



**ODISHA UNIVERSITY OF HEALTH SCIENCES,  
BHUBANESWAR**



**PG Curriculum  
DM Nephrology**

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**PG Curriculum**  
**DM - NEPHROLOGY**

**GOALS**

The goal of DM Nephrology is to produce a competent nephrologist who:

- Has acquired the competence pertaining to Nephrology that is required to be practiced in the community and at all levels of health care system
- Has acquired the skills to manage the patient effectively pertaining to nephrology
- Has acquired skill in effectively communicating with patient and his attendants.
- Has the desired skills to independently manage emergency cases
- Is aware of the latest developments in the field of nephrology oriented to principles of research methodology
- Has acquired skills in educating medical and paramedical professionals.

**OBJECTIVES**

At the end of the DM Nephrology, the student should be able to

- Practice the specialty of nephrology in keeping with the principles of professional ethics
- Recognize and identify the various renal problems
- Institute diagnostic, therapeutic, rehabilitative and preventive measures to provide holistic care to the patient
- Take detailed history, perform full physical examination and make clinical diagnosis, perform relevant investigative and therapeutic procedures
- Interpret important imaging and laboratory results
- Independently perform basic surgical procedures
- Manage emergency efficiently
- Demonstrate empathy and human approach towards patients and their families.
- Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education to patients, families and communities,
- Develop skills as a self-directed learner, recognize continuing educational needs, use appropriate learning resources, and critically analyze relevant published literature in order to practice evidence-based medicine, facilitate learning of medical/nursing students, practicing physicians, paramedical health workers and other providers as a teacher/trainer
- Organize and supervise the desired managerial and leadership skills

The major components of our Post-Graduate Curriculum are according to the guidelines issued by the NMC

1. Theoretical Knowledge
2. Practical and Clinical skills
3. Attitudes including Communication skills
4. Knowledge about research methodology.

**DURATION:** 3 Years

**CURRICULUM**

- Training will be exclusively on whole time in-service basis on the residency pattern.

- The programme will impart a sound training in the diagnosis and management of patients with renal disorders. During the training period, the candidate shall take part in all the activities of the department including inpatient and outpatient nephrology care, laboratory and investigative work up, lectures, seminars, conferences, group discussions and various other clinical and teaching assignments. The candidate will work as a member of the renal team and will be given the responsibility of investigation and therapeutic care of all patients under the direct guidance of the consultants in Nephrology. He will be first on call for routine and emergency renal consultants.
- Each candidate will go through the following rotations in various areas/sub specialties of nephrology during 3 years of training in Nephrology.
  - I. Inpatients services/Out-patient Clinics/Consultations 6 months / year
  - II. II. Dialysis 3 months/ year
  - III. Renal transplantation 3 months/ year

The candidate would be involved in the pre-transplant, immediate post-transplant and late post-transplant medical management of renal transplant recipients and the donors including immunosuppressive therapy, immunological monitoring, diagnostic and therapeutic interventions in patients with allograft dysfunction including renal allograft biopsy and ultrasound evaluation of the allograft.

**Candidates will be exposed to:**

**Critical Care Nephrology:**

- Intermittent peritoneal dialysis.
- Vascular Access. The candidate would also be expected to have insert at least 50 internal jugular, 10 subclavian, 50 femoral vascular access catheters including perm-cath insertion. Investigative work-up the candidate is expected to perform routine urine examination and ultrasonography.

In addition, he/she must familiarize himself/herself with the following investigations:

Laboratory:

- Electrolyte and acid base analysis.
- Renal function tests.
- Auto analyzer functioning.
- Renal pathology interpretation including immune – fluorescence and electron microscopy. Radiological:
- Intravenous urography.
- Micturating cystourethrography.
- Digital subtraction angiography.
- Selective renal angiography and interventional angioplasty and stenting.
- Selective renal venography.
  
- Doppler studies.

