

त्रि.वि. सेवा आयोग

प्रशासन सेवा, स्वास्थ्य समूहका अधिकृत स्तरका विभिन्न पदहरूको

प्रयोगात्मक परीक्षाको पाठ्यक्रम

त्रिभुवन विश्वविद्यालय

सेवा आयोग

प्रयोगात्मक परीक्षाको पाठ्यक्रम

पद : नर्सिङ अधिकृत
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

तह/श्रेणी : अधिकृत तृतीय
उत्तिर्णाङ्क: १५

Objectives:

- To ensure clear, structured, and effective communication between healthcare professionals for patient safety.
- To prevent infection transmission in healthcare settings.
- To manage biomedical waste safely to prevent infection and environmental hazards.
- To demonstrate teaching skills in nursing education.
- To calculate the required fluid replacement for burn patients.
- To insert urinary catheter safely and maintain aseptic technique.

Contents

S.N.	Topic	Marks	Remarks
1	Communication-By applying ISBAR methods	5	
2	Hand washing technique	5	
3	Waste Disposal	5	
4	Lesson plan of microteaching	5	
5	Fluid Calculation of Burn patient	5	
6	Check list of Foley's catheterization	5	
Total marks		30	

Evaluation Methods:

1. Communication Using ISBAR Method

- Clarity of communication
- Logical presentation
- Accuracy of patient information
- Professional attitude

2. Hand Washing Technique

- Correct sequence
- Adequate duration
- Coverage of all hand surfaces
- Infection control compliance

3. Waste Disposal in Healthcare

- Correct segregation

- Use of appropriate container
- Safe handling practices
- Knowledge of infection prevention

4. Lesson Plan for Microteaching

- Organization of lesson
- Teaching clarity
- Use of teaching aids
- Interaction with learners
- Time management

5. Fluid Calculation for Burn Patient

- Correct formula application
- Accurate calculation
- Understanding of timing

6. Checklist of Foley's Catheterization

- Aseptic technique
- Correct procedure steps
- Patient safety
- Documentation

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प्रयोगात्मक परीक्षाको पाठ्यक्रम

पद : प्राविधिक अधिकृत (जनस्वास्थ्य)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

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उत्तिर्णाङ्क: १५

Objective:

- Use major development tools for health planning,
- Compute and interpret major epidemiology and demography related estimations,
- Prepare health education plan and procedure,
- Prepare diet and nutritional requirement charts

Specification Chart

S.No.	Course Content (Activities)	No.of Question	Marks
1.	Logistic Framework Approach (LFA), Compute DALY, Critical Path Method (CPM), planning cycle	1	5
2.	Compute Relative Risk, Odds ratio, Age specific fertility Rates, Total Fertility Rate, Human Development Index (HDI)	1	5
3.	Sample size calculation for different conditions, sampling, BMI calculation and interpretation	1	5
4.	Water purification methods, Major Vectors and Vector borne diseases, climate change and human health	1	5
5.	Prepare a curriculum grid, Lesson plan, PRECEDE-PROCEED model, The Health Belief Model	1	5
6.	Krebs Cycle, Diet chart for different age groups and diseases conditions, Nutritional requirement chart for different age groups	1	5
Total		6	30

Evaluation Criteria:

1. case based OSPE
2. computation of the formula, values
3. Preparation of illustrations etc

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पद : प्राविधिक अधिकृत (फरफ्युजनिष्ट)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

तह/श्रेणी : अधिकृत तृतीय
उत्तिर्णाङ्क: १५

Objective: To evaluate advanced clinical competence in cardiopulmonary bypass, extracorporeal life support, perfusion decision-making under crisis and knowledge and skills to maintain patient safety, applied pharmacology, hemodynamic interpretation, and independent intraoperative management and effective anticoagulation management.

