



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION
MAY 2023**

Time 3hrs

Part 1 paper 1

**DRRT-F-I-MAY-2023
Max 100 Marks**

GENERAL AND RADIATION PHYSICS

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION-A

- I. Explain the following** **(5x3=15)**
- | | |
|-----------------------------|-------------------------------------|
| a. Coulombs Law | b. PN Junction diode |
| c. Atomic mass Unit | d. Exponential Law of Radioactivity |
| e. Electromagnetic Spectrum | |
- II. Answer the following** **(3x5=15)**
- a. Explain the working of moving coil galvanometer
- b. What is rectification? Explain in detail about different rectifiers used in X-ray circuit.
- c. What are Intrinsic and extrinsic semiconductors?
- III. Answer the following** **(1x20=20)**
- a. Explain different types of transformers and their use in X-ray circuit. What are transformer losses

SECTION B

- IV. Explain the following** **(5x3=15)**
- | | |
|-------------------------|-------------------|
| a. Collimators in X-ray | b. Bragg peak |
| c. HVT & TVT | d. Effective dose |
| e. OSLD . | |
- V. Answer the following** **(3x5=15)**
- a. Explain the working of proportional counter
- b. What are the basic radiation quantities and their units
- c. Explain in detail about Compton effect
- VI. Answer the following** **(1x20=20)**
- a. Explain how bremsstrahlung and characteristic X-rays are produced? What are the factors affecting the quality and quantity of X-rays.
-



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION
MAY 2023**

**DRRT-F-II—MAY 2023
Max 100 Marks**

Time 3hrs

**Part 1 paper - II
ANATOMY**

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION-A

- I.** Describe Cardiovascular system under the following headings (2+3+2+3=10)
- a) Pericardium
 - b) Chambers
 - c) Heart valves
 - d) Radiological investigation
- II. Answer briefly on:** (5x5=25)
- a. Cerebrum
 - b. Cartilage
 - c. Thyroid gland
 - d. Urinary bladder
 - e. Testis
- III. Write short notes on** (5x3=15)
- a. Clavicle
 - b. Spleen
 - c. Compound epithelium
 - d. Trachea
 - e. Skeletal muscle

SECTION B

- I.** Enumerate the parts of gastrointestinal system. Describe briefly the anatomy of stomach, small intestine and large intestine. Mention one radiological investigation for studying gastro intestinal tract, (2+3+2+2+1=10)
- II. Answer briefly on** (5x5=25)
- a. Right lung
 - b. Spinal Cord
 - c. Connective Tissue
 - d. Ear
 - e. Uterus
- III. Write Short notes on:** (5x3=15)
- a. Aorta
 - b. Peritoneum
 - c. Tongue
 - d. Hip Joint
 - e. Graafian follicle
-



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION
MAY 2023**

DRRT-F-III-MAY-2023

Time 3hrs

Part 1 paper III

Max 100 Marks

PHYSIOLOGY AND PATHOLOGY

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

- I.** Describe the steps of coagulation of blood **(10)**
- II. Write short notes on** **(5x5=25)**
- a. Micturition reflex
 - b. CO₂ transport in blood
 - c. Regulation of cardiac output
 - d. Synaptic transmission
 - e. Functions of liver
- III. Define the following** **(5x2=10)**
- a. Blood Pressure
 - b. Resting membrane potential
 - c. Neuro endocrine reflex
 - d. Pulmonary ventilation
 - e. Edema
- IV. Name the following** **(5x1=5)**
- a. Receptor organ for hearing
 - b. Two hormones increasing blood glucose levels
 - c. Main hormone secreted from corpus luteum
 - d. Neurotransmitter released at the neuro muscular junction.
 - e. Activator of Trypsinogen

P.T.O

SECTION B

I. Define Anaemia. Classify Anaemia. Describe clinical features, laboratory values, peripheral smear and bonemarrow findings in Iron deficiency Anaemia. (1+4+5=10)

II. Write short notes on : (5x5=25)

- a. Types of necrosis
- b. Giant cell tumour of bone
- c. Rickets
- d. Cellular events of inflammation
- e. Edema

III. Define the following: (5x2=10)

- a. Leukemia
- b. Hypertrophy
- c. Metaplasia
- d. Embolism
- e. Neoplasia

IV. Name the following (5x1=5)

- a. Two routes of spread of malignant tumours
- b. Name two malignant bone tumours
- c. Two differences between acute and chronic inflammation
- d. Two oncogenic viruses
- e. Name the aetiological agent for tuberculosis.