- Antergrade and retrograde pyelography.
- CT imaging.
- Magnetic resonance imaging. Nuclear Medicine:
- Various renal isotope imaging and functional techniques Urodynamic studies Microbiology:
- Viral, bacterial and fungal cultures, serological and PCR techniques. Immunological test: ANCA, ANA, anti-ds DNA, complement, anti GBM antibody, Cryoglobulin, immune electrophoresis. HBV DNA, HCV RNA and HIV viral load, BK Virus PCR, **free light chain assays**. Tissue typing:
- Cross match, serological typing, molecular HLA typing, PRA. Research each candidate will be required to undertake research under the guidance of the faculty. They will be required to submit a research plan within 6 months after joining the course and submit a project report not later than 2 years after joining the course. In addition, the candidate will participate in all the departmental research activities.

### **Interventional Nephrology**

A candidate will be required to have achieved proficiency in performing and supervising:

- Hemodialysis (HD machine disinfection, dialyzer reuse, priming, starting and closing dialysis)
- Peritoneal dialysis (catheter insertion, CAPD training, PET test, Mechanical complications, peritonitis management and catheter removal).
- Renal biopsies he would be expected to have performed a minimum of 50 renal biopsies.
- SLED, CVVHD, CRRT, Plasmapheresis.

### **Research Posting**

During this period, the candidate will complete his on-going research projects and would also familiarize himself/herself with research methodologies with laboratory techniques being carried out in HLA lab, immunofluorescence and EM laboratories and also with routine laboratory investigations being done in the Renal Lab.

Every candidate shall carry work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a Project report. The Project work is aimed at contributing to the development of a spirit of enquiry, besides acquaintance with the latest advance in medical Science and the manner of identifying and consulting available literature.

The Project topic shall be chosen before the end of eight months from the date of joining the course: a) Guide As per MCI instructions b) Co-guide-As per MCI instructions Teaching/learning methods: a) Learning will essentially be self-Learning. b) Following teaching-learning methods shall be followed.

- Group teaching sessions
- Journal review
- Submit seminar presentation

- Group discussion
- Clinical case presentations pertaining to the speciality
- Presentation of the findings of an exercise on any of the sub-specialities
- Participation in CME programs and conferences. Internal assessment:

Research work to be assessed and reviewed once in four months by the Chief Guide and the Head of the unit.

- I. Choice of article/topic (unless specifically allotted)
- II. Completeness of presentation
- III. Clarity and cogency of presentation
- IV. Understanding of the subject and ability to convey the same
- V. Whether relevant references have been consulted
- VI. Ability to convey points in favour and against the subject under discussion
- VII. Use of audio-visual aids
- VIII. Ability to answer questions
- IX. Time scheduling
- X. Overall performance

**Clinical training schedule will include the following:**

- Bedside rounds - daily
- Mortality meeting - once a month
- Seminar - once in two weeks
- Grand rounds - once a week
- Journal club - once in week
- Renal histology meeting - once in a month.
- Clinical case discussion - once a week
- Transplant meeting - once in 2 weeks
- Nephro-urology meeting - once a month
- Nephro-radio logy meeting - once a month

Seminars in nephrology Schedule of training Activities Clinical schedule of training activities include the following:

Topic Discussion (Basic Sciences related to Nephrology)  
 Topic Discussion (General Nephrology)/Topic Discussion (Drug)/Topic Discussion (Dialysis)/ Topic Discussion (Transplantation)

Seminar once in 2 week

Journal Club once in 2 weeks Dialysis/OPD meeting once a month Nephro-Pathology meeting twice a month Nephro-Urology seminars once a month

Nephro-Radiology meeting once a month Mortality meeting once a month Case presentation twice a week Grand Rounds once in 10 days Consultation daily

Transplantation clinic

Schedule of training Activities Clinical schedule of training activities include the following

Topic Discussion (Basic Sciences related to Nephrology)  
 Topic Discussion (General Nephrology)/ Topic Discussion (Drugs)/Topic Discussion (Dialysis)/ Topic Discussion (Transplantation).

