

देवदह नगरपालिका
नगर कार्यपालिकाको कार्यालय
केरवानी, रुपन्देही



नेपाल स्वास्थ्य सेवा, रेडियोग्राफी समूह, सहायक पाँचौं तह, रेडियोग्राफर पदको प्रतियोगितात्मक
परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ ।

प्रथम चरण:- लिखित परीक्षा

पूर्णाङ्क:- १००

द्वितीय चरण:- अन्तर्वार्ता

पूर्णाङ्क:- २०

प्रथम चरण:- लिखित परीक्षा योजना (Written Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या × अङ्क	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुवैकल्पिक (Multiple Choice)	५०×२ अङ्क=१००	४५ मिनेट

द्वितीय चरण:-

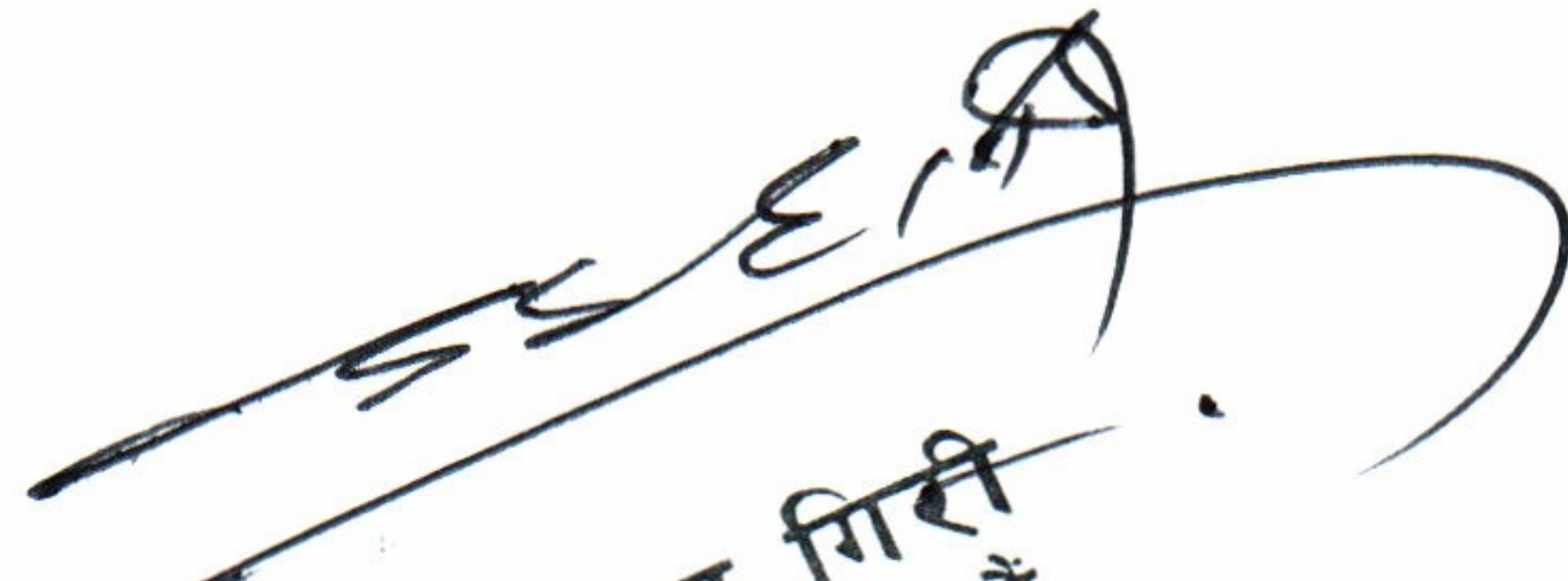
विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तरवार्ता	२०	मौखिक

द्रष्टव्य:-

१. लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरू सोधिने छ ।

पाठ्यक्रम इकाई	१	२	३	४	५	६	७
वस्तुगत प्रश्न संख्या	१०	१२	४	८	८	६	२

- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- यस पाठ्यक्रम योजना अन्तर्गत पत्र/ विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तरवार्तामा सम्मिलित गराइनेछ ।


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1. Anatomy and Physiology

1.1 General introduction

- 1.1.1 The cell
- 1.1.2 Reproduction of the individual

1.2 The tissues

- 1.2.1 Epithelial tissue
- 1.2.2 Connective tissue
- 1.2.3 Skeletal tissue
- 1.2.4 Muscular tissue
- 1.2.5 Nervous tissue

1.3 General pathology

- 1.3.1 Bacteria
- 1.3.2 Viruses
- 1.3.3 Tumours

1.4 Surface and regional anatomy

- 1.4.1 The anatomical position
- 1.4.2 The head
- 1.4.3 The neck
- 1.4.4 The thorax
- 1.4.5 The abdomen
- 1.4.6 The pelvic cavity

1.5 The skeleton

- 1.5.1 The structure of bone
- 1.5.2 Function of bone
- 1.5.3 The development and growth of bones
- 1.5.4 The healing of fractures

