

M.D. DEGREE EXAMINATION

Branch IX - Radio Therapy

Part II Preliminary

(Revised Regulations)

MEDICAL RADIATION PHYSICS
AS APPLIED TO RADIOTHERAPY

Time: Three hours Maximum: 90 marks

Answer ALL Questions

1. Compare the advantages and disadvantages of different radiation sources used in Brachytherapy. Discuss the highlights of remote afterloading systems in Brachytherapy. (20)
2. Discuss the various treatment planning techniques in the management of Carcinoma Oesophagus by Radiotherapy. (20)
3. Write short notes on:
 - a) Genetic effects of Ionising Radiation
 - b) Interaction of radiation with matter
 - c) Tissue equivalent phantoms
 - d) 'Point A' and 'Point B'
 - e) Diagnostic X-ray tube (5x10=50)

November-1995

[MB 184]

M.D. DEGREE EXAMINATION.

Branch IX — Radiotherapy

Part II — Preliminary

(Revised Regulations)

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours.

Maximum : 90 marks.

Answer ALL questions.

1. Bring out the salient points on the physical aspects of radiotherapy, treatment planning, and treatment execution. Discuss the possible errors to be overcome in achieving good outcome in radiotherapy patient care.

(20 marks)

2. Explain the terms Annual Dose Equipment Limits (ADEL) and as low as reasonably achievable (ALARA). How are radiation protection guidelines followed in a radiotherapy department.

(20 marks)

3. Write short notes on the following :

(a) Inverse Square Law.

(b) Beam modifiers.

(c) Integral Dose.

(d) Linear Accelerator.

(e) Exposure and Absorbed Dose.

(5 × 10 = 50 marks)

October-1996

PK 138

M.D. DEGREE EXAMINATION
Branch IX - Radio Therapy

(Revised Regulations)

Part II

Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIOTHERAPY

Time: Three hours

Max. marks: 90

1. Define Brachytherapy. Classify intracavitary systems. Discuss their clinical application dose rate, advantages and disadvantages. Add a note on radium substitutes. (20)
2. Beam direction and beam modification devices practiced in clinical Radiotherapy Discuss. (20)
3. Write briefly on:
 - (a) L.E.T.
 - (b) Tissue compensators
 - (c) Photoelectric process
 - (d) Beta particle emitter
 - (e) Iridium 192.

(5x10=50)

April-1997

MP 115

M.D. DEGREE EXAMINATION
Branch IX - Radio Therapy
(Revised Regulations)
Part II - Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIO THERAPY

Time: Three hours

Max. marks: 50

Answer All Questions

1. Discuss the various teletherapy radiation treatment planning techniques in the management of carcinoma cervix. (20)
2. Role of medical linear accelerator and tele cobalt machine in radiotherapy treatment of cancer patients in Indian scene - Discuss. (20)
3. Write briefly of
 - (a) Computers in Radio therapy
 - (b) Pair production
 - (c) Film badge
 - (d) Patterson Parker system
 - (e) Proton beam therapy.

(5x10=50)

October-1997

MS 143

M.D. DEGREE EXAMINATION
Branch IX - Radio Therapy
(Revised Regulations)
Part II - Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIO THERAPY

Time: Three hours

Max.marks:90

Answer, All Questions

1. What do you understand by the terms attenuation, absorption and scatter with respect to gamma/X radiations and human body Describe their importance in radiotherapy with special relevance to orthovoltage, cobalt gamma radiations and megavoltage X rays. (20)
2. Write an essay on developing of a radiotherapy department with all basic facilities and lay out plan. Discuss your proposals with enough justifications and reasons. (20)
3. Write briefly on:
 - (a) Beam direction devices in radiotherapy
 - (b) Tissue Air Ratio
 - (c) Radioactive Equilibrium
 - (d) Iridium 192 in brachytherapy
 - (e) Oxygen Enhancement Ratio.