This exam shall assess:

- Cognitive domain (Situational awareness)
- Precision under pressure requiring accuracy and decision making skills
- Leadership and team coordination skills as well as ethical responsibility in OR

Specification Chart

S.No.	Course Content (Activities)	No.of Question	Marks
1.	Basic and Advanced CPB Circuit Assembly and Prime with Fault Identification	1	5
2.	Real-time Clinical Scenario Simulation (Adult/Pediatric)	1	5
3.	Advanced Perfusion Calculations & Hemodynamic Monitoring	1	5
4.	ABG + Electrolyte + ACT + TEG Interpretation Under Crisis+Blood Management	1	5
5.	Advanced Support System (ECMO/IABP/DHCA/Mechanical Circulatory Support/RAP/Off-Pump Support System) Application	1	5
6.	Spotters (Integrated Applied Viva)	1	5
Total		6	30

Above Topics are explained in sub-topics below:

1. Cardiopulmonary Bypass (CPB) setup and Management
 - Assembly of complete adult and pediatric CPB circuit
 - Priming of CPB Circuit (Crystalloid, Colloid, Blood Prime)
 - Select appropriate oxygenator (given BSA)
 - Pre-Bypass Safety Checklist
 - Initiation, Maintenance and Termination of CPB

- Troubleshooting during CPB:
 - Misconnected recirculation
 - Air trap not secured
 - Gas blender mis calibrated
 - Arterial filter reversed
 - Oxygenator Failure
2. Myocardial Protection and Real-time Clinical Scenario Simulation (Adult/Pediatric)
- Preparation and administration of cardioplegia
 - Types of cardioplegia (Blood and Crystalloid)
 - Temperature management strategies
 - Flow target (indexed)
 - Perfusion pressure goal
 - Hematocrit target
 - Temperature strategy
 - Acid-base strategy (alpha vs pH stat)
 - Vasopressor decision
3. Hemodynamic Calculations
- Oxygen delivery (DO₂ formula)
 - Oxygen consumption
 - Heparin dose correction with low ACT
 - Protamine reversal ratio
 - Ultrafiltration volume calculation
4. Advanced Perfusion Techniques:
- ECMO circuit layout (VA vs VV, Cannulation Techniques and Troubleshooting)
 - IABP timing diagram interpretation
 - Retrograde vs Antegrade cerebral perfusion techniques
 - DHCA management timeline
 - Pediatric Perfusion Techniques
 - Retrograde Autologous Priming
 - Off Pump Support System
 - VAD (Ventricular Assist Devices Overview)
5. ABG + Electrolyte + ACT + TEG Interpretation Under Crisis ,Blood Management
- Ultrafiltration Techniques (CUF, MUF, ZBUF, PBUF)
 - Autotransfusion techniques
 - Cell Saver Operation
6. Spotters:
- Candidate must:
- Identify
 - One complication

- One
contraindication

Devices

- Hollow fiber oxygenator (plasma leak concept)
- Centrifugal pump head (afterload sensitivity)
- Hemoconcentrator membrane
- Bubble detector sensor
- Inline blood gas monitor
- Cannulas
- Perfusion Equipment and

devices Pharmacology

- Heparin (AT-III interaction)
- Protamine reaction
- Tranexamic acid mechanism
- Phenylephrine vs Noradrenaline on CPB

Evaluation Criteria:

1. Technical precision and safe machine handling
2. Clinical reasoning and decision-making ability and emergency response approach
3. Communication, confidence, and aseptic discipline

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पद : प्राविधिक अधिकृत (प्याथोलोजी)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

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उत्तिर्णाङ्क: १५

Objective:

- To ensure candidate has basic knowledge in different aspects of pathology, as per syllabus.

Specification Chart

S.No.	Course Content (Activities)	No.of Question	Marks
1.	Histology of lymph node slide interpretation	1	5
2.	Perform Pap stain on the given smear along with identification of different cells	1	5
3.	Staining of Peripheral blood smear along with interpretation	1	5
4.	Perform routine examination of urine with interpretation	1	5
5.	Perform urea estimation and write down the interpretation	1	5
6.	Perform Blood grouping on the given sample and write the interpretation.	1	5
Total		6	30

Evaluation Criteria:

- Points of description, diagnosis in slides
- Interpretation of tests and steps of procedure

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पद : प्राविधिक अधिकृत (फार्मसी)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

तह/श्रेणी : अधिकृत तृतीय
उत्तिर्णाङ्क: १५

Objective: To assess the practical ability of the pharmacy candidates.