1.6 The skull

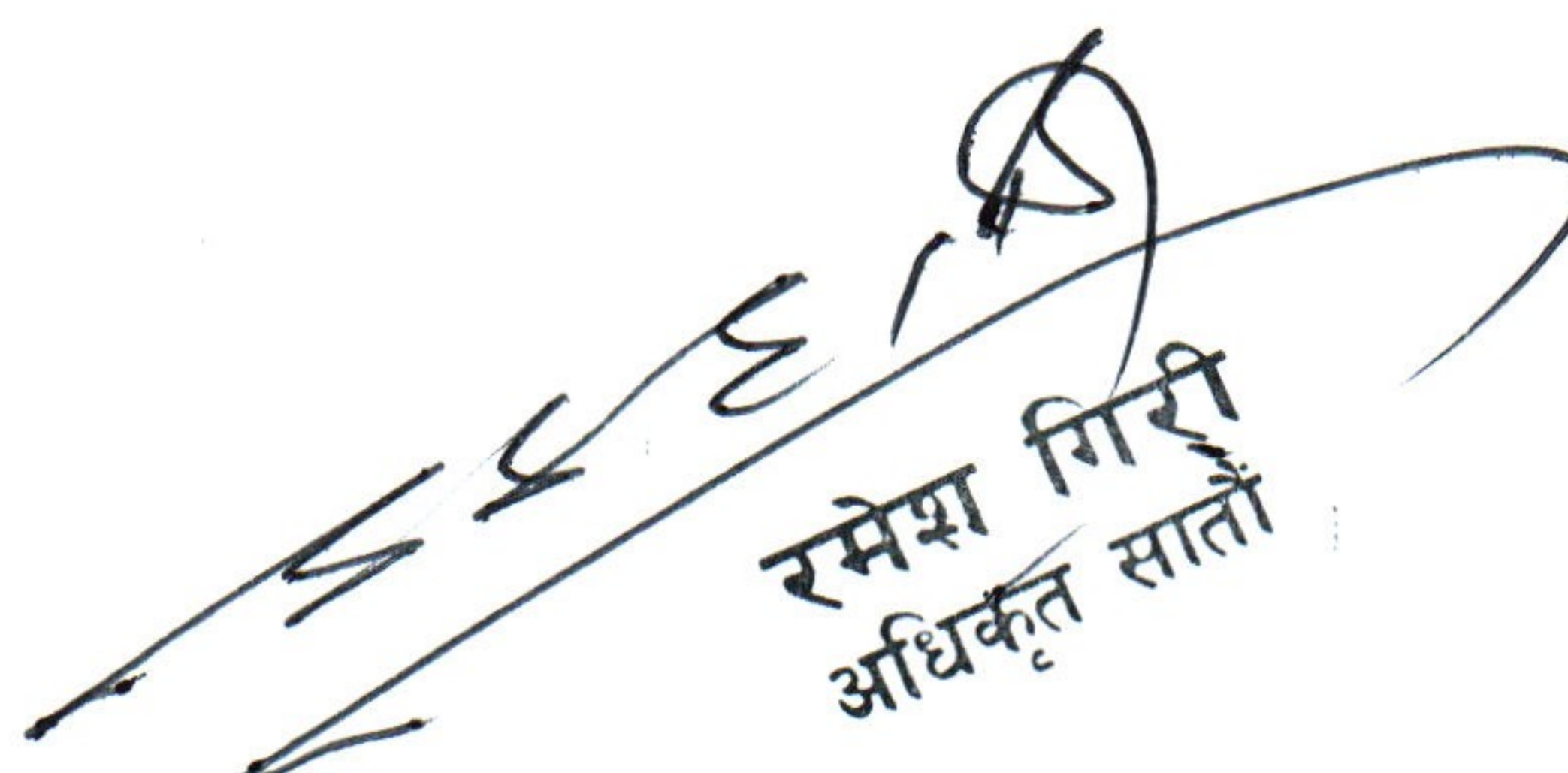
- 1.6.1 The skull viewed from above
- 1.6.2 The skull viewed from the front
- 1.6.3 The skull viewed from the side
- 1.6.4 The skull viewed from the below
- 1.6.5 The interior of the skull cap
- 1.6.6 The interior of the base of the skull
- 1.6.7 The nasal cavity
- 1.6.8 The accessory nasal sinuses
- 1.6.9 The individual bones of the skull

1.7 The vertebral column, ribs and sternum

- 1.7.1 The vertebral column
- 1.7.2 The ribs
- 1.7.3 The sternum

1.8 The bones of the upper limb

- 1.8.1 The clavicle
- 1.8.2 The scapula
- 1.8.3 The humerus
- 1.8.4 The radius
- 1.8.5 The ulna
- 1.8.6 The carpal bones

