

Reg. No.

MANIPAL ACADEMY OF HIGHER EDUCATION

MD (RADIOTHERAPY) DEGREE EXAMINATION – APRIL 2019

SUBJECT: PAPER I: BASIC SCIENCES, RADIOLOGY, STATISTICS, NUCLEAR MEDICINE

Tuesday, April 02, 2019

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ Answer ALL the questions.

✍ Long Essay:

1. Explain in brief the necessity for staging cancers. What are the basic principles and components of staging?

(15 marks)

2. Explain the concept of Relative Biological Effectiveness. How is it related to Linear Energy Transfer? What are the factors that affect RBE?

(15 marks)

3. Write short notes on:

3A. Explain the concept of intent-to-treat analysis.

3B. What are the possible long-term harms of radiotherapy for 15 year old girl requiring involved field radiotherapy to the neck for Hodgkin's lymphoma?

3C. What is the importance of fractionation in a radiotherapy regimen?

3D. Roentgen Equivalent Man.

3E. Describe the general features of deterministic effects of radiation, with a clinical example.

3F. Explain the variation in biological effect of hyperthermia with temperature and duration of heat exposure.

3G. Rationale for vaccination against Human Papilloma Virus in cancer prevention.

3H. What are the risk factors associated with development of esophageal cancer?

3I. Write the clinical course of a radiation worker with estimated 50 Gy acute accidental exposure to whole body.

3J. The concept of α cell kill, β cell kill and α/β ratio in Linear Quadratic model.

(7 marks \times 10 = 70 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION
MD (RADIOTHERAPY) DEGREE EXAMINATION – APRIL 2019
SUBJECT: PAPER II: RADIATION PHYSICS, RADIOTHERAPY

Wednesday, April 03, 2019

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer ALL the questions.**

✍ **Long Essay:**

1. A 65 year old smoker presented with a two month history of insidious, progressive pain in the right shoulder with associated weakness in the right hand. His chest X-ray revealed a lung mass in the right upper zone. How will you evaluate him for diagnosis, staging and further treatment?

(15 marks)

2. What are the dose parameters you will evaluate prior to approving an external beam radiotherapy plan for a patient with margin negative, node positive distal gastric cancer?

(15 marks)

3. **Write short notes on:**

3A. Klystron.

3B. In what scenarios will you consider the use of a bolus in external beam radiotherapy? How is the material and appropriate thickness determined?

3C. Dose volume histograms.

3D. How will you evaluate a lady with cancer breast on follow up, with recent onset backache?

3E. Explain the rationale of short course Neoadjuvant radiotherapy for cancer rectum. What are its benefits and disadvantages compared to conventionally fractionated RT regimen?

3F. Describe the Clinical Target Volumes to be considered for the planning of a cT2N0M0 nasopharyngeal cancer.

3G. Chordoma of the skull base.

3H. Brachytherapy in treatment of extremity soft tissue sarcomas.

3I. Radiation induced liver disease.

3J. How will you plan brachytherapy for a patient with early stage endometrial cancer requiring adjuvant radiotherapy?

(7 marks × 10 = 70 marks)



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MANIPAL ACADEMY OF HIGHER EDUCATION
MD (RADIOTHERAPY) DEGREE EXAMINATION – APRIL 2019
SUBJECT: PAPER III: CHEMOTHERAPY, CLINICAL ONCOLOGY

Thursday, April 04, 2019

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer ALL the questions.**

✍ **Long Essay:**

1. What are the presenting features of Wilms' tumor? Write on the staging of Wilms' tumor. How would you manage a patient with resected stage II favorable histology Wilms' tumor?
(15 marks)

2. Write the WHO risk classification of gestational trophoblastic tumors. Outline the management of a patient with choriocarcinoma.
(15 marks)

3. **Write short notes on:**

3A. Juvenile Pilocytic astrocytoma.

3B. Risk factors for development of esophageal cancer.

3C. Organ preservation strategies in bladder cancers.

3D. Treatment of tumor lysis syndrome.

3E. Reporting of Pap smear.

3F. Enumerate the different types of MEN syndrome.

3G. List the presenting features of SVC syndrome, and enumerate the causes.

3H. Bortezomib.

3I. Evaluation and treatment of stage I follicular lymphoma.

3J. Merkel cell tumors.

(7 marks × 10 = 70 marks)



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MANIPAL ACADEMY OF HIGHER EDUCATION
MD (RADIOTHERAPY) DEGREE EXAMINATION – APRIL 2019
SUBJECT: PAPER IV: RECENT ADVANCES

Friday, April 05, 2019

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer ALL the questions.**

✍ **Long Essay:**

1. Describe the design of a modern gamma knife unit. Enumerate the indications for stereotactic radiosurgery.
(15 marks)

2. Write the steps in the planning of craniospinal radiotherapy for a patient with average risk medulloblastoma.
(15 marks)

3. **Write short notes on:**

3A. Homogeneity Index.

3B. Treatment of Gastrointestinal Stromal Tumors.

3C. Fan beam IMRT.

3D. F18- Fluorodeoxyglucose.

3E. Cetuximab.

3F. Prophylactic para-aortic radiotherapy in cervical cancers.

3G. Role of Stereotactic Body Radiotherapy in non-small cell lung cancer.

3H. Rationale and indications for intraoperative radiotherapy.

3I. Indications and technique of surface mold therapy.

3J. Techniques of adaptive radiotherapy.

(7 marks × 10 = 70 marks)