Practical exams of pharmacists or pharmacy assistants in hospital pharmacy need to test their ability in core competency, especially in extemporaneous preparations, and simple visible tests of medicines. It requires 3 hours, and the examiner should be given some flexibility based on availability of raw materials and infrastructure of the laboratory.

The examiner should be instructed to give at least 3 assignments to each candidate, and make sure the 3 assignments belong to different formulation types. In case a candidate cannot remember the formula of a product, the candidate should be given the formula, but 10 % marks should be deducted from its score. Each assignment assigned carries 10 marks.

List of experiments for hospital pharmacists (technical officers)

No.	Formulation	Quantity	Brief Answer Guide (Ingredients / Key Points)
1	Whitfield's Ointment	50 g	Benzoic acid 6 g + Salicylic acid 3 g + ointment base q.s.; levigate solids into base.
2	Lassar's Paste	50 g	Zinc oxide 25 g + Salicylic acid 2 g + starch 25 g + soft paraffin q.s.; triturate thoroughly.
3	Urea Cream	50 g	Urea 10–20% + cream base q.s.; ensure uniform mixing.
4	Salicylic Acid Ointment	50 g	Salicylic acid 2–5% + ointment base q.s.; levigation required.
5	Zinc Oxide Ointment	50 g	Zinc oxide 20% + ointment base q.s.; trituration recommended.
6	Menthol Ointment	50 g	Menthol 1–2% + ointment base q.s.; mix until homogeneous.
7	Camphor Liniment	50 mL	Camphor 5% + olive oil or liquid paraffin; dissolve camphor before mixing.
8	Calamine Lotion	100 mL	Calamine 15 g + Zinc oxide 5 g + bentonite + glycerin + lime water q.s.; prepare as lotion.
9	Starch Mucilage	100 mL	Starch 5 g + water q.s.; heat and stir until smooth.

No.	Formulation	Quantity	Brief Answer Guide (Ingredients / Key Points)
10	Magnesium Trisilicate Mixture	200 mL	Magnesium trisilicate 25 g + Sodium bicarbonate 5 g + peppermint water q.s.; shake well before dispensing.
11	Potassium Citrate Mixture	200 mL	Potassium citrate 30 g + syrup + water q.s.; ensure fully dissolved.
12	Compound Sodium Bicarbonate Mouthwash	100 mL	Sodium bicarbonate 1 g + glycerin 5 mL + peppermint water q.s.; stir until clear.
13	Boric Acid Eye Wash	100 mL	Boric acid 2 g + purified water q.s.; prepare as isotonic solution.
14	Glycerin Suppositories	12 suppositories	Glycerin 70 g + sodium stearate 5 g + water q.s.; melt base, pour into molds.
15	Carron Oil	100 mL	Lime water 50 mL + linseed oil 50 mL; emulsify gently.
16	Coal Tar Ointment	50 g	Coal tar 5 g + ointment base q.s.; mix uniformly.
17	Compound Tincture of Benzoin	50 mL	Benzoin 10 g + Aloes 2 g + Storax 8 g + Tolu 4 g + alcohol q.s.; dissolve solids in alcohol.
18	Rose Water Ointment	50 g	Rose water 20 mL + white wax 15 g + almond oil 65 g; melt wax, add oil, mix with rose water.
19	Lead Subacetate Lotion	100 mL	Lead subacetate solution 5 mL + water q.s.; dilute properly; astringent use.
20	Burow's Solution	100 mL	Aluminium acetate solution diluted with water; astringent for skin conditions.

Evaluation Criteria:

1. Formula 10 %
2. Preparation 70 %
3. Labelling 10 %
4. Patient instructions 10 %

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पद : प्राविधिक अधिकृत (फिजियोथेरापी)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

तह/श्रेणी : अधिकृत तृतीय
उत्तिर्णाङ्क: १५

Practical Questions for Technical Officer (Physiotherapy)

Objective:

- To ensure candidate has basic knowledge in different aspects of Physiotherapy, as per syllabus.

