

शहीद धर्मभक्त राष्ट्रिय प्रत्यारोपण केन्द्र

मानव अङ्ग प्रत्यारोपण विकास समिति, प्रविधिक सेवा, रेडियोलोजी समूह, रेडियोथेरापी/रेडियोडाइग्नोसिस उपसमूह, आठौं तह, सिनियर रजिष्ट्रार/रजिष्ट्रार (रेडियोलोजी) पदको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम एवं परीक्षा योजना

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

प्रथम चरण (First Phase) : लिखित परीक्षा योजना (Written Examination Scheme)

Paper	Subject	Marks	Full Marks	Pass Marks	No Questions & Weightage	Time Allowed
I	Management	25	100	40	5 × 5 = 25 (Short answer)	3.00 hrs
	General Health Issues & Related Legislations	40			4 × 5 = 20 (Short answer) 2 × 10 = 20 (Long answer)	
	Human Organ Donation & Transplantation	35			3 × 5 = 15 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject (Radiology)		100	40	6 × 10 = 60 (Short answer) 2 × 20 = 40 (Long answer)	3.00 hrs

द्वितीय चरण (Second Phase) : अन्तर्वार्ता (Interview)

Subject	Full Marks	Examination
Interview	30	Oral

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने प्रश्नसंख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।
- विषयगत प्रश्नमा एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
- प्रथम र द्वितीय पत्रमा प्रत्येक खण्ड (Section) को लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । उम्मेदवारले प्रत्येक खण्ड (Section) को प्रश्नको उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जुन सुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम 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 ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति :- २०८१/०८/०४

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Paper I: General Subject
(Management, Human Organ Donation & Transplantation, General Health Issues & Related Legislations)

Section (A)

Short Questions	5 Question × 5 Marks = 25 Marks	25 Marks
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1. Management

- 1.1 Management: concept, principles, functions, scope, role, level and skills of managers
- 1.2 Participative management: concept, advantages and disadvantages, techniques of participation
- 1.3 Time management: concept, advantages, and disadvantages
- 1.4 Conflict management: concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
- 1.5 Stress management: concept, causes and sources of stress, techniques of stress management
- 1.6 Planning: concept, principles, nature, types, instrument and steps
- 1.7 Motivation: concept, theories of motivation, reason for low productivity, techniques of employee motivation
- 1.8 Leadership: concept, functions, leadership styles, leadership and management effectiveness
- 1.9 Coordination: concept, need, types, techniques & approaches of effective coordination
- 1.10 Communication: concept, communication process and barrier to effective communication, techniques for improving communication
- 1.11 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
- 1.12 Fundamental principles of healthcare institution and hospital management

Section (B)

Short Question	4 Question × 5 Marks = 20 Marks	40 Marks
Long Question	2 Question × 10 Marks = 20 Marks	

2. General Health Issues (25 Marks)

- 2.1 Present Constitution of Nepal (health and welfare issues)
- 2.2 International health agencies: role and responsibilities of WHO, UNICEF, UNFPA and interagency relationships
- 2.3 Medical ethics
- 2.4 Indigenous and traditional faith healing and health practices
- 2.5 Supervision, types and its usage in health sector
- 2.6 Monitoring and evaluation system in health Sector
- 2.7 Health management information system
- 2.8 Health insurance and financing in health care
- 2.9 Effects of environment in public health: air pollution, domestic pollution, noise pollution
- 2.10 Importance of water, sanitation and hygiene in public health

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- 2.11 Effects of disaster in public health: deforestation, landslide, flood, earthquake & fire
- 2.12 Health volunteers' involvement in health service delivery
- 2.13 Counseling: concept, type, importance and its application in health service delivery

3. Related Legislations (Policy, Act and Regulations) (15 Marks)

- 3.1 National Health Policy, 2076
- 3.2 Human Organ Transplantation (Regulation and Prohibition) Act, 2055 with amendment
- 3.3 Human Organ Transplantation Regulations, 2073
- 3.4 Guidelines on medical treatment of deprived citizens program, 2080
- 3.5 Human Organ Transplant Development Committee Personnel Administration Rules, 2069 (मानव अंग प्रत्यारोपण विकास समिति कर्मचारी प्रशासन नियमवाली, २०६९)
- 3.6 Human Organ Transplant Development Committee Formation Order, 2068 (मानव अंग प्रत्यारोपण विकास समिति गठन आदेश, २०६८)
- 3.7 Health Workers and Health Institutions Security Act, 2066 & Health Workers and Health Institutions Security Regulation, 2069
- 3.8 Health Insurance Act, 2074
- 3.9 Health Service Act, 2053
- 3.10 Public Health Service Act, 2075

