





**[KP 150]**

**Sub. Code : 2047**

**M.D. DEGREE EXAMINATION.**

**Branch IX — Radiotherapy**

**Part II — Preliminary**

**MEDICAL RADIATION PHYSICS AS APPLIED TO  
RADIOTHERAPY**

**Time : Three hours                      Maximum : 100 marks**

**Theory : Two hours and                      Theory : 80 marks  
forty minutes**

**M.C.Q. : Twenty minutes                      M.C.Q. : 20 marks**

**Answer ALL questions.**

**Draw suitable diagrams wherever necessary.**

**I. Essay questions :**

(1) Explain with the help of suitable cross sectional diagram, the design and working of a teletherapy machine with a Co-60 radioisotope. What are the various disadvantages of Tellocobalt machines as compared to linear accelerators. (20)

(2) Explain in detail the radiobiology of LDR, MDR and HDR brachytherapy with reference to cancer of the uterine cervix. (15)

(3) What is Mega voltage radiation? Discuss the construction of loom and installation of High energy linear accelerator. (15)

**II. Short notes : (6 × 5 = 30)**

- (a) Tissue maximum ratio.
- (b) Shielding blocks.
- (c) Inverse Square law.
- (d) Effective dose equivalent
- (e) Annual maximum permissible dose limits.
- (f) Wedges.

[KQ 180]

Sub. Code : 2049

M.D. DEGREE EXAMINATION.

Branch IX — Radiotherapy

Paper I — MEDICAL RADIATION PHYSICS AS  
APPLIED TO RADIOTHERAPY AND RADIATION  
BIOLOGY

(Candidates admitted from 2004-05 onwards)

Time : Three hours                      Maximum : 100 marks

Theory : Two hours and                      Theory : 80 marks  
forty minutes

M.C.Q. : Twenty minutes                      M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I. Essay questions :

(1) Describe the physical properties of alpha, beta, gamma rays and their absorption in matter and the methods of detection. (20)

(2) Draw a block diagram of linear accelerator and describe briefly the functions of the various parts and the clinical applications. (15)

(3) Mention factors that modify radiation response and discuss in detail radio sensitizers and their mechanism of action. (15)

II. Short notes : (6 × 5 = 30)

- (a) Manchester system
- (b) RBE and fractionation
- (c) Radiation survey in a teletherapy facility
- (d) IMRT clinical application
- (e) Radiation protection rules in India
- (f) Rotation and arc therapy.

[KR 150]

Sub. Code : 2046

II. Short notes :

(6 × 5 = 30)

M.D. DEGREE EXAMINATION.

Branch — IX — Radiotherapy

Paper I — MEDICAL RADIATION PHYSICS AS  
APPLIED TO RADIOTHERAPY AND RADIATION  
BIOLOGY

(Candidates admitted from 2004–05 onwards)

Time : Three hours

Maximum : 100 marks

Theory : Two hours and  
forty minutes

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams whenever necessary.

I. Essay :

1. Discuss the role of adjuvant radiotherapy in Oncologic practice. Narrate giving two examples. (20)
2. Discuss the radiobiologic basis of radiation. (15)
3. Write an account on altered radiation fractionation. (15)

**MARCH 2008**

**[KS 140]**

**Sub. Code : 2035**

M.D. DEGREE EXAMINATION.

Branch IX — Radiotherapy

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO  
RADIOTHERAPY AND RADIATION BIOLOGY

Common to all Regulations

**Q.P.Code : 202035**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

- I. Essay : (2 × 20 = 40)
1. Give an account of Radiation protection as relevant to Radiation oncology practice. (20)
  2. Name the various brachytherapy implant dosimetry systems and describe any one in detail. (20)
- II. Short notes : (10 × 6 = 60)
1. Multileaf collimators.
  2. Tissue compensators.
  3. Percentage depth dose.
  4. Radioprotectors.
  5.  $^{99m}\text{Tc}$ .
  6. p-value.
  7. Hyperthermia.
  8. Lymphatic drainage of tongue.
  9. Cancer Registry.
  10. BED (Biological Effective Dose).
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