Seminar once in 2 week.

Journal Club once in 2 weeks Dialysis/OPD meeting once a month

Nephro-Pathology meeting twice a month Nephro-Urology seminars once a month  
Nephro-Radiology meeting once a month Mortality meeting once a month Case  
presentation twice a week Grand Rounds once in 10 days Consultation daily  
Transplantation clinic Frequency of training activities would include all the above activities  
and frequency to be determined by the department based on the available time ensuring  
that teaching activities are conducted on all working days. Rotations in various areas of  
Nephrology Each candidate will go through the following rotations in various  
areas/subspecialties of nephrology during 3 years of training in Nephrology.

1. Ward posting 15 months
2. Dialysis (HD and CAPD) 6 months
3. Renal Transplantation 6 months
4. Out patients 6 months
5. Critical care Nephrology 3 months (will be part of ward posting) intensive care nephrology including management of electrolyte and acid base problems, CRRT and dialysis of critically ill patients with multi-organ failure.

The candidate would be involved in the pre-transplant, immediate post-transplant and late post-transplant medical management of renal transplant recipients and the donors including immunosuppressive therapy, immunological monitoring, diagnostic and therapeutic interventions in patients with allograft dysfunction including renal allograft biopsy and ultrasound evaluation of the graft.

6. Interventional Nephrology 3 months (will be part of ward posting)
7. Allied depts & external posting 3 months

## SYLLABUS

### Assessment of Renal Disease

- History and clinical examination of patients with renal disease
- Urinalysis and microscopy
- Clinical assessment of renal function
- Renal function in the newborn infant
- The aging kidney
- Imaging in renal disease
- Renal biopsy
- Immunological investigation of renal disease

### Basics

- Embryology of the kidney
- Anatomy of the kidney
- Renal circulation
- **Bio** statistics
- Research Methodologies
- Solute transport / Both organic and inorganic
- Renal Acidification
- Urine Concentration & Dilution
- Role of kidney in blood pressure regulation
- Endocrine and Autocrine function of the kidney

### Pharmacology and Drug

- Handling of drugs in kidney disease
- Drug-induced nephropathies
- Clinical use of diuretics
- Systemic cancer therapies and the kidney

### **Fluid and Electrolyte Disorders**

- Hypo-/hyponatremia: disorders of water balance
- Hypo-/hyperkalemia
- Hypo-/hypercalcemia
- Hypo-/hyperphosphatemia
- Hypo-/hypermagnesemia
- Clinical acid-base disorders

### **Epidemiology and Risk Factors**

- Epidemiology of kidney disease
- Kidney disease in Indian subcontinents
- Risk factors of CKD
- Nephron endowment
- Aging and kidney disease

### **Pediatric Nephrology**

- Malformation of the kidney
- Fluid, Electrolyte, Acid base disturbance
- Disease of kidney and Urinary track
- Dialysis in Children
- Pediatric Transplantation

### **Glomerular Disease**

- Proteinuria and/or hematuria
- Nephrotic syndrome
- Minimal change disease
- Focal segmental glomerulosclerosis
- Immunoglobulin A nephropathy and Henoch-SchOnlein purpura
- Membranous nephropathy
- Mesangiocapillary glomerulonephritis
- Acute endocapillary glomerulonephritis
- Crescentic glomerulonephritis
- Antiglomerular basement membrane (Goodpasture's) disease
- Infection-related glomerulonephritis
- Malignancy-associated glomerular disease
- Glomerular disease in the tropics

### **The Kidney in Systemic Disease**

- Diabetes mellitus
- Amyloid and immunotactoid glomerulopathy
- Plasma cell dyscrasias
- Sarcoidosis
- Systemic vasculitis
- Mixed cryoglobulinemias and hepatitis C infection

- Systemic lupus erythematosus
- Scleroderma-systemic sclerosis
- Rheumatoid arthritis, connective tissue disease, and Sjogren's syndrome
- Sickle cell neuropathy
- Cancer and the kidney