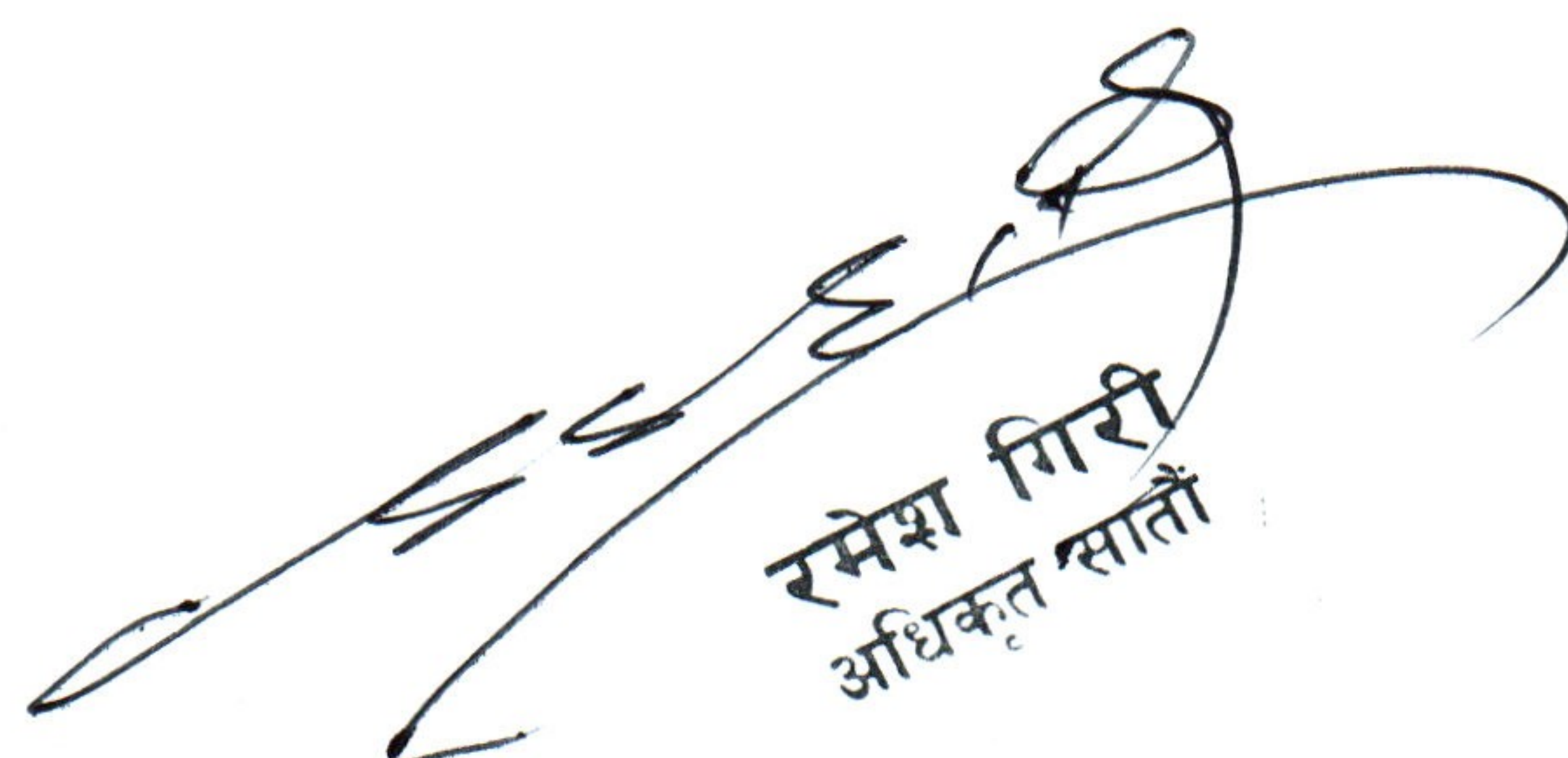

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- 1.8.7 The metacarpal bones
- 1.8.8 The phalanges
- 1.8.9 Arteries and nerves related to the bones of the upper limb
- 1.8.10 Ossification of the bones of the upper limb
- 1.9 The bones of the lower limb**
 - 1.9.1 The hip bone
 - 1.9.2 The pelvis
 - 1.9.3 The femur
 - 1.9.4 The patella
 - 1.9.5 The tibia
 - 1.9.6 The fibula
 - 1.9.7 The tarsal bones
 - 1.9.8 The metatarsal bones
 - 1.9.9 The phalanges
 - 1.9.10 The arches of the foot
 - 1.9.11 Arteries and nerves related to the bone of the lower limb
 - 1.9.12 Ossification of the bones of the lower limb
- 1.10 The joints of the bones of the lower limb**
 - 1.10.1 types of joints
 - 1.10.2 The muscles and joints of the head
 - 1.10.3 The joints and muscles of the neck and trunk
 - 1.10.4 The joints and muscles of the upper limb
 - 1.10.5 The joint and muscles of the lower limb
- 1.11 The circulatory system**
 - 1.11.1 The blood
 - 1.11.2 The blood vessels
 - 1.11.3 The heart
 - 1.11.4 The pulmonary circulation
 - 1.11.5 The systemic circulation
 - 1.11.6 The veins
- 1.12 The lymphatic system**
 - 1.12.1 Lymph
 - 1.12.2 The lymphatic vessels
 - 1.12.3 The lymphnodes
 - 1.12.4 The lymphatic drainage of the body
 - 1.12.5 Lymphatic tissue
 - 1.12.6 The spleen
- 1.13 The respiratory system**
 - 1.13.1 The nose
 - 1.13.2 The pharynx
 - 1.13.3 The larynx
 - 1.13.4 The trachea
 - 1.13.5 The bronchi
 - 1.13.6 The lungs
 - 1.13.7 The physiology of respiration
- 1.14 The digestive system**
 - 1.14.1 The mouth
 - 1.14.2 The salivary glands




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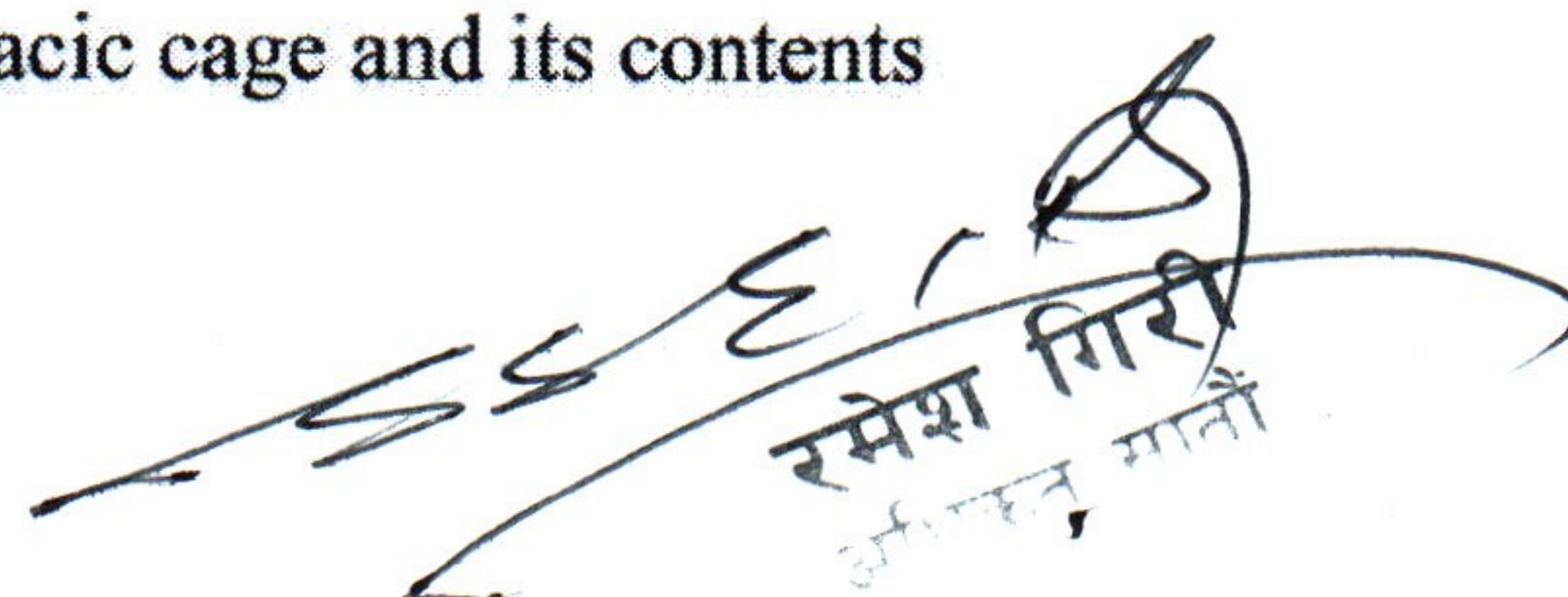