Contents:

- Neurological Rehabilitation (Stroke)
- Musculoskeletal/Orthopedic (Chronic Low Back Pain)
- Cardiorespiratory Rehabilitation (COPD)
- Geriatric/Orthopedic (Osteoarthritis Knee)
- Developmental Delay Paediatric Physiotherapy
- Evidence-Based Practice Process

Sample Practical Questions for Technical Officer (Physiotherapy)

Neurological Rehabilitation (Stroke)

- A 65-year-old male is referred for physiotherapy 10 days post-acute ischemic stroke, with right-sided hemiplegia, severe upper limb spasticity (MAS Grade 3), and inability to walk independently. (Time: 20-25 min).
A) Outline an evidence-based assessment protocol for motor recovery and functional capacity. (10 marks)
B) Describe a 4-week rehabilitation program based on current stroke guidelines, focusing on gait training and spasticity management. (12 marks)
C) Discuss evidence regarding intensity and timing of rehabilitation (early mobilization). (8 marks)

Musculoskeletal/Orthopedic (Chronic Low Back Pain)

- A 45-year-old office worker presents with 6 months of non-specific chronic low back pain (CLBP), radiating pain to the right buttock, with no red flags. The patient is apprehensive about movement and has failed previous passive treatments (Time: 25-30 min;).
A) Based on current evidence-based guidelines, explain why exercise is superior to passive modalities for this patient. (10 marks)
B) Develop a comprehensive management plan including Pain Neuroscience Education (PNE), manual therapy, and specific exercises (e.g., motor control vs. general aerobic). (12 marks)
C) How would you incorporate cognitive-behavioral principles to address fear-avoidance behaviors? (8 marks)

Cardiorespiratory Rehabilitation (COPD)

3. A 70-year-old patient with Chronic Obstructive Pulmonary Disease (COPD) has been admitted for an acute exacerbation (AECOPD). The patient is breathless, has difficulty with sputum clearance, and shows significant muscle fatigue.

A) Identify the evidence-based physiotherapy techniques for airway clearance and justify their use in an acute setting. (7+6 marks)

B) Propose a progressive mobilization and exercise training program to improve functional capacity and reduce dyspnea. (7 marks)

C) What outcome measures would you use to assess the efficacy of your intervention during the rehabilitation period? (10 marks)

Geriatric/Orthopedic (Osteoarthritis Knee)

4. A 75-year-old female presents with severe pain and functional limitation in both knees due to knee osteoarthritis (OA), affecting her ability to walk, climb stairs, and perform household activities.

A) Formulate a rehabilitation strategy based on evidence-based practice that addresses strengthening, balance, and pain management. (12 marks)

B) Explain the evidence regarding aquatic therapy vs. land-based exercise for knee OA. (10 marks)

C) Describe patient education strategies to improve long-term adherence to a home exercise program. (8 marks)

Developmental Delay Paediatric Physiotherapy

A 3-year-old girl presents with global developmental delay: cannot walk independently (cruises furniture only), poor fine motor (scribbles but no tower building), speech delay (10 words), diagnosed after prematurity (32 weeks) and hypotonia. Caregiver worried about school readiness. GMFCS Level III suspected. (Time: 20-25 min)

A) What comprehensive physiotherapy assessment will you perform for motor delays? Name tools and demo age-appropriate testing for gross/fine motor milestones. (12 marks)

B) Describe expected 3-year milestones and how you'd quantify her delay (e.g., scores/tools). Plan interventions to target crawling-to-walking progression. (8 marks)

C) Outline a 6-week home/clinic exercise plan focusing on posture, strength, and play-based facilitation. Include precautions for hypotonia. (10 marks)

Evidence-Based Practice Process

5. You are reviewing the use of Ultrasound Therapy in a clinic for acute soft tissue injuries, noting that it is used for almost all patients despite mixed reviews in literature.