#### **Tubular Disease**

- Isolated defects of tubular function
- Fanconi syndrome
- Renal tubular acidosis
- Hypokalemia tubular disorders
- Nephrogenic diabetes insipidus

#### **Chronic Interstitial Disease**

- Analgesic nephropathy
- Nonsteroidal anti-inflammatory drugs and the kidney
- Nephrotoxic metals
- **Balkan** nephropathy
- Aristocholic acid nephropathy ('Chinese herb nephropathy') and other rare causes of chronic
- interstitial nephritis

#### **Urinary Tract Infection**

- Lower and upper urinary tract infection in adults
- Urinary tract infection in children
- Renal tuberculosis or other mycobacterial infections
- Fungal infections and the kidney

#### **Renal Stone Disease**

- Medical management of stone disease
- Surgical management of stone disease
- Nephrocalcinosis

#### **Renal stone disease in children **Acute Kidney Injury (AKI)****

- Clinical approach to AKI
- Renal replacement therapies in AM
- Dialysis and hemoperfusion treatment of acute poisoning
- Glomerulonephritis, vasculitis, and nephritic syndrome
- Acute tubulointerstitial nephritis
- Hemolytic uremic syndrome and thrombotic thrombocytopenic purpura
- Hepatorenal syndrome
- Ischemic AKI
- Pigment-induced AM
- AKI in tropical countries
- AKI in infants and children
- AKI in preanancy
- AKI in the elderly



### **Chronic Kidney Disease (CKD)**

- Assessment of CKD
- Endocrine disorders in CKD
- Sexual disorders in CKD
- Hypertension in CKD
- Cardiovascular risk factors in CKD
- Gastrointestinal disorders in CKD
- Liver disorder in CKD
- Hematological disorders in CKD
- Skeletal disorders in CKD
- p2-Microglobulin amyloidosis in CKD
- Immune function in CKD
- Coagulation disorders in CKD
- Dermatologic disorders in CKD
- Neuropsychiatric disorders in **CKD**

### **Special Problems in CKD**

- CKD in children
- CKD in the elderly
- CKD in diabetic patients
- CKD in pregnancy

### **Dialysis**

- Dialysis strategies
- Vascular access
- Hemodialysis, hemofiltration and hemodiafiltration
- Peritoneal dialysis
- Adequacy of dialysis
- Medical management of the dialysis patient
- Psychological aspects of treatment for renal failure

### **Renal Transplantation**

- Donor & Recipient issues
  - Transplantation immunobiology
  - Medical & surgical complications following transplantation
  - Early management of transplant recipients
- Immunosuppression for renal transplantation

### **Inherited Renal Disease**

- Investigation of inherited renal disease
- Autosomal dominant polycystic kidney disease
- Nephronophthisis
- Alport's syndrome
- Primary hyperoxalurias

### **Structural and Congenital Abnormalities**

- Renal dysplasia
- Vesicoureteric reflux and reflux nephropathy
- Urinary tract obstruction
- Congenital abnormalities of the urinary tract
- Medullary sponge kidney

## Maintenance Log Book

### Log book (Performance record book):

Maintenance of performance record Log book is mandatory. Certified and assessed copy should be made available at the time of practical examination for review by examiners, Log book should be made contain:

1. Certificate duly signed by teacher, Head of department, Head of Institute stating Dr..... has worked in department from ..... to ..... for a period of 3 years.  
This performance record book contains authentic record of work done and assessment for last 3 years.
2. Record of training: Name of the trainee, Name of the Hospital, Training period, Name of teacher.
3. Posting.
4. Working schedule.
5. Teaching programme.
6. Presentation at Journal club: Date, Article Name, Assessment.
7. Seminars: Date, Topic / Subject, Assessment.
8. Case presentation: Date, Teacher's Signature.
9. Death Audit / C PC: Date, Case discussed, Assessment. & Signature.
10. Procedures: Date, Name of patient, Type, Complications observed.
11. Teaching activity: Date, Topic, Class. The candidate should also be required to participate in the teaching and training programme of postgraduate and paramedical students.
12. Participation in Research Activity : name of project, Duration.
13. Conference / Workshop attended paper presentation / Publications.

