



*In the name of God, the Most Gracious, the Most Merciful*

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## **INTRODUCTION**

The objective of the Postgraduate Medical Institute, Quetta is to promote the Postgraduate Medical Education amongst the doctors by designing postgraduate medical studies programs keeping in view the provincial, national and international needs.

To achieve this objective the Postgraduate Medical Institute, has developed structured training programs for specialist to be utilized in the Health Care facilities of tertiary and secondary levels. Besides clinical sciences the institute is also running Postgraduate training programs in Basic Medical Sciences.

The Post Graduate Medical Institute, Quetta possesses all the relevant learning facilities like qualified and well trained faculty, teaching hospitals, audiovisual aids, internet access, etc.

The Post Graduate Medical Institute is affiliated with University of Balochistan. The format of the examination has been improved with more valid objectives and reliable methods of assessment. To ensure the fairness and transparency the institute has introduced the use of assessment forms for scoring of all components of clinical and oral examination.

This booklet contains the information for the Trainee of Diploma in Radiology (DMRD), eligibility criteria for admission to the course, details of training program, syllabus, objective of this training and format of examination.

## **ELIGIBILITY CRITERIA FOR DMRD COURSE**

Following are the requirements for admission in Diploma in Radiology (DMRD) at Post Graduate Medical Institute, Quetta (PGMIQ).

- MBBS or equivalent qualification registered with the PMDC.
- One year House job in a teaching hospital six months of which should preferably be either in Radiology and Medicine & allied.
- Only those doctors are eligible who are in the active service of Government of Balochistan for a minimum period of two years.
- Selection through entry test and selection committee approval.

## **TRAINING PROGRAM**

The duration of program for DMRD is two years. In this duration the trainees are suppose to attend the formal lectures in the relevant sciences but simultaneously trainees start their clinical program which is specially designed for acquisition of knowledge, attitude and skill in the relevant field.

Following teaching modalities will be employed:

- Lectures
- Seminar Presentation and Journal Club Presentations
- Group Discussions
- SEQ as assignments on the content areas
- Hands-on training experience in diagnostic Imaging Techniques
- Diagnostic Imaging Techniques training workshops
- Indoor and outdoor clinics
- Long and short case presentations
- Self study, assignments and use of internet

### **PHASE-I:-**

Besides clinical work formal lectures will be given in the basic science education, medical physics and nuclear medicine relevant to field of radiology.

### **PHASE-II:-**

It includes training in Diagnostic Radiology.

## **AIMS AND OBJECTIVES OF THE COURSE**

### **AIMS**

The aim of 2 years diploma programme in Medical Radiology is to equip medical graduates with relevant professional knowledge, skills and ethical values to enable them to apply their acquired expertise at primary and secondary health care organizations.

### **OBJECTIVES**

At the end of training in DMRD, a trainee doctor should be able to:

1. Take a comprehensive and pertinent history of patients coming for radiological investigations
2. Take proper informed consent before commencing any investigative procedure and ensuring confidentiality and appropriate environment for procedures and investigative processes involving unusual exposure
3. Explain all procedures to patients or to their relatives in patient's preferred language in elective and emergency situations in keeping principles of good communication skills, empathy and empowerment to patients

4. Satisfactorily address fears, concerns and expectations of the patients
5. Exhibit emotional maturity and stability, integrity, ethical values and professional approach, sense of responsibility in day-to-day professional activities
6. Act as an independent specialist at BHU /Tehsil and Headquarter Hospital
7. Show initiative and become lifelong self-directed learners tapping on resources including clinical material, faculty, internet and on-line learning programmes and library.



## **SYLLABUS**

### **PART-I Syllabus**

The syllabus for the first part of the diploma ensures that diagnostic radiologists receive a comprehensive training in those subjects which relate to the production of a radiograph or which provide the background to radiological interpretation.

### **Anatomy**

The Trainee must be familiar not only with the basic anatomy relevant to all the common radiological examinations but also the radiographic technique required to demonstrate this anatomy.

