

Final Examinations
for Diploma in Radiotherapeutic Technology : DRT (Tech) Course

Paper – III
Radiotherapy Physics – Part II

Time : 3 Hours

Full Marks : 80

Question 1 & 6 are Compulsory.
Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

Q-1) Write down the correct answer:

10x1 = 10

- i) Gray is the unit of:
 - a) Absorbed dose
 - b) KERMA
 - c) Both
- ii) In a 45° wedge the angle of the thin side of the wedge (Material Lead) is:
 - a) Equal to 45°
 - b) Less than 45°
 - c) Greater than 45°
- iii) In a LINAC electron scattering foil is required to:
 - a) Get pencil beam
 - b) Broaden electron beam from pencil beam
 - c) Get X-ray beam
- iv) In Scintillation detector the material which is generally used is:
 - a) NaI
 - b) LiF
 - c) CaSO₄
- v) In a thimble chamber thimble wall is:
 - a) Air equivalent
 - b) Water equivalent
 - c) Tissue equivalent
- vi) Patient immobilization devices are necessary:
 - a) To reduce dose to the tumour
 - b) For reproducibility of the treatment
 - c) For fast execution of the treatment
- vii) The treatment time in LINAC is in:
 - a) Minutes
 - b) MU
 - c) Hour
- viii) In a secondary standard dosimeter the chamber used is:
 - a) Thimble chamber
 - b) GM chamber
 - c) Scintillation counter
- ix) Thermoluminescence dosimeter is suitable for:
 - a) Temporary personnel dose record
 - b) Permanent personnel dose record
 - c) None of the above
- x) Blocks within radiation fields are used to:
 - a) Increase beam intensity
 - b) Protect certain organs
 - c) Increase dose to certain organs

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Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. Define Roentgen. What is its unit in SI system? What is the relation between R and SI unit of exposure? Describe with the help of diagram how the exposure is measured by free air ionization chamber. What is absorbed dose? Define Rad. What is the SI unit of absorbed dose?
2+1+1+10+2+2+2 = 20

Q3. A Co-60 source of teletherapy machine has activity of 10500 Ci and 200 RMM. The source will be changed when the output will be 50 R/m at 80 cm. After how many days the source will have to be changed and what will be the activity of the source at that time?
Half-life of Co-60 is 5.26 years.
What will be the speed of gantry to be set in rpm for a rotational treatment of duration 4 min to get 2 full rotations of the gantry?
Describe at least five QA procedures for the Telecobalt machine.
6+4+10 = 20

Q4. What do you mean by Equivalent dose and Effective dose equivalent? What are the Dose limits recommended by ICRP and AERB? What are the personal monitoring devices used in radiation area? For protection survey around a radiotherapy installation, what should be your choice of instrument from the following and why?
a) Zone monitor
b) Secondary standard dosimeter
c) Survey meter
Describe its principle of measurement.
5+6+2+2+5 = 20

Q5. Describe with diagram the different parts of Telecobalt machine. What type of radiation comes out from it and how?
16+4 = 20

Q6. Write short notes on the following (**Any Four**):- **4 x 7½ = 30**

- a) IMRT
- b) SRS
- c) Radiation emergency
- d) Somatic effects
- e) Linear Accelerator.

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**Paper – IV
Radiotherapeutic Practices & Principles of Treatment**

Time : 3 Hours

Full Marks : 80

*Question 1 & 6 are Compulsory.
Answer any Two from Question No. 2 to 5 and any Four from Question No. 6*

Q-1) Write down the correct answer:

10x1 = 10

- i) Cough and dyspnoea are common symptoms of cancer of:
 a) Bladder
 b) Lung
 c) Oral cavity
 d) Prostate
- ii) Box technique can be used in treatment of:
 a) Cancer Cervix
 b) Prostate cancer
 c) Rectal cancer
 d) All of the above
- iii) Breast Board is used for:
 a) Immobilization of patient
 b) Correction of Contour
 c) Holding the Breast
 d) Comfort of the patient
- iv) Shielding block should be placed at least:
 a) 10 cm from the patient's skin
 b) 15 cm from the patient's skin
 c) 20 cm from the patient skin
 d) 25 cm from the patient's skin
- v) Subsites of supraglottic larynx include:
 a) Laryngeal surface of epiglottis
 b) Arytenoids
 c) Ary-epiglottic folds
 d) All of the above
- vi) Pap smear is a common screening method for cancer of:
 a) Clinical
 b) Biochemical
 c) Radiology
 d) Histological
- vii) Imaging modality of choice for cancers of Brain & Spinal Cord region:
 a) CT Scan
 b) MRI
 c) X-ray
 d) Ultrasonography
- viii) An individual exposed to 100 rads (1 Gy) of whole body x-irradiation would be expected to:
 a) Have bone marrow depression
 b) Be permanently sterilized
 c) Exhibit no symptoms
 d) Vomit
- ix) Early radiation reactions include all, except:
 a) Mucositis
 b) Dry desquamation of skin
 c) Telangiectasia
 d) Moist desquamation of skin
- x) Palliative Radiation treatment should be attempted for:
 a) Early Vocal Cord Cancer
 b) Post operative Breast cancer
 c) Cervical cancer-Stage IIB
 d) Brain metastasis following Lung Cancer

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Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. Outline different methods of diagnosis of cancer. Mention in brief role of radiology, biochemical methods, cytology and histological methods.

5+5+5+5 = 20

Q3. Describe the steps of radiation therapy in a patient of cancer of Nasopharynx starting from simulator room up to the end of first day of execution of treatment. Also mention the precautions you tell the patient.

15+5 = 20

Q4. What is staging – mention its importance. Write briefly about TNM staging classification. Discuss grading in short. Briefly outline the FIGO staging for carcinoma cervix.

6+3+3+8 = 20

Q5. Mention some benign diseases, which can be treated by Radiation Therapy. Outline briefly the role of Radiation therapy in benign diseases.

5+15 = 20

Q6. Write short notes on the following (**Any Four**):-

4 x 7½ = 30

- a) Role of Radiotherapy in Cancer Breast
- b) Cisplatin
- c) Radical and Paliative treatment
- d) ICRT
- e) Immobilization in Radiation Therapy.