**Publications:** Xerox copies or reprints of full paper/ abstracts published or sent for publication in National / International Journals should be submitted to the department before the examination.

Examination for the award of Degree DM Nephrology Panel of Examiners: Total number of examiners required - Four Internal Examiners - Two External Examiners - Two All the external examiners should be from outside the state of Karnataka. Internal examiners may be from within the institute or within the state. However, if the examiner who evaluated the dissertation but not in a position to attend the practical/viva examination, the institute can nominate another examiner from among the panel recommended by the concerned HOD. Examination: The examinations shall be organized, evaluated and certify candidates level knowledge, skill and competence at the end of the training and obtaining a minimum of 50% marks in each theory paper, practical and viva examinations shall be mandatory for passing the examination. The examinations shall be held before the end of 3 academic years. i. Number of candidates i. The maximum number of candidates to be examined in Clinical/practical and oral on any day shall not exceed three for DM examinations. ii. The examination for the degree shall consist of written (theory) examination, Practicals/Clinicals and Vice Voce. iii. Theory There shall be the following four theory papers:

1. Basic Medical Sciences pertains to Nephrology
2. Clinical Nephrology
3. Dialysis and Transplantation
4. Recent advances in Nephrology The theory examination will be held at least one week before the start of the Practical Clinical and oral examination.

Practical/Clinical examination shall consist of carrying out special investigative techniques for Diagnosis and therapy. Oral examination shall be comprehensive to test the candidate's overall knowledge of the subject.

i) Distribution of Marks Duration Marks Basic Sciences 3 Hrs. 100 Clinical Subjects | 3 Hrs. 100 Clinical Subjects || 3 Hrs. 100 Recent advances 3 Hrs. 100 Total Marks 400 ii) Examination Theory examination duration: 3hrs. i) Practical Clinical examination: DM student shall appear for practical exam on given date with a) Logbook duly signed by HOD. b) Project report duly signed by HOD. c) Long case-- 100 marks time 1 hour d) 2 Short cases-50 marks e) Ward rounds 4 cases- 50 marks f) Viva Voce -50 marks g) Histopath slides-25marks Radiology-25marks ii) Maximum marks: a) Theory- 400 b) Practical's-200 c) Viva voce-100 Grand total-700

**Points to be considered: 1. Punctuality**

**RECOMMENDED BOOKS AND JOURNALS:**

- Diagnostic Atlas of Renal Pathology, Fogo, Agnes B 7th ED. Elsevier , 2005
- Clinical Dialysis, Nissenson, Allen R, 4th ED. Mc Graw Hill, 2005
- Hypertension companion to Brenner & Rectors the Kidney, Oparil, Suzanne, 2nd Ed. Elsevier, 2005
- Nephrology Secrets, Brown, David E, 2nd ED. Elsevier, 2003
- Disease of the Kidney & Urinary tract, Schrier, Robert W, 8th ED. Vol I, Lippincott, 2007
- Disease of the Kidney & Urinary tract, Schrier, Robert W, 8th ED. Vol II, Lippincott, 2007
- Disease of the Kidney & Urinary tract, Schrier, Robert W, 8th ED. Vol III, Lippincott, 2007
- Comprehensive Clinical Nephrology, Feehally, John, 3rd ED. Mosby 2007.
- Renal Diseases Prevention and Management: A physicians perspective, Feehally, John, Jaypee Brothers, 2008.
- Seldin and Giebischs the Kidney: Physiology and Pathophysiology, Alpern, Robert. J, Vol I 4th ED. Academic Publisher, 2008
- Seldin and Giebischs the Kidney: Physiology and Pathophysiology, Alpern, Robert. J, Vol II 4th ED. Academic Publisher, 2008
- Comprehensive Pediatrics Nephrology, Geary, Denis. F (ED), 1st ED. Elsevier 2008.
- Evidence-Based Nephrology, Molony, Donald. A, John wiley, 2009