Content: recognition of the normal radiological anatomy of:

1. Skull
2. Brain
3. Paranasal Sinuses
4. Optic Canal, Temporal Bone
5. Upper and Lower Jaws
6. Atlantoaxial Joint
7. Thyroid Gland
8. Cervical Vertebral Column
9. Thoracic Vertebral Column
10. Lumbar Vertebral Column
11. Sacrum , Coccyx
12. Pelvis (Male & Female)

13. Hip Joint
14. Knee Joint
15. Ankle Joint
16. Foot
17. Shoulder
18. Elbow
19. Hand
20. Thorax
21. Lungs
22. Heart
23. Aortic Arch
24. Trachea
25. Pharynx
26. Esophagus
27. Abdomen
28. Stomach
29. Small Intestine
30. Large Intestine
31. Biliary Ducts
32. Liver
33. Kidney and Urinary Tract
34. Superior Mesenteric Artery
35. Inferior Mesenteric Artery
36. Pelvic Arteries
37. Inguinal Lymph Nodes
38. Axillary Lymph Nodes

## **GENERAL PATHOLOGY**

### **Cell Injury and adaptation**

#### **Cell Injury**

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathologic calcification
- Necrosis and Gangrene

### **Cellular adaptation**

- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

### **Inflammation**

- Acute inflammation --- Vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate
- Chronic inflammation
- Etiological factors, Granuloma

### **Cell repair and wound healing**

- Regeneration and Repair
- Healing--- steps of wound healing by first and second intention
- Factors affecting healing
- Enlist the complications of wound healing

### **Haemodynamic disorders**

- Define and classify the terms Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the pathogenesis and possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

## **Neoplasia**

- Dysplasia and Neoplasia
  - Differences between benign and malignant neoplasms
  - Enlist the common etiological factors for neoplasia
  - Define and discuss the different modes of metastasis
  - TNM staging system and tumor grade
- Immunity and Hypersensitivity
- Urinary system: Effect of injury and disease

## **PHYSICS**

### **THE PHYSICAL BASIS OF RADIOLOGY.**

The Physics Syllabus Concentrated On Topics Which Have A Direct Bearing On Radiological.

### **DETAILED SYLLABUS:**

#### **A. Structure of matter**

- 1 Element
2. Atom
  - Shells
  - Nucleus
3. Fundamental particles
  - Electron
  - Proton
  - Neutron
4. Atomic structure

- Electron arrangement
- Electron binding energy

5. Atomic nomenclature

- Atomic Number
- Mass number
- Isotope
- Isobar
- Isotones
- Isomer
- Nuclide
- Atomic units
- Electron volt

6. Problems

**B. Electromagnetic Theory**

1. Electric charge
2. Coulomb's law
3. Electric and Magnetic field and their intensities
4. Electric and Magnetic flux
5. Electric current
6. Ohm's law
7. Resistor and Capacitor
8. Electromagnetism
9. Ampere's law
10. Induce current

11. Electromagnetic radiation
12. Photons
13. Ionizing and non ionizing radiation
14. Electromagnetic wave equation
15. Electromagnetic spectrum
16. General prope
- 17 Wave and Plank's quantum theory
18. Pa radiation
- 19, Problems

**C.      Radioactivity**

- 1, Exponential decay and specific activity
2. Half life, physical, biological and effective half life
3. Radioactive decay schemes and units of activity
4. Inverse square law
5. Propefties of radiation
  - Alpha
  - Beta
  - Gamma
6. Radioactive isotopes and production of radioactive isotopes
7. Basic knowledge of cyclotron and nuclear reactor
- 8, Problems

**D.      Radionuclide imaging**

1. Preparation of radiopharmaceuticals
2. Properties of radiopharmaceuticals

### 3. Uptake, elimination and chemical form of radiopharmaceutical

#### 4. Gamma camera

- Role of the collimator
- Photo multiplier assembly
- Formation of the image of the radionuclide distribution
- Scanning techniques
- Types of display and the role of the computer.

