

# MANIPAL UNIVERSITY

FIRST YEAR MOT/M.Sc. (RRT & DT)/ M.Sc. RT/ M.A.S.L.P/M.Sc. MLT/M.Sc. MIT/  
M.Sc. ECHOCARDIOGRAPHY/M. OPT DEGREE EXAMINATION – JUNE 2015

SUBJECT: ADVANCED BIOSTATISTICS & RESEARCH METHODOLOGY/ STATISTICS &  
RESEARCH METHODS/BIOSTATISTICS/EPIDEMIOLOGY & BIOSTATISTICS /  
RESEARCH METHODOLOGY & BIOSTATISTICS

Tuesday, June 02, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

- 1A. With the help of suitable examples discuss the quantitative and qualitative variables.
- 1B. Explain systematic random sampling with an example. What are the advantages and disadvantages of this method?  
(5+5 = 10 marks)
- 2A. Discuss skewness and kurtosis.
- 2B. A sample of 50 liver cirrhosis subjects were selected and the mean serum potassium level was observed to be 5.4 mEq/L with standard deviation of 2.5 mEq/L. Find the 95% and 99% confidence intervals for mean serum potassium level among liver cirrhosis subjects. (The standard normal table values for 95% and 99% confidence levels are 1.96 and 2.58 respectively).  
(5+5 = 10 marks)
- 3A. Enumerate the steps in hypothesis testing.
- 3B. What do you mean by non-parametric tests? With suitable examples briefly explain the applications of Mann Whitney U test and Wilcoxon signed rank test.  
(5+5 = 10 marks)
4. The mean serum cholesterol level of 25 randomly selected normal healthy men is 240 mg/dl with a standard deviation of 40 mg/dl. The mean serum cholesterol level of 20 randomly selected men who undergone coronary bypass surgery during the preceding two year period is 260 mg/dl with standard deviation of 56 mg/dl.
- 4A. Name the statistical test used for comparing the mean serum cholesterol levels between the two groups.
- 4B. Write the null hypothesis and alternate hypothesis for this test.
- 4C. What are the assumptions for this test?
- 4D. Compute the value of test statistic for the above study.
- 4E. Briefly explain how do you take a decision on acceptance and rejection of null hypothesis for the above study.  
(1+1+2+4+2 = 10 marks)

- 5A. Explain how do you compute sample size for comparing means of two independent groups.
- 5B. A research team conducted a case-control study examining the relationship between daily alcohol consumption and liver cancer. The team selected 2000 cases and 2000 controls and observed that 700 cases and 400 controls daily take alcohol. Make a two by two table and find the appropriate measure of strength of association between alcohol consumption and liver cancer. How do you interpret it?

(5+5 = 10 marks)

6. What do you mean by randomization in RCTs? Explain the simple, block and stratified randomization methods.

(1+9 = 10 marks)

7. Explain the structure of research thesis.

(10 marks)

8. **Write short notes on:**

8A. Survival analysis

8B. Validity and reliability of diagnostic tools

(5+5 = 10 marks)



## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. R.R.T. &amp; D.T. DEGREE EXAMINATION – JUNE 2015

SUBJECT: MDT 601 – ANATOMY AND PHYSIOLOGY RELATED TO URINARY TRACT INCLUDING KIDNEY

(COMMON FOR TWO YEARS AND THREE YEARS PROGRAMME)

Thursday, June 04, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

1. Multiple choice questions- select the single best answer:

1A. Angiotensin-2 causes all of the following except:

- i) Vasoconstriction
- ii) Vasodilation
- iii) Sodium retention
- iv) Water retention

1B. Normal glomerular filtration rate is

- i) 90-120 ml/min
- ii) 50-100 ml/min
- iii) 100-150 ml/min
- iv) 120-180 ml/min

1C. Glomerular filtration rate depends on

- i) Glomerular permeability
- ii) Hydraulic pressure
- iii) Oncotic pressure
- iv) All of the above

1D. Renal plasma flow is

- i) 625ml/min
- ii) 1025ml/min
- iii) 2025 ml/min
- iv) 225 ml/min

1E. In the glomerulus filtration equilibrium occurs at filtration of \_\_\_\_\_ % of renal plasma flow

- i) 15
- ii) 25
- iii) 20
- iv) 50

1F. Auto regulation in the kidney is not effective below \_\_\_\_\_ mmHg mean arterial pressure

- i) 100
- ii) 120
- iii) 140
- iv) 80

1G. Glomerular filtration rate =

- i)  $UV/P$
- ii)  $UP/V$
- iii)  $PV/U$
- iv)  $UVP/2$

1H. Creatinine clearance

- i) Underestimates glomerular filtration rate
- ii) Has no relation to glomerular filtration rate
- iii) Overestimates glomerular filtration rate
- iv) Is equal to glomerular filtration rate

1I. Which of the following are absorbed by the proximal convoluted tubule?