.....



GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR EXAMINATION MAY 2023
DRRT-S-I-MAY 2023

Time 3hrs

Part II paper I

Max 100 Marks

PHYSICS OF MEDICAL IMAGING AND RADIOTHERAPY

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

- I. Explain the following** **(5x3=15)**
- a. Types of Anode in X-Ray tube
 - b. Transducers in Ultra Sound
 - c. T2 weighted image in MRI
 - d. Cone beam CT
 - e. SPECT
- II. Discuss the following** **(3x5=15)**
- a. Working principle, merits and demerits of Digital Radiography
 - b. Construction of a X-Ray film
 - c. Working of Image Intensifier
- III. Answer the following** **(1x20=20)**
- a. What is CT number? Explain the principle of CT. What are the different generations of CT

SECTION B

- IV. Explain the following** **(5x3=15)**
- a. PDD and TAR
 - b. Electron Gun
 - c. Isocentre of a Teletherapy Machine
 - d. MLC
 - e. 3DCRT and IMRT
- V. Explain the following** **(3x5=15)**
- a. Describe Co-60 Teletherapy Machine
 - b. Difference between 4D CT simulator and conventional simulator
 - c. What is equivalent field? Calculate the equivalent field of field size 15x13
- VI. Essay** **(1x10=20)**
- a. Explain in details the Beam Modifying Devices in Radiotherapy
-



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION
MAY 2023**

DRRT-S-II-MAY-2023

Time 3hrs

Part II paper II

Max 100 Marks

RADIOGRAPHY TECHNIQUES

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

- I.** Discuss the different radiographic views for paranasal Sinuses– Explain the technique, positioning and centering for any one view in detail. (5+10=15)
- II. Write short notes on** (7x5=35)
- a. Skyline view
 - b. Soft tissue radiography of neck. Indications and techniques.
 - c. Scattered radiation.
 - d. DICOM
 - e. Macroradiography
 - f. Submentovertex projection
 - g. Open Mouth View

SECTION B

- I.** Describe the indications, contraindications, patient preparation, procedure and filming sequences for barium Enema. (15)
- II. Write short notes on :** (5x5=25)
- a. Skeletal Survey.
 - b. Indication and contra Indication for Hysterosalpingography.
 - c. Double contrast barium meal
 - d. Advantages of doing Preliminary / Pilot films
 - e. Contrast media used to study Gastrointestinal Tract.
- III. Explain the following** (5x2=10)
- a. Uses of Fluoroscopy
 - b. Give two examples of ionic contrast media
 - c. Sialography
 - d. Safety considerations in cervical spine injury.
 - e. Views in mammography
-



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIO DIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION MAY 2023**

DRRT-S-III-MAY-2023

Time 3hrs

Part II paper III

Max 100 Marks

BASICS OF RADIOTHERAPY

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

- I. How will you stage Carcinoma of the glottis. Describe the radiation treatment of carcinoma of the glottis. (25)
- II. Write Short notes on (5x5=25)
- a. Concurrent chemoradiation
 - b. Phantom
 - c. Cisplatin
 - d. Radiotherapy for benign tumours
 - e. Bolus

SECTION B

- I. Describe the staging of rectal Cancer. What is the treatment for locally advanced rectal cancer. Explain Radiation treatment in rectal cancer and radiation toxicity. (25)
- II. Write Short notes on (5x5=25)
- a. Tumour markers
 - b. Hyper fractionation
 - c. TLD
 - d. Palliative whole brain radiation
 - e. Malignant ascites
-



**GOVERNMENT OF KERALA
DIRECTORAT E OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION MAY 2023**

DRRT-T-I-MAY-2023

Time 3hrs

Part III paper I

Max 100 Marks

RADIATION SAFETY IN RADIODIAGNOSIS AND RADIOTHERAPY

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

I. Define **(5x3=15)**

- | | |
|---|----------------------------|
| a. Principal of optimization in Radiology | b. Chromosomal aberrations |
| c. Thermo luminescence | d. CTDI |
| e. Use factor | |

II. Describe **(3x5=15)**

- a. How the out put consistency is verified in an X-ray unit?
- b. Output of an X-ray unit is 2 mR/hr for 100 mA, if mA linearity error is zero what will be the out put for 150 mA.
- c. An X-ray unit is energized for 90KV, 200 mA, 0.1 sec. What is the maximum energy, minimum energy and average energy with its units.