Section (C)

Short Question	3 Question × 5 Marks = 15 Marks	35 Marks
Long Question	2 Question × 10 Marks = 20 Marks	

4. General Concept of Solid Organ Donation and Transplantation

- 4.1 Basic Concept of Transplant Science
 - 4.1.1 Transplant immunology
 - 4.1.2 Basic terminology : autologous graft, syngeneic graft, allogeneic graft, xenogeneic graft, alloantigen, alloreactive, immune rejection
 - 4.1.3 Types of graft rejection : hyper acute rejection, acute cellular rejection, acute antibody mediated rejection, chronic rejection
 - 4.1.4 Immunosuppressant drugs used in organ transplantation
 - 4.1.5 Evaluation of donor and recipient and management
 - 4.1.6 Organ preservation and procurement
 - 4.1.7 Role of immunological test in transplantation : Human leucocyte antigen (HLA), Donor specific antibodies (DSA), Panel reactive antibodies (PRA), Complement dependent cytotoxicity (CDC) cross match, flow cross match
 - 4.1.8 Complications among organ transplant recipients and management
- 4.2 Concepts of Organ Donation and Transplantation Process
 - 4.2.1 Demand vs. supply gap in transplantation
 - 4.2.2 Health promotion and prevention of organ failure
 - 4.2.3 Organ failure, organ donation, transplant etc
 - 4.2.4 Organ recovery process
 - 4.2.5 Organ donation process
 - 4.2.6 Brain death donation: definition, declaration & management

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- 4.2.7 Contraindication of transplantation in brain death donation
- 4.2.8 Hurdles in brain death donation program
- 4.2.9 Brain death, criteria for certifying brain death and tests to confirm diagnosis
- 4.2.10 Concept of circulatory death : donation after circulatory death (DCD), types, different from brain death donation
- 4.2.11 Allocation of Kidneys, Liver, Heart and Lungs in Deceased donor transplantation
- 4.2.12 Preservation and transportation of retrieved organs
- 4.3 History of organ transplantation in Nepal
- 4.4 Role, scope and importance of Shahid Dharmabhakta National Transplant Center in organ transplantation
- 4.5 Religion and culture in organ donation and transplantation

5. Ethical Issues in Organ Donation and Transplantation

- 5.1 Patient confidentiality and privacy legislation
- 5.2 Patient autonomy
- 5.3 Principles of informed consent and decision making
- 5.4 Next of kin designation
- 5.5 End of life decision making
- 5.6 Organ procurement for transplantation
- 5.7 Management and review of adverse events
- 5.8 Communication with families in crisis

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Paper II: Technical Subject
(Radiology)

Section A

Short Question	3 Question × 10 Marks = 30 Marks	50 Marks
Long Question	1 Question × 20 Marks = 20 Marks	

1. Transplant Radiology

(20 Marks)

- 1.1 Pre op evaluation of the donor- role of imaging
- 1.2 Role of Radiology in post renal transplant complication
- 1.3 Role of imaging in post renal transplant
- 1.4 Renal Doppler
- 1.5 Fistula Doppler
- 1.6 Venous mapping for AV fistula creation
- 1.7 CT scan pre-op evaluation of the donor
- 1.8 CT Renal angiography donor
- 1.9 Post renal transplant complication
- 1.10 Transplant renal biopsy
- 1.11 Liver Transplant
 - 1.11.1 Pre op evaluation of the donor- role of imaging
 - 1.11.2 Pre op evaluation of the donor, Liver Volumetric study
 - 1.11.3 Liver attenuation index. (LAI)
 - 1.11.4 Intra op Liver Doppler
 - 1.11.5 Role of Radiologist and interventional Radiologist in post Liver transplant complication management
 - 1.11.6 Post-operative Liver Doppler
 - 1.11.7 Targeted and non-targeted liver biopsy
- 1.12 Transplant immunology

2. Cardiovascular

(10 Marks)