- i) Sodium
- ii) Bicarbonate
- iii) Glucose
- iv) All of the above

1J. \_\_\_\_\_ % of glomerular filtrate is reabsorbed by the proximal convoluted tubule

- i) 60
- ii) 75
- iii) 80
- iv) 90

(1 mark × 10 = 10 marks)

2. **Long essay questions:**

2A. Describe the functional anatomy of the kidney with relevance to the causation of acute kidney injury.

2B. Describe the role of the kidney in water homeostasis.

(10 marks × 2 = 20 marks)

3. **Short essay questions:**

3A. How is water purification for hemodialysis achieved?

3B. Describe the mineral and bone disorders of chronic kidney disease.

3C. How is anemia in a patient with chronic kidney disease investigated?

3D. What are the indications and contraindications for renal biopsy?

3E. What is an erythropoietin stimulating agents? Explain with examples.

3F. Explain the Henderson-Hasselbalch equation.

(5 marks × 6 = 30 marks)

4. **Short notes questions:**

4A. Mention the components of the glomerular filtration barrier.

4B. What factors affect creatinine generation?

4C. Explain briefly the rules of blood transfusion with regards to blood grouping.

4D. What is hemostasis?

4E. What is meant by renal clearance?

4F. Mention the endocrine functions of the kidney.

4G. What is the effect of angiotensin II blockade on the kidney?

4H. How are urinary casts formed?

4I. What is glomerular hematuria?

4J. What is diffusion?

(2 marks × 10 = 20 marks)



## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. R.R.T. &amp; D.T. DEGREE EXAMINATION – JUNE 2015

SUBJECT: MDT 602 – PATHOLOGY, MICROBIOLOGY & PHARMACOLOGY  
 RELATED TO KIDNEY AND DIALYSIS  
 (COMMON FOR TWO YEARS AND THREE YEARS PROGRAMME)

Saturday, June 06, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

1. Multiple choice questions- select the single best answer:
- 1A. Cardiopulmonary recirculation is not seen in
- i) Arteriovenous graft                      ii) Arteriovenous fistula  
 iii) Central vein catheter                  iv) Arteriovenous shunt
- 1B. In water purification carbon filter removes
- i) Organic compounds                      ii) Chlorine  
 iii) Chloramine                                  iv) All of the above
- 1C. Softeners remove
- i) Calcium                                      ii) Magnesium  
 iii) Both the above                              iv) None of the above
- 1D. Bacterial colonies should be below \_\_\_\_\_ colonies/ml in pure water
- i) 100    ii) 1000  
 iii) 10000    iv) 100000
- 1E. Conductivity corresponds to
- i) Na    ii) K  
 iii) Cl    iv) Ca
- 1F. Post dialysis potassium should be measured after dialysis
- i) Immediately                                  ii) Half an hour later  
 iii) One hour later                                iv) Two hours later
- 1G. Hemofilter clotting is more with \_\_\_\_\_ replacement
- i) Predilution                                  ii) Postdilution  
 iii) None of the above                          iv) Both A) and B)
- 1H. Removal of one plasma volume reduces macromolecules by
- i) 39%    ii) 63%  
 iii) 78%    iv) 86%
- II. The antidote to methanol poisoning is
- i) Ethanol                                        ii) Fomepizole  
 iii) Dialysis                                        iv) None of the above

- 1J. Anuria > 12 hours stands for which stage of RIFLE?
- i) Risk
  - ii) Injury
  - iii) Failure
  - iv) None of the above

(1 mark × 10 = 10 marks)

2. **Long essay questions:**

- 2A. Describe the Mineral and bone disorders of chronic kidney disease.  
2B. Define acute kidney injury and discuss its etiology.

(10 marks × 2 = 20 marks)

3. **Short essay questions:**

- 3A. Describe the principles and complications of continuous ambulatory peritoneal dialysis.  
3B. How should erythropoietin stimulating agent therapy in chronic kidney disease be monitored and managed?  
3C. Briefly explain urinalysis and its importance.  
3D. Discuss the role of vascular access monitoring and surveillance in hemodialysis.  
3E. What are the complications of hemodialysis catheter insertion and how can they be prevented?  
3F. Describe the mechanism of action and complications of the commonly used diuretics.