- 1.14.3 The pharynx
- 1.14.4 The oesophagus
- 1.14.5 The stomach
- 1.14.6 The small intestine
- 1.14.7 The large intestine
- 1.14.8 The pancreas
- 1.14.9 The liver
- 1.14.10 The biliary apparatus
- 1.14.11 The function of the alimentary system
- 1.15 The urinary system**
 - 1.15.1 The kidneys
 - 1.15.2 The ureters
 - 1.15.3 The urinary bladder
 - 1.15.4 The urethra
 - 1.15.5 The functions of kidneys
 - 1.15.6 The control of micturition
- 1.16 The nervous system**
 - 1.16.1 Nervous tissue
 - 1.16.2 The central nervous system
 - 1.16.3 The brain
 - 1.16.4 The spinal cord
 - 1.16.5 The peripheral nervous system
 - 1.16.6 The autonomic nervous system
- 1.17 The endocrine system**
 - 1.17.1 The pituitary gland
 - 1.17.2 The thyroid gland
 - 1.17.3 The parathyroid gland
 - 1.17.4 The adrenal glands
- 1.18 The reproductive system**
 - 1.18.1 The male reproductive system
 - 1.18.2 The female reproductive system
- 1.19 The skin and the organs of special sense**
 - 1.19.1 The skin
 - 1.19.2 The eye
 - 1.19.3 The ear
 - 1.19.4 The nose
 - 1.19.5 The tongue

2 Radiographic Technique

2.1 General radiography

- 2.1.1 Routine Radiography Technique for upper limb
(Fingers, thumb, hand, wrist forearm, elbow, humerus, shoulder, scapula, clavicle)
- 2.1.2 Routine Radiography Technique for the lower limb,
(Toes, foot, calcaneum, ankle, tibia, fibula, knee, femur, hip joint, neck of femur, pelvis)
- 2.1.3 Routine Radiographic technique for thoracic cage and its contents
(Chest, heart, ribs and sternum)