- 2.1 Normal heart and pericardium
 - 2.1.1 Pulmonary circulation
 - 2.1.2 Acquired heart diseases
 - 2.1.3 Congenital heart diseases
- 2.2 Respiratory
 - 2.2.1 Normal chest
 - 2.2.2 Tumors of the lung
 - 2.2.3 Inflammatory diseases of the lung
 - 2.2.4 Remaining diseases of lung, pleura and soft tissue and bony thoracic cage of chest
 - 2.2.5 Chest trauma
 - 2.2.6 Chest children
 - 2.2.7 Gastrointestinal tract and abdomen
 - 2.2.8 Diseases of pharynx, esophagus, stomach and duodenum

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2.2.9 Diseases of small bowel and large bowel acute abdomen

2.2.10 Diseases of biliary tract

2.2.11 Diseases of liver, spleen & pancreas

3. Urogenital Tracts

(20 Marks)

3.1 Urogenital and renal Doppler

3.1.1 Congenital lesions

3.1.2 Cystic diseases of the kidney

3.1.3 Tumors of the kidney and ureter

3.1.4 Renal calculi and Nephrocalcinosis

3.1.5 Renal Vascular diseases

3.1.6 Diseases of Bladder and prostate

3.1.7 Gynecological diseases and obstetrical study

3.1.8 Renal Doppler. Iliac Doppler of the recipient.

3.1.9 Fistula Doppler.

3.1.10 Venous mapping for AV fistula creation

3.1.11 CT scan prep evaluation of the donor

3.1.12 CT Renal angiography Donor

3.2 Bone & Joints

3.2.1 Congenital skeletal anomalies

3.2.2 Diseases of bone and joints

3.2.3 Tumors and tumors like conditions of bone

3.2.4 Skeletal disorders of metabolic and endocrine diseases

3.2.5 Skeletal trauma

3.3 Endocrine and metabolic diseases

3.3.1 Ultrasound imaging of the whole body

3.3.2 CT Imaging of the whole body

3.3.3 MRI Imaging of the whole body

3.3.4 Radiological Procedures

3.3.5 Urinary tract

3.3.5.1 IVU (Intravenous urogram)

3.3.5.2 MCUG (Micturating cystourethrogram)

3.3.5.3 RGP (retrograde pyelography) and RGU (Retrograde Urethrogram)

3.4 Biliary tract and pancreas

3.4.1 OCG T- tube cholangiography

3.4.2 ERCP, PTC (percutaneous transhepatic cholangiography) and percutaneous transhepatic biliary drainage (PTBD),

3.4.3 GIT- gastrointestinal tract

3.4.4 Barium swallow, barium meal, barium follow through, small bowel enema, barium enema, sinogram, logogram fistulogram.

3.4.5 Reproductive system- HSG (hysterosalpingography)

3.4.6 Vascular system

3.4.7 Angiography

3.4.8 Venography

3.4.9 Lymphangiography

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3.5 Interventional procedures

3.5.1 Ascites and pleural tapping, PCN (percutaneous nephrostomy)

3.5.2 FNAC (Fine needle aspiration cytology) / USG guided biopsy

Section B

Short Question	3 Question × 10 Marks = 30 Marks	50 Marks
Long Question	1 Question × 20 Marks = 20 Marks	

4. Basic Science Anatomy (20 Marks)

- 4.1 Respiratory system
- 4.2 Cardiovascular system
- 4.3 Gastrointestinal system
- 4.4 Hepatobiliary system
- 4.5 Genitourinary system
- 4.6 Skeletal system
- 4.7 Cross sectional anatomy
- 4.8 Central Nervous system

5. Radiation Physics (30 Marks)

- 5.1 Electromagnetic radiation & its properties
- 5.2 Radiation measurement and units
- 5.3 Production and properties of X-ray
- 5.4 Interaction of Radiation with matter
- 5.5 Properties of X-ray film, film processing
- 5.6 Intensifying and fluorescent screens
- 5.7 X-ray absorption on the radiographic image
- 5.8 Grid & filter
- 5.9 Principles of Fluoroscopy
- 5.10 Principle of Diagnostic ultrasound
- 5.11 Principle of CT
- 5.12 Principle of MRI
- 5.13 Principle of Nuclear Medicine and Imaging
- 5.14 Radiation Hazards and its effects