III. a. Draw the cross sectional view of a Cath lab room and mark the important facilities associated with the cathlab. What are the AERB recommended thickness of Lead door & wall of a typical Cathlab room **(10)**

- b. What are the AERB recommended dose equivalent limits of a radiation worker for the following regions? **(10)**
- | | | | |
|---|---------------|------------|-------------|
| a. Body extremities | b. Whole body | c. Thyroid | d. eye lens |
| e. Foetus of a pregnant radiation worker. | | | |

SECTION B

I. Define **(5x3=15)**

- | | | |
|---------------------------|--------------|----------------------|
| a. Linear Acivity & units | b. Workload | c. Curie & Bacquerel |
| d. Maynards factor | e. Isocentre | |

II. Describe **(3x5=15)**

- a. What is the role of maze entry in a Teletherapy room? What modifications are needed in the absence of maze entry?
- b. Role of gamma zone monitor and T rod in a telecobalt unit?
- c. Draw the cross sectional view of a HDR Brachytherapy room. Briefly explain the functioning of HDR Brachytherapy unit.;

- III. a.** What are the daily checks in a Telecobalt unit. How the output is measured in a telecobalt unit **(10)**
- b.** Define PDD, TAR and TPR with the help of diagrams. **(10)**

.....



GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR EXAMINATION
MAY 2023

DRRT-T-II-MAY-2023

Time 3hrs

Part III paper II

Max 100 Marks

ADVANCED MEDICAL IMAGING TECHNOLOGIES

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

I. What is an image intensifier? Draw a diagram and write in detail its construction.

(15)

II. Write short notes on

(6x5=30)

- a. CT gantry
- b. Digital subtraction angiography
- c. Film badge
- d. MRCP – Common sequences.
- e. Digital radiography
- f. Contrast media in CT

III. Expand the following

(5x1=5)

- a. FLAIR
- b. Min IP
- c. MLO view
- d. SPECT
- e. TLD1222222222225

SECTION B

I. Draw the basic structure of ultrasound transducer. What are the different types of transducers and enumerate their uses. Discuss the Doppler principle

(15)

II. Write short notes on

(7x5=35)

- a. Radiation safety in DSA room
- b. HRCT thorax
- c. MR Spectroscopy
- d. CR image processing methods.
- e. CT coronary angiogram
- f. Compare film-screen mammography and digital mammography
- g. Seldinger's technique



**GOVERNMENT OF KERALA
DIRECTORATE OF MEDICAL EDUCATION
DIPLOMA IN RADIODIAGNOSIS & RADIOTHERAPY TECHNOLOGY REGULAR
EXAMINATION
MAY 2023**

DRRT-T-III-MAY 2023

Time 3hrs

Part III paper III

Max 100 Marks

ADVANCED RADIOTHERAPY

(Answer Section A & B separately and draw diagrams wherever necessary)

SECTION A

- I.** Describe in detail the risk factors, clinical presentation, investigations, staging and treatment of carcinoma oropharynx (5+5+5+5+5=25)
- II. Write Short Note** (5x5=25)
- a. What is chemo radiation? What is its role in the radical treatment of carcinomas?
 - b. Acute toxicities of radiotherapy in head and neck cancer
 - c. CT simulation
 - d. Treatment verification during radiotherapy
 - e. R's radiotherapy

SECTION B

- I.** Describe in detail the risk factors, clinical presentation, investigations, staging and treatment of carcinoma breast (5+5+5+5+5=25)
- II. Write Short Notes** (5x5=25)
- a. Types of radiation induced DNA damage
 - b. Beam modifying devices in radiotherapy
 - c. Radioisotopes used in brachytherapy
 - d. Hyper fractionated treatment.
 - e. Radiotherapy for brain metastasis

.....