#### 5. Problems of radionuclide images

- Resolution
- Examples of applications
- Static imaging
- Dynamic imaging
- Safe handling of radioactive materials
- Clinical applications

#### 6. Problems

### **E. Interaction of x-rays and gamma rays with matter**

1. Interaction processes and their relative importance for various materials and at different radiation energies.

- Coherent scattering
- Compton effect
- Photoelectric effect
- Pair production

- Photo disintegration

## 2. Explain

- Auger effect
- Internal conversion
- Annihilation
- Attenuation
- Absorption
- Scattering
- Exponential law
- Linear attenuation coefficient
- Homogeneous and inhomogeneous radiation
- Half value layer

## 3. Problems

### **F. X-ray imaging system**

#### 1. Operating console

#### 2. Auto transformer

- Peak kilo voltage (KVp)
- Miliamperage (mA)
- Exposure time
- Methods of cooling
- Effect of focal spot size

#### 3. High voltage generator

- High voltage transformer
- Filament Transformer



- Self rectification
- Single phase power
- Three phase power
- High frequency generator
- Tube rating
- Half wave and full wave rectification
- Grid control
- Constant voltage sets
- Measurement of current voltage
- Fault finding and basic repairs
- Regulation and safety devices
- Interlocks
- Type of unit most suited to tropical climate

#### 4. Problems

#### **G. X-ray tube**

1. External components    15
  - X-Ray tube support
  - Protective housing
  - Glass or metal enclosure
2. Internal components
  - Cathode
  - Dual focus
  - Anode
3. Explain

- Target
- Rotating anode
- Heel effect
- Heat capacity
- Voltage wave form
- Exposure timers

#### 4. Explain

- X-Ray tube failure
- Rating charts

#### 5. Principles of modern imaging techniques and procedures

- Ultrasound
- CT scan
- MRI

#### 6. Problems

### **H. X-ray production**

#### I. Electron target interactions

- Anode heat
- Characteristic radiation
- Bremsstrahlung radiation
- Efficiency of x-ray production
- Spatial distribution of x-ray emission from target

#### 2. X-ray emission spectrum

- Characteristic x-ray spectrum
- Bremsstrahlung x-ray spectrum

- Minimum wavelength

### 3, Factors affecting the x-ray emission spectrum

- Effect of mA and mAs
- Effect of KVp
- Effect of added filtration
- Effect of target material
- Effect of voltage wave form

## **I. Measurement of x-rays and gamma rays**

### 1. Explain

- Ionization
- Excitation
- Absorbed dose and exposure
- Dosimetry
- Quality assurance
- TLD and photographic dosimetry
- Rad and roentgen
- Relative biologic effectiveness (RBE)
- Quality factor (QE)
- Dose equivalent (DE)
- Ionization chambers
- Film badges

2. Range of secondary electrons and average energy per ion pair

3. Geiger-Muller counter, scintillation detectors

associated electronic apparatus

4. Radioactive isotopes detection measurement
5. Problems

**J. Principles of diagnostic ultrasound**

1. The nature of ultrasound waves and dependence of velocity on the medium.
2. The behaviour of ultrasound and waves at a boundary between
3. Piezoelectric effect and production of ultrasound
4. Measurement of frequency and intensity
5. Explain
  - Power and db ratio
  - Diffraction
  - Interaction of ultrasound with matter
  - Pulse and continuous wave techniques
  - A and B mode scan technique
  - Diagnostic application
  - Scanning and image formation
6. Obstetrics tumor detection and blood flow
7. Possible hazards from the use of ultrasound
8. Problems

## **K. Radiation protection**

1. Biological effects of ionizing radiation and risk of somatic and genetic effects
2. Recommendations of ICRP
3. Maximum permissible dose (MPD)
4. Dose control by design and by operation in diagnostic x- ray procedures and nuclear medicine for staff, patients and public
5. Dose limitation
6. Problems

## **L. Physical aspects of radiography**

1. Image formation, distortion and blurring
2. Application of absorption and scatter in radio diagnostics
3. Explain
  - Filters
  - Grids
  - Choice of KV and contrast
  - Cones
  - Tube diaphragms
  - Construction and operation potter bucky diaphragms
  - Use of molybdenum target
4. Physical basis for macro and micro radiography
5. Physical aspects of

- Tomography
  - Stereoradiography
  - Xeroradiography
  - Mammography
  - Fluorography
  - Image intensifiers
  - Photographer
6. Optical systems for viewing and recording final image
  7. 70 and 100 mm spot film
  8. Television principles and operation
  9. Videotape recording and cinematography and their respective merits
  10. Physical basis of effect of ionizing radiation on photographic emulsion
  11. Explain
    - Optical density
    - Densitometer characteristic curves of films
    - Wavelength variation of sensitivity
    - Effect of statistical fluctuation
    - Contrast in films
    - Intensifying screen
    - Physical basis of fluorescence
    - Use of photographic film