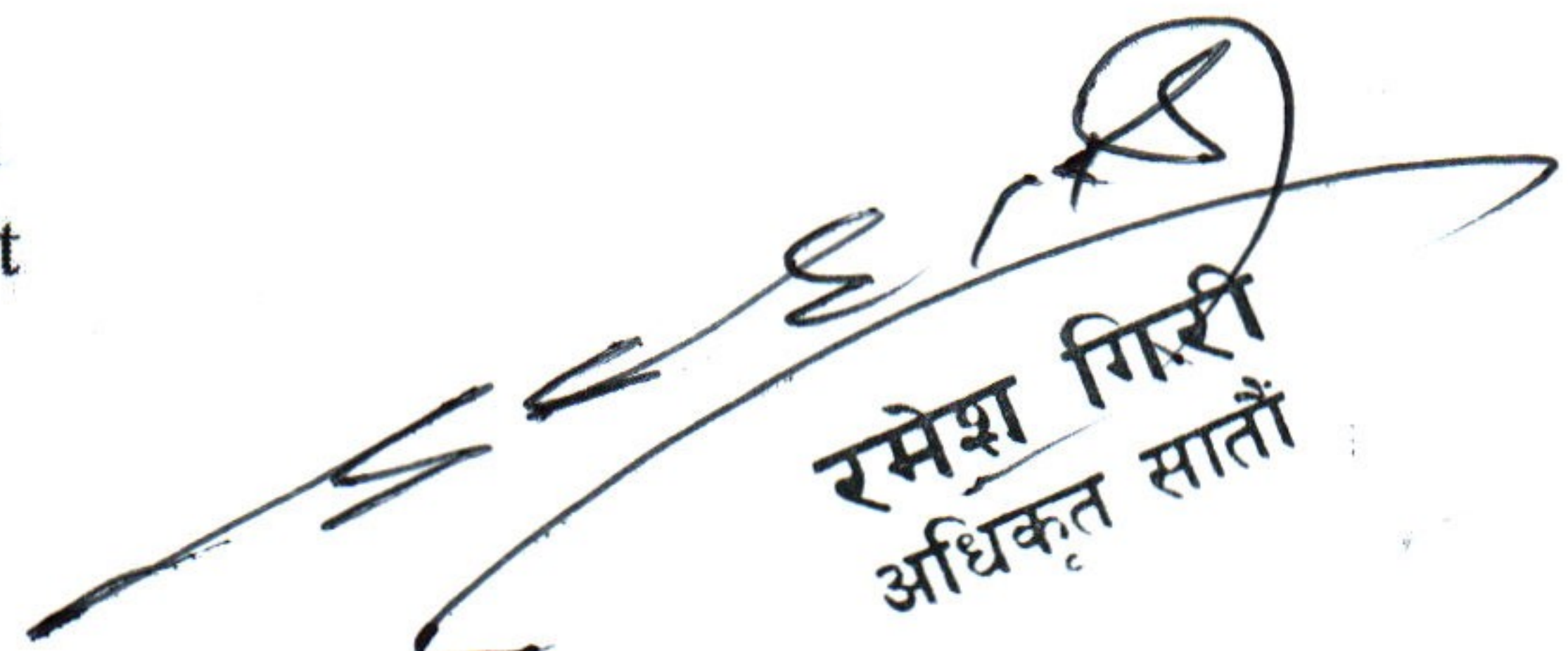

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- 2.1.4 Routine technique for the abdomen
Routine technique of plain & erect abdomen x-ray
- 2.1.5 Routine technique for the spine
(Cervical, thoracic, lumbar, sacrum and coccyx, sacro-illac joint)
- 2.1.6 Routine technique for the skull
 - 2.1.6.1 The radiograph anatomical landmarks of the skull
 - 2.1.6.2 The process of routine examination of the bones of skull
(cranium, facial bone and mandible)
- 2.1.7 To locate the following by x-rays (scaphoid, foreign body in the hand, head of humerus & axial Shoulder, acromio-calvicular joints, sterno- calvicular joints, foreign body in the foot, lateral foot, weight bearing, skyline view of patella, tibial tuberosity)
- 2.1.8 a) The supplementary views of the chest and abdomen (Apical views, lordotic view & decubitus, oblique views for heart size & lateral with barium swallow, thoracic inlet, diaphragm excursion, inhaled or swallowed foreign body, imperforated anus)
b) The purposes of these views
- 2.1.9 The supplementary views for the spine and pelvis (soft tissue)
(Neck, odontoid peg (open-mouth), vertebral foramina of cervical spine, upper thoracic spine oblique lumbar spine, lumbosacral junction, oblique sacro-illac joints, illum, acetabulum, pelvimetry, skeleton survey)
- 2.1.10 The supplementary views for the skull (towne's view, submento vertical, sella turcica, temporo-mandibular joint, nasal bones, paranasal sinuses, mastoids, orbits, optic foramina, foreign body in the eye, dental radiography)
- 2.1.11 Tomography
 - a) Basic principle of tomogram
 - b) Practical application of Tomography for the chest, kidney, gall bladder and skeletal system
- 2.1.12 Registration process
 - a) The steps of registration of patients
 - b) The importance of a monthly and annual record, filling system and preparing the Performa invoices
 - c) Filling of radiographs and reports (x-ray No, hospital number, patient's name, cross reference bill, with patient's name)
- 2.2 Radiographic examination with contrast media**
Special examination with contrast media
 - 2.2.1 Contrast media
 - 2.2.1.1 Definition of the contrast media
 - 2.2.1.2 Types of contrast media
 - 2.2.1.3 Methods of introducing the contrast media
 - 2.2.1.4 Reactions of contrast media
 - 2.2.1.5 Name of the emergency equipments and drugs needed to cope with reactions
 - 2.2.2 Radiographic investigation of Gastro-intestinal tract using contrast media
 - 2.2.2.1 Barium swallow
 - 2.2.2.2 Barium meal
 - 2.2.2.3 Barium follow-through
 - 2.2.2.4 Examination of GI tract
 - 2.2.2.5 Ba-enema


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- 2.2.2.6 Small bowel enema
- 2.2.2.7 Loopogram
- 2.2.2.8 State the role of a radiographer during fluoroscopy
- 2.2.3 Investigation of urinary tract and hysterosalpinogram
 - 2.2.3.1 Intravenous Urogram(IVU)
 - 2.2.3.2 Cystogram
 - 2.2.3.3 Micturating cystogram
 - 2.2.3.4 Urethrogram
 - 2.2.3.5 Retrograde pyelogram
 - 2.2.3.6 Hystero salpinogram(HSG)
- 2.2.4 Radiographic procedure of the Biliary tract
 - 2.2.4.1 Oral cholecystography(OCG)
 - 2.2.4.2 Intravenous cholangiography(IVC)
 - 2.2.4.3 Percutaneous transhepatic cholangiography and drainage (PTC and PTCD)
 - 2.2.4.4 Endoscopic retrograde cholangio pancreatography(ERCP)
 - 2.2.4.5 Operatic cholangiography
 - 2.2.4.6 T. Tube cholangiography
- 2.2.5 Use of portable/mobile x-ray in ward and operation theatre
 - 2.2.5.1 The uses of portable machine
 - 2.2.5.2 The technique of using ward radiography
 - 2.2.5.3 The technique of using operating theatre radiography
 - 2.2.5.4 Technique to help in Hip pinning
 - 2.2.5.5 The technique of operative-cholangiography
- 2.2.6 Vascular and Neurological examinations
 - 2.2.6.1 Carotid and vertebral angiogram
 - 2.2.6.2 Femoral angiogram
 - 2.2.6.3 Aortogram
 - 2.2.6.4 Phlebogram
 - 2.2.6.5 Encephalogram
 - 2.2.6.6 Ventriculogram
 - 2.2.6.7 Myelogram
- 2.2.7 Special examinations
 - 2.2.7.1 Arthrogram
 - 2.2.7.2 Dacryo cystogram
 - 2.2.7.3 Sinogram/Fistulogram
 - 2.2.7.4 Sailogram
 - 2.2.7.5 Mammogram
 - 2.2.7.6 Macro-radiography
 - 2.2.7.7 Soft tissue radiography

3. Patient Care and Management

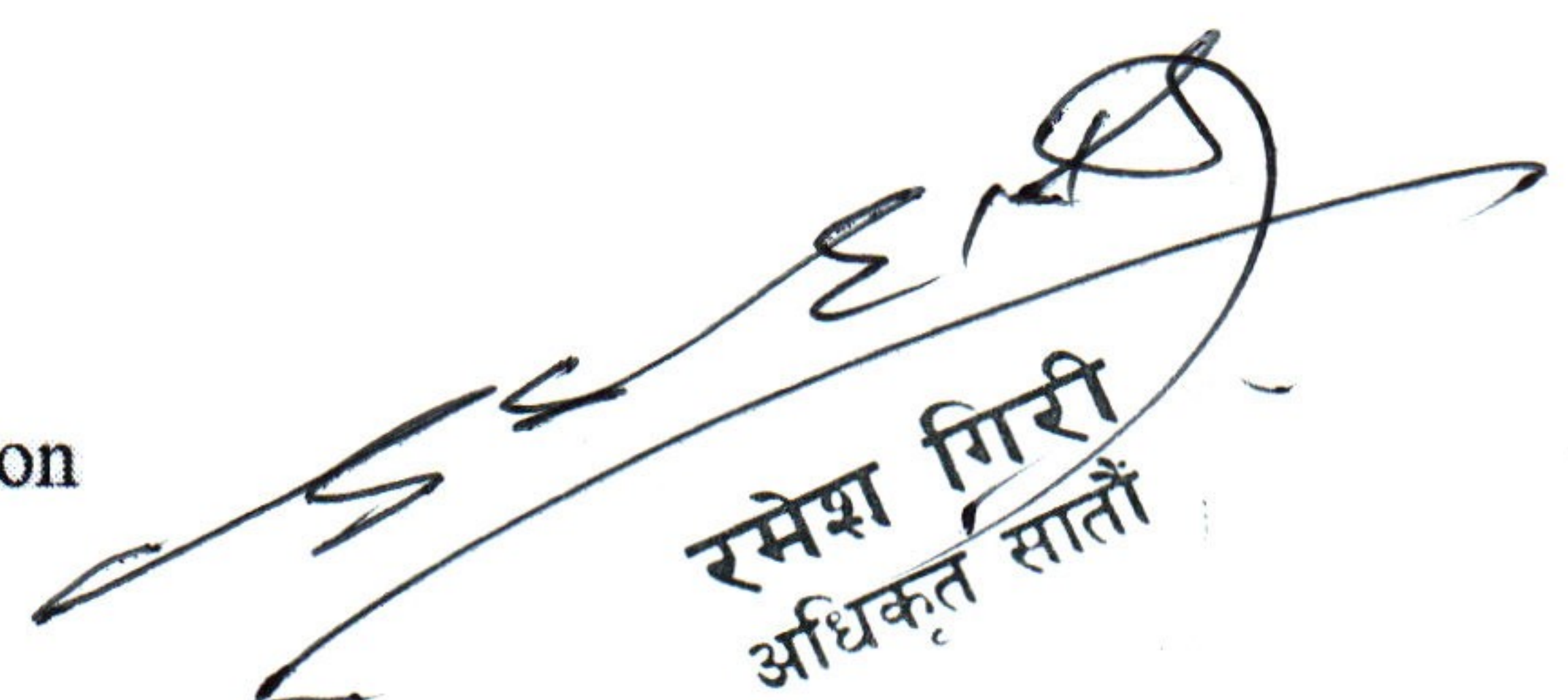
3.1 The hospital, the patient and the radiographer