A) Summarize the 5 steps of Evidence-Based Practice. (10 marks)

B) Using the PICO framework, formulate a clinical question to determine the effectiveness of Therapeutic Ultrasound vs. Active Exercise for acute ankle sprains. (12 marks)

C) If evidence shows the intervention is low-value, how would you, as a Technical Officer, facilitate the implementation of more effective, evidence-based alternatives? (8 marks)

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पद : प्राविधिक अधिकृत (स्विच प्याथोलोजी)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

तह/श्रेणी : अधिकृत तृतीय
उत्तिर्णाङ्क: १५

Objective: To assess the candidate's practical competence in audiology and speech-language pathology including hearing assessment procedures, speech-language evaluation, interpretation of audiological results, identification of speech disorders, and application of basic clinical skills used in speech and hearing services.

Specification Chart

S.N.	Course Content (Activities)	No. of Question	Marks
1.	Demonstration and interpretation of Pure Tone Audiometry / Audiogram	1	5
2.	Identification and classification of hearing loss from given audiological findings	1	5
3.	Speech and Language assessment task (articulation screening / phonological error identification)	1	5
4.	Clinical case analysis of speech or language disorder (e.g., stuttering, cleft palate, aphasia)	1	5
5.	Identification of speech therapy instruments / audiology equipment and their uses	1	5
6.	Basic counseling or management planning for a speech or hearing disorder case	1	5
Total		6	30

Evaluation Methods:

Accuracy of Procedure
Knowledge and Understanding
Use of Equipment / Tools
Professionalism and Documentation

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प्रयोगात्मक परीक्षाको पाठ्यक्रम

पद : प्राविधिक अधिकृत (अप्टोमेट्री)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
समय : १ घण्टा

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Note: Out of the multiple sample tasks/activities listed for each station, only one task per station will be selected for the practical exam questions. This ensures focused assessment while covering core competencies.

Station No.	Core Competency	Purpose	Sample Tasks / Activities	Time (min)	Marks	Assessment Method
1	Ocular Anatomy & Physiology	Assess identification and functional understanding of ocular structures	<ul style="list-style-type: none">Identify orbital structures, eyelids, eyeball, extraocular muscles, lacrimal apparatus, lens, vitreous, retina, optic nerve on models or diagramsDemonstrate eye movements: ductions, versions, vergence, saccades, smooth pursuitIdentify anterior chamber, angle structures, uvea Note: Only one task will be selected for assessment.	10	5	Spotting on models/diagrams, drawing or labelling exercises, short viva to explain structures/functions. Note: Partial marks may be awarded for incomplete identification or minor errors.
2	Optical Principles & Visual Function	Assess practical skills in measuring and interpreting visual function and optical principles.	<ul style="list-style-type: none">Perform distance & near visual acuity measurementConduct color vision tests: Ishihara, D-15Demonstrate prism/lens application; measure lens power and magnificationPerform manual or autorefractor refraction Note: Only one task will be selected for assessment.	10	5	Hands-on demonstration, direct observation, calculation exercises, interpretation of test results. Note: Partial marks may be awarded for minor errors or incomplete technique.
3	Clinical Examination & Diagnosis	Assess clinical reasoning, patient examination skills, and	<ul style="list-style-type: none">Examine patient with red eye, watering, swelling, or painAssess pupillary reactions, relative afferent pupillary	10	5	OSCE-style patient examination, scenario-based evaluation, structured viva