## 12. Problems

### **M. Photographic process**

1. Negative and positive image
2. Energy sensitive salts of silver
3. Construction of x-ray film and function of latent image
4. Processing procedure including development, fixing etc and automatic processing
5. Problems

### **N. Characteristics of x-ray film**

1. Sensitometer characteristic curve
2. Speed and contrast
3. Screen and non screen types of film
4. Latitude in relation to contrast
5. Film for automatic processing
6. Special purpose film including 70-100 mm film reversal subtraction techniques
7. Storage and protection of unexposed film
8. Film faults

### **O. Fluorescent and intensifying screens**

1. Physical construction of screen
2. Purpose and method of use
3. Intensification factor and cassettes and film holders
4. Screen for multi section tomography
5. Care of screens and x-rays cassettes

**P. X-rays exposure factors**

1. Variation of these with patient thickness and anatomical structure
2. Explain
  - Focal film distance
  - Filtration speed of film
  - Speed of screens
  - Grid ratio and development conditions

**Q. Picture quality**

1. Explain
  - Meaning of contrast
  - Sharpness
  - Resolution
  - Effect on radiation quality (KV)
  - Scatter grids
  - Intensifying screens
  - Film characteristics, development and viewing conditions
2. Geometrical factors including focal spot size and movement blurring
3. Condition for minimizing unhappiness

**R. Cameras and lenses**

1. Principles of cine and 70,100 mm camera with lens
2. X-ray dark room
3. Film labeling and identification.



## **S. Practical**

### 1. 10 Practical

(Detail will given later on)

## **General Radiography**

### **Introduction:**

Knowledge of the standard radiographic projections relation to the regions outlined in the radiological anatomy syllabus is required. The Trainee should be able to comment on the positioning, centering or tube angulations used to obtain a film and should be able to give practical advice on improving the film or solving diagnostic problems which it has raised. Knowledge of detailed exposure factors.

1. Positioning of patient. Use of immobilizing devices and protective devices.
2. Standard radiographic projections and centering points. Correction of errors in Centering and exposure.
3. Soft tissue radiography mammography.
4. Micro radiographic and macro radiographic techniques- principles and uses.
5. Stereo radiographic- principles.

6. Localization techniques-particularly foreign bodies in the eye.
7. High KV techniques- principles and use.
8. Tomography-general principles. Indications for and modes of application- types of topographic movement, advantage of each with approximate “thickness of cut”- construction of multiplayer tomographic box. Advantages and drawbacks of multiyear tomography.

### **SPECIAL INVESTIGATIONS.**

The term covers all the contrast investigations, including barium examination. The level of knowledge demanded will depend on the type of examination. Thus the Trainee will be Trainee to show familiarity with and experience of everyday investigations – barium studies, urography and intravenous cholangiography. For the less common in investigations, including vascular studies and negative contrast examination, he should know the features listed below-indications, limitations important points in technique, complication and so forth – but in outline only. Knowledge of the main items of equipment needed will be expected but not the full trolley “settings”

where there are alternative methods for studying a particular area the Trainees should know their comparative merits. It should be noted that the standard methods of resuscitation are included among the procedure which Trainees should know, the Trainee should study each procedure under the following heading where they are relevant:

1. Principal indications and contra- contra indications.
2. Preparation required.
3. X-ray apparatus required, e.g. film changer.  
Radiographic aspects.
4. Contrast media- see the following section.
5. Equipment needed
6. Outline technique with main variations.
7. Principal complications and their treatment

### **CONTRAST MEDIA IN PHARMACOLOGY AIDS TO RADIOLOGY**

#### **Introduction:**

Trainee Medical Officers should know the main types of contrast media with their official well as their trade names, their constitution and their routine of absorption and excretion, where relevant, the advantages and drawbacks of particular media will be asked, together with their dosage and side effects, the treatment of contrast

reactions and of emergencies due to X-ray procedure should be learned. The pharmacology and dosage of the other drug used in radiological practice will also be required.

### **Contrast media.**

The contrast media to be studied are those, which relate to the practical procedures mentioned above. For each contrast substance the following attributes are expected where relevant:

1. Official name.
2. Constitution (not detailed formula)
3. Modes of Administration and clinical uses.
4. Routes of elimination,
5. Relative advantages of different types of media.
6. Side effects and treatment of reactions.
7. Contra- indications to use.