- Handbook of Dialysis, Daugirdas, John. T, 4th ED. Lippincott, 2009
- Manual of Nephrology, Schrier, Robert. W, 7th ED. Lippincott, 2009
- Oxford Handbook of Dialysis, Levy, Jeremy, 2nd ED. Oxford, 2007
- Ganongs Review of Medical Physiology, Barrett, Kim. E (Etal), 24rd ED. Mc Graw Hill, 2012
- Renal Disease Techniques and Protocols, Goligorsky, Michael. S, Humana Press, 2003
- Renal and Electrolyte Disorders, Schrier, Robert. W, 7th ED. Lippincott, 2010
- Acid-Base Disorder and their Treatment, Gennari, John F (Et al), Taylot & Francis, 2005
- Primer on Kidney Diseases, Greenberg, Arthur, 5th ED. Saunders, 2009
- The Kidney, Brenner & Rector - 8th ED. Saunders, 2008
- Critical Care Nephrology, C. Roncu — 2nd ED. Saunders, 2009.
- Oxford desk Reference Nephrology, Jonathan Barratt, Kevin harris, Peter Topham, 1st Indian ED, 2009.

## **JOURNALS**

### **International**

- Transplantation
- Kidney International
- Hemodialysis International
- Clinical Journal of the American Society of Nephrology

### **Indian**

- Indian Journal of Nephrology

### **Online Journals**

- BMC Nephrology
- Clinical and Experimental Nephrology
- International Urology and Nephrology
- Journal of Artificial Organs
- Hong Kong Journal of Nephrology
- Clinical Queries: Nephrology
- Journal of American society of Hypertension
- Journal of Cardiothoracic- Renal research
- Indian Journal of Transplantation
- Pediatric Nephrology

Various websites and CD-ROM programme which will help in keeping updated are recommended

- Up to Date
- HDCN.Com
- Ndt.edu.org.

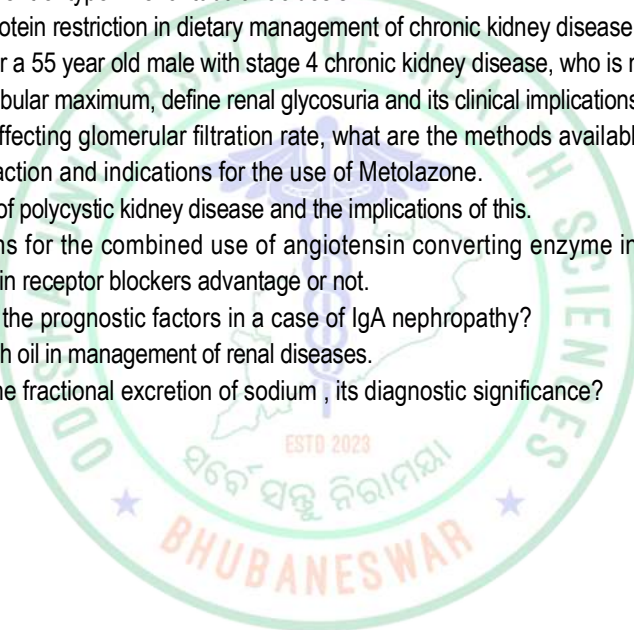
**MODEL PAPER**  
**DM Examination Month, Year**  
**NEPHROLOGY**

Paper I  
**Basic Sciences : Principles of Nephrology**

**Time : Three Hours**  
Maximum Marks : 100

Attempt all questions  
All questions carry equal marks **(10 marks each)**  
Draw diagrams wherever necessary