		emergency identification	<p>defect, anisocoria, Horner's syndrome</p> <ul style="list-style-type: none"> Examine fundus with direct/indirect ophthalmoscope or +90D lens Identify cataract, glaucoma, retinal detachment, ocular emergencies <p>Note: Only one task will be selected for assessment. Simulated patients, mannequins, or images may be used if live patients are unavailable.</p>			(explain findings and differential diagnosis), simulated emergency scenario. Note: Partial marks for incomplete examination or minor errors.
4	Diagnostic & Investigative Skills	Test proficiency with diagnostic instruments, accuracy of findings, and result interpretation	<ul style="list-style-type: none"> Perform slit lamp anterior segment examination Measure intraocular pressure (tonometry) & corneal thickness (pachymetry) Visual field assessment (manual confrontation or automated) Demonstrate topographic / tomographic / imaging techniques <p>Note: Only one task will be selected for assessment. Simulated patients, models, or images may be used if live patients or instruments are unavailable.</p>	10	5	Hands-on instrument use, observation checklist, oral explanation of principles and interpretation, practical demonstration on models/patients, mini-quiz on image interpretation. Note: Partial marks for incomplete demonstration or minor errors
5	Dispensing & Binocular Vision / Contact Lens	Assess practical dispensing skills, pediatric and binocular vision assessment, and contact lens/prosthesis handling	<ul style="list-style-type: none"> Measure face and fit spectacles, verify lens power Pediatric vision assessment and cycloplegic refraction Assess binocular vision, strabismus, amblyopia, vergence/accommodative disorders Demonstrate contact lens fitting & ocular prosthesis handling. <p>Note: Only one task will be selected for assessment.</p>	10	5	Observation of procedure, verification of technique, demonstration of CL insertion/removal on models, viva on lens design, frame selection, and patient counselling. Note: Partial marks for minor errors or incomplete technique.
6	Low Vision,	Assess	<ul style="list-style-type: none"> Demonstrate low vision 	10	5	Device

	Rehabilitation, Geriatric & Ethics	counseling skills, ethical reasoning, low vision rehabilitation, and community eye health knowledge.	devices and optical/non-optical aids <ul style="list-style-type: none"> • Counsel visually impaired or geriatric patient; assess visual changes in aging • Apply ethical scenario in patient care; demonstrate safe drug instillation • Basic community eye health knowledge & nutritional vision assessment. <p>Note: Only one task will be selected for assessment. Ethical scenarios may be role-played or case-based written questions if volunteers are unavailable.</p>			demonstration, ethical scenario discussion, oral questioning on community eye health and nutrition, practical demonstration of safe drug instillation on model eyes. Note: Partial marks for incomplete demonstration or minor errors.
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Overall Examiner Guidelines:

- Each station = 5 marks, total = 30 marks.
- Time per station = 10 minutes.
- Only one task per station will be assigned during the examination.
- Use simulated patients, standardized patients, volunteers, anatomical models, diagnostic instruments, charts, or clinical photographs as appropriate.
- Partial marks can be awarded for incomplete or partially correct tasks.
- A standardized checklist and marking rubric must be used by all examiners to ensure objectivity and uniformity.
- Each station should include a brief viva component to assess reasoning, understanding, and decision-making ability.
- Infection control and patient safety principles must be observed during all clinical demonstrations.
- An Examiner Comments Section must be completed for transparency and documentation, particularly for borderline candidate.
- Failure to attempt a station shall result in a score of zero for that station.
- The final result shall be determined based on the cumulative marks obtained across all six stations.

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पद : प्राविधिक अधिकृत (रेडियोलोजी)
पूर्णाङ्क : ३०

समूह : स्वास्थ्य
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Objective: The candidate should be able to perform all types of general radiography and post process CR and DR images. They should also be able to perform and assist in fluoroscopic procedures and carryout routine Computed Tomography (CT) and Magnetic Resonance Imaging (MRI).

Specification Chart

S.No.	Course Content (Activities)	No. of Question	Marks
1.	Positioning for Radiography of spine (Cervical/Thoracic/Lumbar)	1	5
2.	Positioning for Radiography of any joints	1	5
3.	Positioning for Radiography of chest or abdomen	1	5
4.	Protocol and positioning of patient for Routine CT (Brain/Chest/Abdomen)	1	5
5.	Protocol and positioning for Routine MRI (Brain/Spine/Pelvis/Joints)	1	5
6.	CR or DR post processing	1	5
Total		6	30

Evaluation Criteria:

1. Knowledge and skill about the given radiographic projection and exposure factors
2. Patient preparation before radiography, CT and MR.
3. Attitude towards the patient and precautions on radiation protection
4. Knowledge about CR/DR image and handling of the respective equipment
5. Knowledge about basic physics of CT and MRI equipment
6. Knowledge about fluoroscopic equipment and procedures