### **Pharmacological aids to radiology.**

Some knowledge is expected to of the drugs commonly used in radiological practice. These can be considered under the following heading:-

1. Preparation of the bowel; purgatives and colonic activations.

2. Sudation before radiological procedures.
3. Prophylaxis and treatment of reactions to contrast.
4. Prophylaxis and treatment of reactions to radiological procedures other than to contrast e.g. in phaeochromocytoma.
5. Drugs modifying the behavior of the gastro – intestinal tract during investigations.

## **PART-2 SYLLABUS**

### **DIAGNOSTIC RADIOLOGY.**

A broad knowledge of the value of diagnostic radiological techniques in medicine is expected. Trainees must be familiar with plain film change in congenital and acquired disease. Detailed knowledge of contrast studies involving the gastro-intestinal tract and Urogenital system is necessary but not a specialist' knowledge of neuro- radiology or cardiac radiology.

### **Diagnostic Imaging Techniques**

- Plain Films
- Negative Contrast Media
- Positive Contrast media
- Water-Insoluble Contrast Media
- Oily Contrast Media
- Water- Soluble Contrast Media

### **Conventional Radiography**

- Skull
- Paranasal Sinuses
- Optic Canal, Temporal Bone
- Upper and Lower Jaws
- Cervical Vertebral Column
- Thoracic Vertebral Column
- Lumbar Vertebral Column
- Sacrum
- Pelvis
- Hip Joint
- Knee Joint
- Ankle Joint
- Foot

- Shoulder
- Elbow
- Hand
- Thorax
- Lungs
- Bronchography
- Heart
- Mammography
- Trachea
- Pharynx
- Esophagus
- Stomach
- Small Intestine
- Large Intestine
- Biliary Ducts
- Kidneys and Urinary Tract
- Vesicourethrography

### **Lymphography**

- Pelvis
- Abdomen
- Inguinal Lymph Nodes
- Axillary Lymph Nodes

### **Gynaecologic Radiography**

- Hysterosalpingography
- Fetography

### **Sonography**

- Upper Abdomen
- Upper Abdomen/Kidney
- Female Pelvis/Pregnancy
- Thyroid Gland/Hip

## **Computed Tomography (CT)**

- Skull
- Brain
- Temporal Bone
- Paranasal Sinuses
- Atlantoaxial Joint
- Lumbar Vertebral Column
- Thorax
- Heart
- Upper Abdomen
- Abdomen
- Abdomen-Pelvis
- Pelvis
- Abdomen

## **Magnetic Resonance Imaging (MRI)**

- Skull
- Brain
- Entire Vertebral Column
- Thoracic Vertebral Column
- Lumbar Vertebral Column
- Sacrum, Coccyx
- Hip Joint
- Knee
- Foot
- Shoulder
- Heart
- Pelvis

## **Scintigraphy**

- Bone Scan
- Whole Body Bone Scintigraphy
- Thyroid Gland
- Liver
- Kidneys



## **ORGAN IMAGING:**

- a) Knowledge of imaging techniques with both recto-linear scanners and gamma cameras is required. Trainees should familiar with the more important applications of these radiological procedures.
- b) Ultrasound. Trainees should be familiar with ultrasound scanning of abdominal organs with particular reference to obstetrics and gynecology and gynecology and should have a basic knowledge of the techniques used in neurology and cardiology.
- c) Principles of CT scanning and its clinical use.
- d) Principles of MRI.

## **LIST OF LECTURES FOR D.M.R.D. COURSE, (PART-2).**

	<b>CHEST</b>	<b>NO.FO LECTURES.</b>
1.	Normal	01
2.	Lung lesion (congenital)	01
3.	Inflammatory	10
4.	Industrial	01
5.	Neoplastic	01
6.	Chest trauma	01
7.	Congenital Heart Diseases	01
8.	Acquired Heart Diseases	01
9.	Miscellaneous diseases	01
10.	Mediastinal diseases	01