- Q1** How do you investigate a patient suspected to have renal tubular acidosis, outline the management of type 1 renal tubular acidosis?
- Q.2** Role of protein restriction in dietary management of chronic kidney disease stage IV write out the diet for a 55 year old male with stage 4 chronic kidney disease, who is not a diabetic
- Q3** What is tubular maximum, define renal glycosuria and its clinical implications?
- Q.4** Factors affecting glomerular filtration rate, what are the methods available to estimate it?
- Q.5** Mode of action and indications for the use of Metolazone.
- Q.6** Genetics of polycystic kidney disease and the implications of this.
- Q.7** Indications for the combined use of angiotensin converting enzyme inhibitors and angiotensin receptor blockers advantage or not.
- Q.8** What are the prognostic factors in a case of IgA nephropathy?
- Q.9** Role of fish oil in management of renal diseases.
- Q.10** What is the fractional excretion of sodium , its diagnostic significance?



**MODEL PAPER**  
**DM Examination Month, Year**  
**NEPHROLOGY**  
**Paper II**  
**Clinical Nephrology including Paediatric Nephrology**  
**Time : Three Hours**  
**Maximum Marks : 100**

Attempt all questions  
All questions carry equal marks **(10 marks each)**  
Draw diagrams wherever necessary

- Q.1 What is pseudohyperkalemia? What are the manifestations of acute hyperkalemia and how do you treat this?
- Q.2 How would you investigate a case suspected to have diabetes Insipidus? What is the differential diagnosis?
- Q.3 What is the current opinion on the role of Dopamine in acute kidney Injury?
- Q.4 What are the RIFLE and AKIN classification? What is the difference between the two and advantages of each?
- Q.5 Describe the kidney lesions seen with malarial infection.
- Q.6 What is the abnormal serology and pathology seen in the kidney in Wegners Granulomatosis? How is the condition treated?
- Q.7 What is Shohl's solution? What is its composition and indications for its use?
- Q.8 What are direct renin inhibitors? What is the advantage of using it over converting enzyme inhibitors or angiotensin receptor blockers?
- Q.9 What is e GFR? What is its importance? What are the common methods of estimating e GFR?
- Q.10 What is Masugis nephritis? How is it produced and what is the human equivalent?

**MODEL PAPER**  
**DM Examination Month, Year**  
**NEPHROLOGY**

Paper III

**Diagnostic and Therapeutic Nephrology including Intervention**

**Time : Three Hours**

Maximum Marks : 100

Attempt all questions

All questions carry equal marks **(10 marks each)**

Draw diagrams wherever necessary

- Q1 Use of citrate for hemodialysis. What are the indications and precautions? How is it done?
- Q2 Wilhelm Kolff and his contributions to care of patients with kidney disease.
- Q.3 Use of plasma exchange in nephrology.
- Q.4 Hanta virus and renal lesions associated with this infection.
- Q.5 Renal lesions seen with Mycobacterium leprae infection.
- Q6 What are the variants of focal segmental glomerulosclerosis? Discuss the prognosis after kidney transplant in a patient with this condition.
- Q.7 Use of Tacrolimus for non-organ transplant situations and efficacy.
- Q8 What predisposing factors, clinical features, histology, treatment and Outcome of Atheroembolic renal disease?
- Q.9 Classification of vasculitis. What are the Clinical features, laboratory investigations and treatment of Churg Strauss disease?
- Q.10 How do you evaluate a highly sensitized recipient for a kidney Transplant? Add a note on pre surgery treatment and postoperative follow up.

**MODEL PAPER**  
**DM Examination Month, Year**  
**NEPHROLOGY**

Paper IV

**Recent Advances in Nephrology**

**Time : Three Hours**

Maximum Marks : 100

Attempt all questions

All questions carry equal marks **(20 marks each)**

Draw diagrams wherever necessary

Write on:

Q.1 Use of stem cell therapy in Nephrology.

Q.2 What is Microinflammation? What is the evidence for its role in chronic kidney disease?

Q.3 Use of Bortezomib in Nephrology.

Q.4 Enumerate podocyte disorders and write briefly on the Finnish type of congenital nephritic syndrome.

Q.5 The role of therapeutic drug monitoring in the management of a kidney transplant recipient.