- 3.1.1 Clinical responsibility
- 3.1.2 Legal responsibility
- 3.1.3 The radiographer and the hospital

3.2 Features of general patientcare

- 3.2.1 General preliminaries to the examination



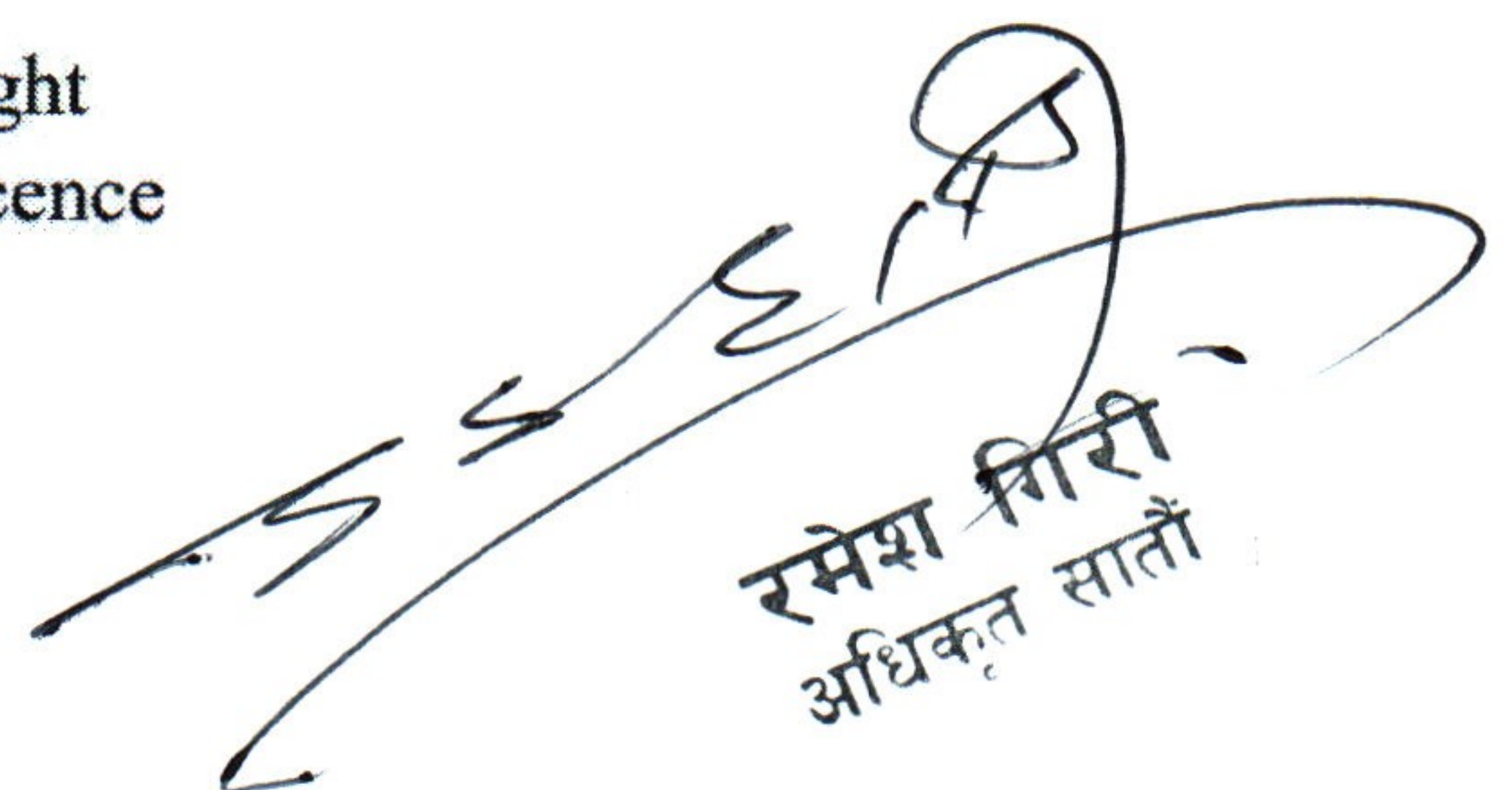

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- 3.2.2 Moving chair and stretcher patients
- 3.2.3 The anaesthetized patient
- 3.2.4 Hygiene in the x-ray department
- 3.2.5 General comfort and reassurance for the patient
- 3.3 **Drugs in the x-ray department**
 - 3.3.1 Poisons and dangerous drugs
 - 3.3.2 Units of measurement
 - 3.3.3 Drugs used in preparation of the patient
 - 3.3.4 Contrast agents used in x-ray examinations
 - 3.3.5 Drugs used in resuscitation
 - 3.3.6 Labeling and issuing
- 3.4 **Sterilization and sterile techniques**
 - 3.4.1 Methods of sterilization
 - 3.4.2 Central sterile supply
 - 3.4.3 Preparation of the hands for aseptic procedures
- 3.5 **Preparation of the patient**
 - 3.5.1 General abdominal preparation
 - 3.5.2 Clothing of the patient
- 3.6 **First aid in the x-ray department**
 - 3.6.1 Radiological emergencies
 - 3.6.2 Shock
 - 3.6.3 Hemorrhage
 - 3.6.4 Burns and scalds
 - 3.6.5 Loss of consciousness
 - 3.6.6 Asphyxia
 - 3.6.7 Fractures
 - 3.6.8 Electric shock
- 3.7 **Medico-legal aspects of the radiographer's work**
 - 3.7.1 Breach of professional confidence
 - 3.7.2 Negligence
 - 3.7.3 Procedure in the event of an accident
 - 3.7.4 The importance of records
- 4. **Radiographic Photography**
 - 4.1 **Film**
 - 4.1.1 Construction and composition of x-ray film
 - 4.1.2 Types of x-ray film
 - 4.1.3 Characteristic curve, special sensitivity & role of dyeing
 - 4.1.4 Film speed, density, contrast, sensitometry
 - 4.1.5 Artifacts and its causes
 - 4.2 **Intensifying screen**
 - 4.2.1 Construction and composition of I.S.
 - 4.2.2 Screen speed, sharpness, coating weight
 - 4.2.3 Fluorescent material and phosphorescence
 - 4.2.4 Fluorescent material, new phosphors
 - 4.3 **Image**
 - 4.3.1 Production of radiographic image
 - 4.3.2 Component of radiographic image