**GRASTORINTESTINAL TRACT                      NO.OF LECTURES**

- |     |  |    |
|-----|--|----|
| 1.  | Pharynx and salivary Glands              | 01 |
| 2.  | Barium technique                         | 01 |
| 3.  | Esophagus                                | 01 |
| 4.  | Stomach, Duodenum                        | 02 |
| 5.  | Small bowel                              | 01 |
| 6.  | Large bowel                              | 02 |
| 7.  | G.B. Diseases                            | 01 |
| 8.  | Liver, pancreas and spleen               | 01 |
| 9.  | Imaging Techniques: Ultrasound C.T. Scan | 01 |
| 10. | Plain Abdomen                            | 02 |

**UROGENITAL SYSTEM:    NO.OF LECTURES.**

- |    |   |    |
|----|---|----|
| 1. | Contrast Examination                    | 01 |
|    | a) I.V.U.                               |    |
|    | b) Retrograde Pyelography               |    |
|    | c) Urethero Cystography                 |    |
| 2. | Inflammatory Diseases                   | 01 |
| 3. | Congenital Diseases                     | 01 |
| 4. | Neoplastic and cystic lesions           | 01 |
| 5. | Traumatic lesion                        | 01 |
| 6. | Imaging trchniques:                     | 02 |
|    | - Ultrasound                            |    |
|    | - C.T. Scan                             |    |
| 7. | Urinary bladder, prostate, bladder Neck | 01 |

**SKELETAL SYSTEM:    NO.OF LECTURES.**

- |    |                                   |    |
|----|-----------------------------------|----|
| 1. | Congenital and Dysphasic lesions. | 02 |
| 2. | Inflammatory                      | 01 |
| 3. | Neoplastic                        | 02 |
| 4. | Metabolic                         | 01 |
| 5. | Miscellaneous- Histocytosis etc   | 01 |
| 6. | Traumatic                         | 01 |
| 7. | Diseases of joints                | 01 |

**GENERAL NERVOUS SYSTEM: NO.OF LECTURES.**

1.	Skull	01
2.	Angiography	01
3.	Myelography	01
4.	C.T. Scan Brain	01
5.	Isotopes	01
6.	Miscellaneous	01
7.	Spine	01

**GYNAE AND OBSTETRICS NO.OF LECTURES.**

1.	Assessment of fetal Maturity	01
2.	Pollinate- Techniques & indication	01
3.	Fetal Abnormalities	01
4.	Pelvic masses	01
5.	Ultrasonography of Obstetrics and Gynecology.	01

**E.N.T NO.OF LECTURES.**

1.	PNS	01
2.	Petrous bone, orbits and eye	01
3.	Teeth and jaws	01
4.	Soft tissue radiology	02

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## **EXAMINATION / EVALUATION**

- There will be Monthly assessment test, which includes MCQs and Essay type questions.
- Every student will be having an assessment / Log book for academic session, which will be considered in the final examination.
- Examination will be held at  
Part-I After Six Months  
Part-II After Twenty Four Months.
- Passing marks will be 50% in every examination.

### **Examination Method**

The evaluation of DMRD Trainee will be done on the following manner:-

*	Internal Assessment	10%
*	Log Book	10%

### **Examination:-**

Part-I Examination (after 06 Months) 80% Each

Part-II Examination (After 24 Months)

### **Internal Assessment**

Internal assessment will be done after every two months from commencement of course.

In internal assessment theoretical and clinical knowledge will be tested by:-

- \* Theory / Viva voce / skill performance
- \* Punctuality and attitude of the TMO's will be

recorded

### **EXAMINATION:-**

#### **PART-1 EXAMINATION**

Examination shall be conducted by the University of Balochistan Quetta as per schedule.

It Comprises of theory (Essay & MCQs) and practical including viva voce.

- \* Paper A Basic Science Education.
- \* Paper B Physics
- \* Practical & viva voce.

#### **Panel of Examiners Part=I examination.**

Radiologist will be Supervisor / Chief Examiner of Part-I as well as Part-II. The panel of examiners for the part-I comprises as follows:-

➤ Radiologist	1	30%
➤ Physist	2	50%
➤ Anatomist	1	20%

### **Eligibility to appear in Part – I Examination**

(a) Application by the Trainee recommended by the Supervisor.

- a. Certificate by the Supervisor, countersigned by Dean PGMI that Trainee has regularly attended at least 75% of the basic science lectures, demonstration, tutorials, and practical or clinical work both in-patients and out-patients.

