotherapy regimen for metastatic anal canal cancer? 4+3+3
2. Describe the radio isotopes used for non sealed radionuclide therapy for palliation of bone metastasis under the following heads:
a) Physical parameters of radioisotopes
b) Dose prescribed
c) Results 3+3+4
3. Describe the rationale, techniques, indications & results of intra-operative radiotherapy. 2+3+2+3
4. Discuss the various chemotherapy schedules used in triple negative breast cancer. Describe the results of adjuvant & therapeutic combination chemotherapy in triple negative breast cancer. 5+5
5. Discuss the indications, techniques, dose schedules and results of ¹³¹Iodine therapy in thyroid cancer. 3+3+2+2
6. Discuss the indications, schedules, duration and results of combination chemotherapy in neuroblastoma. 3+3+2+2
7. Describe physical parameter of Iridium-192 and its clinical applications in radiation therapy. 5+5
8. Discuss the role of sorafenib in oncology practice under the following headings:
a) Indications
b) Dose
c) Side effects
d) Clinical trials 3+2+2+3
9. Discuss the role of stereotactic body radiation therapy in early stage lung cancer. Discuss its technique and results. 5+5
10. Discuss the indications, drugs used, doses and results of targeted therapy in colon cancer. 2+2+3+3

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PAPER – III

Time : 3 hours
Max. Marks : 100

RTH/D/12/41/III

Attempt all questions in order.
Each question carries 10 marks.

1. Discuss the management of motion in radiation treatment planning and delivery. 10
2. Describe the radiobiological basis, clinical applications and results of hyperthermia in radiation oncology. 4+3+3
3. Discuss the role and evaluation of radiation techniques used in stage I seminoma. Quote the relevant literature. 2+6+2
4. Discuss the biological basis, techniques & results of CHART technique in oncology practice. 4+3+3
5. What is the fundamental basis of tomotherapy? Describe the equipment available and advantages & disadvantages over conventional teletherapy techniques. 4+6
6. Discuss the role, techniques and complications of brachytherapy in patients of carcinoma esophagus. 2+5+3
7. What do you understand by simultaneous integrated boost? Describe the concept in management of carcinoma of nasopharynx in detail. 3+7
8. Discuss the risk stratification in choriocarcinoma. Describe the chemotherapy protocols & results for the various groups. 5+5
9. Discuss the indications, techniques and result of hemibody radiation therapy. 3+4+3
10. Discuss the indications, dose schedules, side effects and results of Erlotinib in modern oncology practice. 2+3+2+3

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PAPER – IV

Time : 3 hours
Max. Marks : 100

RTH/D/12/41/IV

Attempt all questions in order.
Each question carries 10 marks.

1. Enumerate the various radiation monitoring devices. What is the basic principle of thermoluminescent dosimeter (TLD)? Name three crystals used in TLD. 3+4+3
2. What are the various steps for practicing evidence based medicine. What are the NCCN categories of consensus for treatment guidelines? 6+4
3. Define photoelectron effect. Describe its physics and clinical implications. 2+(5+3)
4. Write physical and clinical characteristics of neutron beam therapy. Mention important clinical trials regarding their use in radiation oncology. (4+3)+3
5. What are the different types of biochemical repair of radiation induced DNA damage? Describe each of them in details. 2+8
6. What is linear energy transfer (LET)? Write its biological and clinical implications. Draw a graph showing relation between LET, Oxygen Enhancement Ratio (OER) and Relative Biological Effectiveness (RBE). 2+4+4
7. What is the hypoxic cell sensitizer? What are the characteristics of an ideal radio sensitizer? Enumerate all hypoxic cell sensitizer. 3+4+3
8. Discuss the late effects of radiation treatment of normal kidneys. What is radiation tolerance of normal kidney? 7+3
9. Write short notes on LENT and SOMA scales. 5+5
10. Write short notes on:
 - a) Survival analysis
 - b) Log Rank Test
 - c) Kaplan Meier graphs4+3+3