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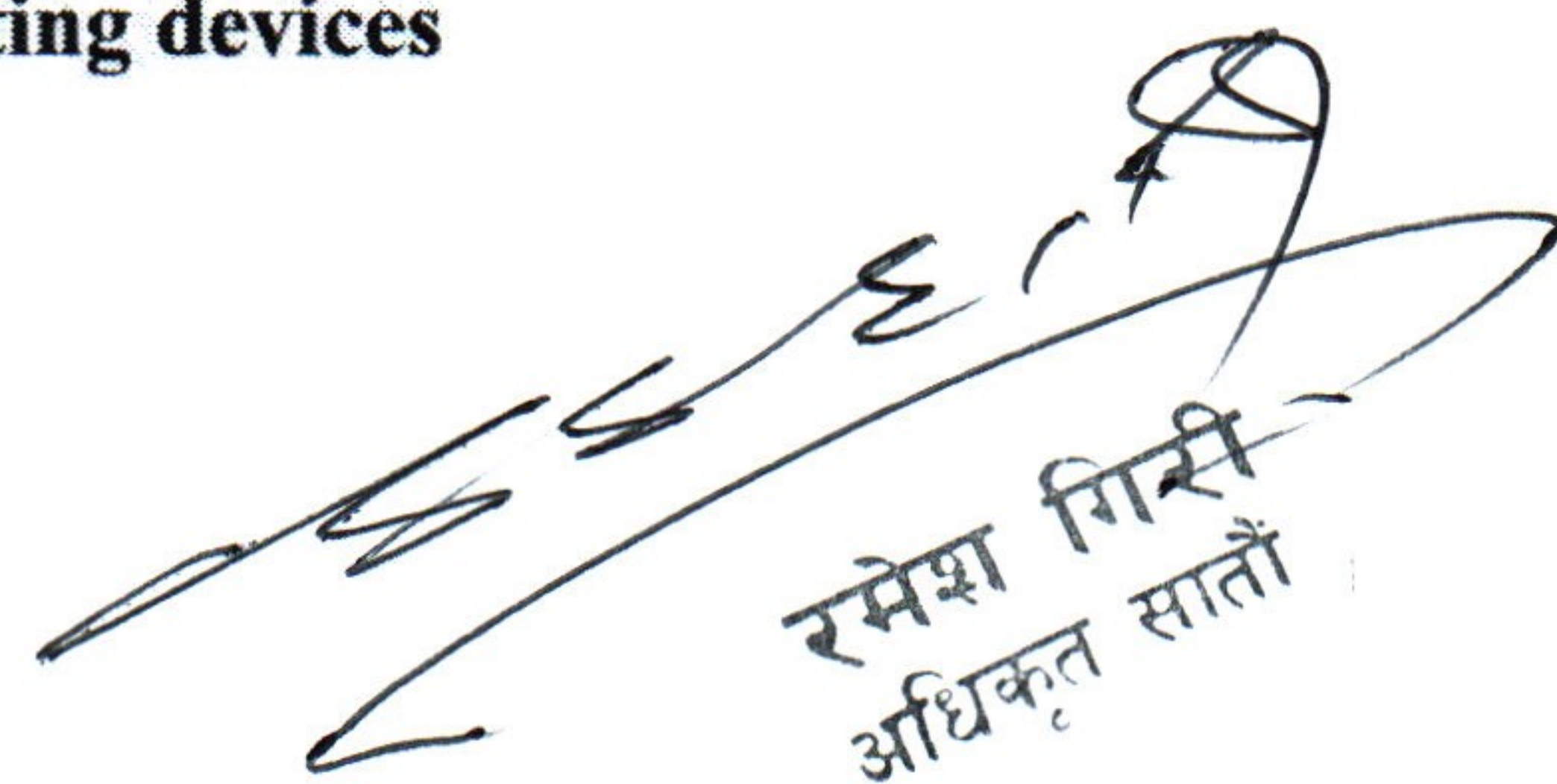
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- 4.3.2.1 Contrast, sharpness, resolution
- 4.3.2.2 Exposure factors
- 4.3.2.3 Absorption coefficient
- 4.4 Film processing**
 - 4.4.1 Manual film processing
 - 4.4.1.1 The processing cycle
 - 441.1.1 Development-constituents of developer, factors affecting control of development, developer replenishes maintenance of activity & level of developer
 - 441.1.2 Rinsing
 - 441.1.3 Fixation-constituents of fixer, factors affecting fixation and regeneration of the Fixer
 - 441.1.4 Washing processing
 - 441.1.5 Drying process
 - 441.1.6 Tanks and containers for processing chemical, processing units
 - 441.1.7 Mixing chemicals
 - 441.1.8 storage of chemicals
 - 441.1.9 Film hangers
 - 4.4.2 Automatic processor
 - 4.4.2.1 Basic principle & it's functioning
- 4.5 Dark room planning**
 - 4.5.1 Location, layout, radiation protection, safelight filter & sensitivity range
- 4.6 Identification**
 - 4.6.1 Methods
 - 4.6.2 Importance
- 4.7 Silver recovery**
 - 4.7.1 General introduction