### **Two written papers**

<b>Paper-1</b>	Basic Science Education	150 Marks
<b>Paper-2</b>	Physics and Allied subjects.	150 Marks

### **Practical and oral:**

<b>1.</b>	Physics and Allied subjects. (Practical)	100 Marks
	Viva-voce.	50 Marks
<b>2.</b>	Anatomy and techniques (Practical)	100 Marks
	Viva – voce	50 Marks

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**Total 600 Marks**

## **PART-2 EXAMINATION**

### **Eligibility to appear in Part – II Examination**

1. The Trainee has completed the prescribed period of training of the course.
2. The Trainee has passed the Intermediate Evaluation (Part-I Examination).
3. Certificate by the Supervisor that the Log Book of Trainee is complete in all aspects and is signed by the Co-Supervisor and the Supervisor. The original Log Book will be presented by the Trainee during Practical / Oral examination.
4. The application form for Part-II examination with recommendation of the Supervisor.

### **Part-II:-**

It comprises of theory (Essay & MCQs) and practical including viva voce.

### **Two Written Papers of Three hours each.**

<b>Paper-A: Radiology Diagnostic</b>	150 Marks
<b>Paper-B: Radiology</b>	150 Marks

### **Practical and oral:**

Reporting session	200 Marks
Viva- voce	100 Marks

-----  
**Total 600 Mark**

It is compulsory to pass all the component parts of the each subject separately. In case of failure to obtain 50% marks in any of components of examination Trainee will have to appear in all components of examination again. In the remaining prescribed three attempts allowed.

**Panel of Examiners Part=II examination.**

**External Examiner**

**One**

(To be selected by University of Balochistan from the list of three examiners available)

**Internal Examiner**

**Two**

(From the faculty of BMC)



**LEAVE.**

The postgraduate trainee will be entitled to avail the leave as per S&GAD and postgraduate studies schedule, after the recommendation of their supervisor and approval of the Registrar PGMI, Quetta.

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## **LOG BOOK**

The trainees must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for the DMRD examination. Log book should include adequate number of diagnostic procedures, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Trainee's Name: \_\_\_\_\_ Roll No. \_\_\_\_\_

### PROCEDURES:

1. Plain x-rays
2. Barium Swallow
3. Barium Meal
4. Barium Enema
5. Bronchography
6. ERCP
7. Cholecystography
8. Intravenous Pyelography
9. Retrograde Urography
10. Mammography
11. Hysterosalpingography
12. Conventional Sonography
13. Ultrasound guided Procedures
14. CT
15. CT guided procedures

S.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Performed	Supervisor's Signature
1					
2					

### Case Presented

S.#	Date	Name of Patient, Age, Sex & Admission No.	Case Presented	Supervisor's Signature
1				
2				

### Seminar / Journal Club Presentation

S.#	Date	Topic	Supervisor's Signature
1			
2			

### Evaluation Record

(Excellent, Good, Adequate, Inadequate, Poor)

S.#	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1				
2				

### **TRAINING SITE.**

- Post Graduate Medical Institute, Quetta.
- Bolan Medical Complex Hospital, Quetta.
- Sandeman Provincial Teaching Hospital, Quetta.
- CENAR, Quetta.
- Fatima Jinnah T.B Santorium.

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## **RECOMMENDED BOOKS**

- Radiologic Science for Technologists
- Stewart C. Bushong.
- Radiographic Positioning
- Eisenberg Dennis May
- Clark's Radiographic Positioning.
- Human Anatomy by Snail
- Imaging Atlas of Human Anatomy s
- Peter H.H. Abrahams
- Text Book of Radiology and Imaging Sutton
- Paul & JuHL's
- Essentials of Radiologic Imaging John H-JuHL
- Andrew B. Crummy.

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## **FACULTY MEMBERS**

### **PROFESSOR.**

1. Prof: Mazhar Naeem MBBS, DMRD
2. Prof. Ashraf Ali Achakzai MBBS, FCPS

### **ASSOCIATE PROFESSOR.**

- 1 Dr. Ejaz Ahmed MBBS, DMRD
- 2 Dr. Muhammad Ashraf Kasi MBBS, FCPS

### **ASSISTANT PROFESSOR**

- 1 Dr Mehwish Mansoor MBBS, FCPS

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