M.D. DEGREE EXAMINATION
Branch IX - Radio Therapy
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Part II - Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIO THERAPY

Time: Three hours

Max.marks:90

Answer All Questions

1. How are radioactive isotopes produced? What are their applications in radiotherapy? (20)
2. Write an essay on 'radiation protection' in radiotherapy departments. (20)
3. Write briefly on:
 - (a) Simulator
 - (b) Pin and Arc
 - (c) Particle beams in Radio therapy
 - (d) Half Value Thickness (HVT)
 - (e) Stereotactic radiosurgery.

(5x10=50)

October-1998

[SM 150]

M.D. DEGREE EXAMINATION.

Branch IX — Radio Therapy

(Revised Regulations)

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours

Maximum : 90 marks

Answer ALL questions.

1. Draw a block diagram of a linear accelerator and explain briefly the function of various components. (20)
2. (a) Define the units of radiation absorbed dose.
(b) Describe the various methods which can be used for measurement of absorbed dose. (20)
3. Write short notes on : (5 × 10 = 50)
 - (a) After loaders in brachytherapy
 - (b) ALARA
 - (c) Compensators
 - (d) Electron Therapy
 - (e) Photoelectric effect.

April-1999

[SG 150]

Sub. Code : 2038

M.D. DEGREE EXAMINATION.

Branch IX — Radio Therapy

(Revised Regulations)

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours

Maximum : 90 marks

Answer ALL questions.

1. Describe and discuss the different qualities of radioactive isotopes which decide their suitability as :
 - (a) Teletherapy sources.
 - (b) Brachytherapy sources. (20)
2. Write an essay on quality assurance in Radiotherapy. (20)
Write short notes on : (5 × 10 = 50)
 - (a) X-Knife
 - (b) Conformal therapy
 - (c) Thermoluminescent dosimetry
 - (d) Wedge filters
 - (e) S.I. Units.

October-1999

[KA 150]

Sub. Code : 2038

M.D. DEGREE EXAMINATION

(Revised Regulations)

Branch IX — Radio Therapy

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours

Maximum : 90 marks

Answer ALL questions.

1. Bring out the difference between the quantities 'Exposure' and 'Absorbed dose'. Explain a beam level dosimeter and how it is used to measure the output of a teleisotope machine used for radiation therapy. (20)
2. (a) Compare various radioactive sources commonly used for brachytherapy treatments in terms of their physical parameters and their relevance. (10)
(b) Describe the Iridium-192 after loading technique including localisation and further dosimetry planning. (10)
3. Write briefly on : (5 × 10 = 50)
 - (a) Isodose curves
 - (b) Tissue compensators
 - (c) Dose build up
 - (d) Annual Dose Equivalent Limits (ADEL)
 - (e) Electron therapy.

April-2000

[KB 150]

Sub. Code : 2047

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch IX — Radiotherapy

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours , Maximum : 90 marks

Answer ALL questions.

1. Compare the various physical features of a cobalt machine with a linear accelerator. Describe the isodose charts for a cobalt beam, high energy X-ray photons with the help of a neat diagram. Explain their advantages and disadvantages in radiotherapy. (20)
2. What are the basic physical properties of brachytherapy radionuclides? Explain with examples. Describe the remote after loading machine that is used in brachytherapy. (20)
3. Write short notes on : (5 × 10 = 50)
 - (a) Tissue compensators
 - (b) Electron beam therapy
 - (c) Iridium 192 ribbons and wires
 - (d) Integral dose
 - (e) Film badge for personal monitoring.

October-2000

[KC 150]

Sub. Code : 2047

M.D. DEGREE EXAMINATION.

Branch IX — Radiotherapy

(Revised Regulations)

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY

Time : Three hours

Maximum : 90 marks

1. How are radioactive isotopes produced? Discuss physical characteristics, merits and demerits of three commonly used radio active isotopes in brachytherapy.
(20)
2. How will you plan on radiation protection in a small radiotherapy department?
(20)
3. Write short notes on : (5 × 10 = 50)
 - (a) Wedges in Radiotherapy.
 - (b) Absorbed dose.
 - (c) Standard Ionisation Chamber.
 - (d) Simulator.
 - (e) Manchester System in treatment of cancer of uterine cervix.