5. Radiographic equipment

- 5.1 Historical background of x-ray and its production**
 - 5.5.1 X-ray tube construction
 - 5.5.2 Stationary and rotating x-ray tube
 - 5.5.3 Recent advancement of an x-ray tube
 - 5.5.4 Tube rating cooling and care of x-ray tube and its faults
- 5.2 Control panel, x-ray table and tube column**
 - 5.2.1 Type of x-ray table
 - 5.2.2 Different metering equipment
 - 5.2.3 X-ray tube support
- 5.3 Fluoroscopic equipment**
 - 5.3.1 Conventional fluoroscopy and image intensifier tube
- 5.4 Control of scatter radiation & beam restricting devices**
 - 5.4.1 Secondary radiation grids
 - 5.4.2 Air gap technique
- 5.5 Portable and mobile x-ray units**
 - 5.5.1 Capacitor discharge and c-arm
- 5.6 Conventional tomography**

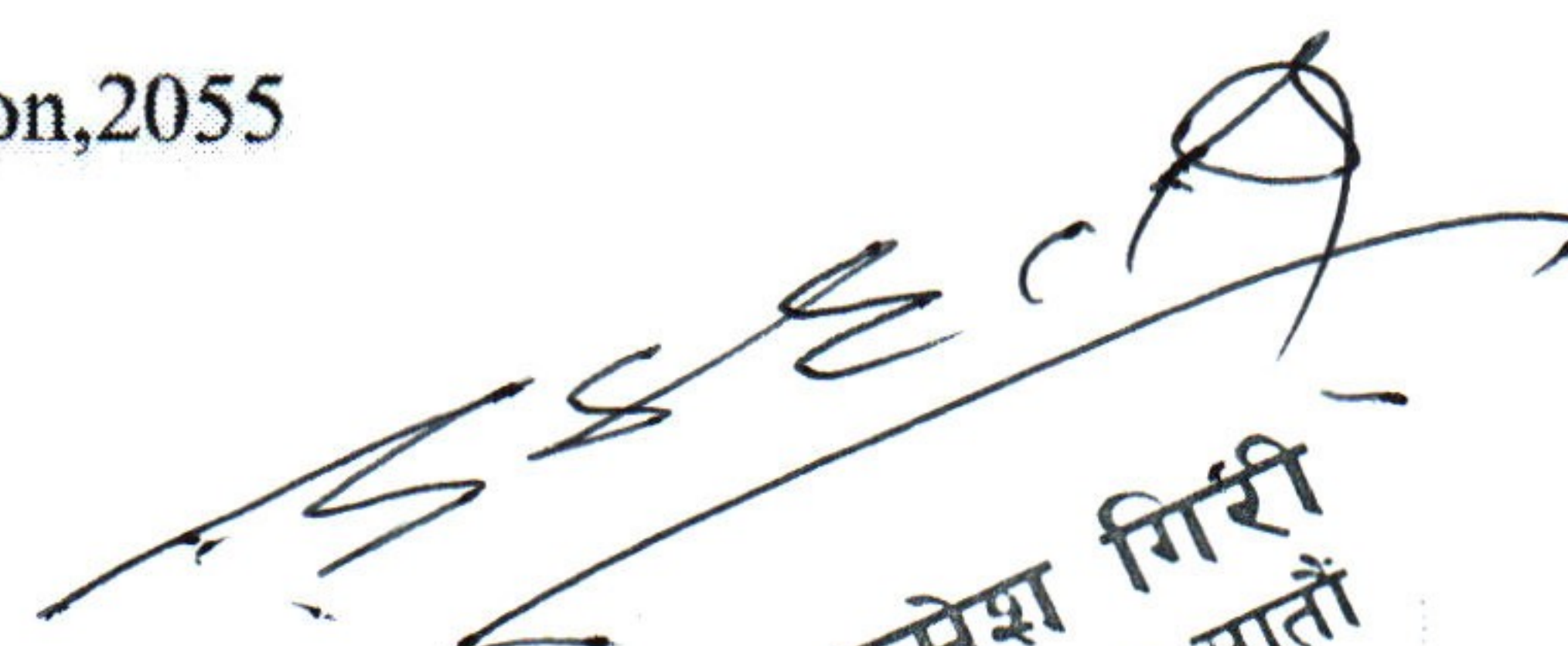

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देवदह नगरपालिका
नगर कार्यपालिकाको कार्यालय
केरवानी, रुपन्देही

नेपाल स्वास्थ्य सेवा, रेडियोग्राफी समूह, सहायक पाँचौं तह, रेडियोग्राफर पदको प्रतियोगितात्मक
परीक्षाको पाठ्यक्रम

- 5.7 Introduction to modern modalities (CT, MRI, mammography)**
- 6. Radiation Physics**
- 6.1 Atomic structure**
- 6.1.1 The Nucleus
 - 6.1.2 Electron orbits and energy levels
- 6.2 Production of x-ray, properties of x-rays**
- 6.2.1 General radiation (Bremsstrahlung),
 - 6.2.2 Characteristic Radiation
 - 6.2.3 Intensity of x-rays beams
 - 6.2.4 Target material
 - 6.2.5 voltage (kVp) applied
- 6.3 Basic interactions between x-rays and matter**
- 6.3.1 Coherent scattering
 - 6.3.2 Photoelectric effect
 - 6.3.3 Compton scattering
 - 6.3.4 Pair production
 - 6.3.5 Photodisintegration
- 6.4 Radiation measurement and units**
- 6.4.1 Construction & working of the free air ionization chamber
 - 6.4.2 Thimble ionization chamber & condenser ionization chamber
- 6.5 Radiation protection**
- 6.5.1 Historical introduction or why the protection is necessary against the radiation
 - 6.5.2 Maximum permissible dose
 - 6.5.3 Tabulation of the recommended maximum permissible doses for the different parts of the body
 - 6.5.4 Following the code of practice
 - 6.5.5 Identifying the protective materials
- 6.6 Personnel monitoring**
- 6.6.1 The necessity of personnel monitoring & monitoring instruments (film badge, ionization chamber & thermoluminescent dosimeter)
- 6.7 Safety requirements for operating a x-ray unit**
- 7. Policies, laws and regulations**
- 7.1 Nepal Health Sector Programme
 - 7.2 Nepal Health Service Act, 2053 and Regulation, 2055
 - 7.3 Nepal Health Professional Council




रमेश गिरी
अधिकृत सातौं