(5 marks × 6 = 30 marks)

4. **Short note questions:**

- 4A. Name the disadvantages of formaldehyde as a disinfectant in the hemodialysis unit.  
4B. How would you monitor the Hepatitis B status of the end stage renal disease hemodialysis patient?  
4C. What are the causes of anemia in chronic kidney disease?  
4D. How can the complications of plasmapheresis be prevented?  
4E. How is chronic kidney disease classified?  
4F. What is the pattern of dyslipidemia in chronic kidney disease?  
4G. What are the common pathogens causing sepsis in the hemodialysis and peritoneal dialysis patient?  
4H. What are the indications for plasmapheresis?  
4I. Why is hyperkalemia dangerous?  
4J. What is meant by universal precaution?

(2 marks × 10 = 20 marks)



# MANIPAL UNIVERSITY

**FIRST YEAR M.Sc. (RRT & DT) DEGREE EXAMINATION – JUNE 2015**

**SUBJECT: MDT 604 – RENAL TRANSPLANTATION  
(TWO YEARS PROGRAMME – 2014-15 BATCH)**

Monday, June 08, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

☞ **Select the single best answer:**

- 1A. One of the following is not a calcineurin inhibitor
- |              |                 |
|--------------|-----------------|
| i) Sirolimus | ii) Tacrolimus  |
| iii) Neoral  | iv) Cyclosporin |
- 1B. Cell mediated immunity is mediated by
- |                     |                  |
|---------------------|------------------|
| i) B cells          | ii) T cells      |
| iii) Both A) and B) | iv) Plasma cells |
- 1C. Origin and maturation of B cells takes place in the
- |                  |                 |
|------------------|-----------------|
| i) Liver         | ii) Thymus      |
| iii) Bone marrow | iv) lymph nodes |
- 1D. Sensitization is not caused by
- |                               |                           |
|-------------------------------|---------------------------|
| i) Blood transfusion          | ii) Pregnancy             |
| iii) Intramuscular injections | iv) Renal transplantation |
- 1E. One of the following does not usually cause neutropenia
- |                   |                  |
|-------------------|------------------|
| i) Sirolimus      | ii) Cyclosporine |
| iii) Azathioprine | iv) Rituximab    |
- 1F. T cell mediates
- |                             |                          |
|-----------------------------|--------------------------|
| i) Humoral immunity         | ii) Non-specific defense |
| iii) Cell mediated immunity | iv) None of these        |
- 1G. All of the drugs are used in immunosuppression in transplantation except
- |               |                      |
|---------------|----------------------|
| i) Tacrolimus | ii) Mycophenolate    |
| iii) Steroids | iv) Cyclophosphamide |
- 1H. Weight gain is usually caused by
- |                              |               |
|------------------------------|---------------|
| i) Mycophenolate             | ii) Steroids  |
| iii) Anti-thymocyte globulin | iv) Sirolimus |

- 1I. Decoy cells are characteristically seen in
- |                                 |                             |
|---------------------------------|-----------------------------|
| i) Polyoma virus nephropathy    | ii) Cytomegalovirus disease |
| iii) Epstein Barr virus disease | iv) Tuberculosis            |

- 1J. Tacrolimus acts by
- i) Inhibition of B cells
  - ii) Inhibition of T cells
  - iii) Inhibition of immune system
  - iv) Inhibition of major histocompatibility complex

(1 mark × 10 = 10 marks)

2. **Long essay questions:**

- 2A. Describe the workup of the potential living renal donor.  
2B. Discuss acute rejection.

(10 marks × 2 = 20 marks)

3. **Short essay questions:**

- 3A. Discuss post-transplant malignancies.  
3B. Discuss calcineurin inhibitors.  
3C. What is chronic allograft nephropathy?  
3D. Discuss induction immunosuppression.  
3E. Describe acquired immunity.  
3F. Describe human leucocyte antigen.

(5 marks × 6 = 30 marks)

4. **Short notes:**

- 4A. What are the sequelae of long term steroid usage?  
4B. What are the causes of delayed graft function?  
4C. Write a note on virtual crossmatch.  
4D. What are the white blood cell crossmatch methods?  
4E. What are the common viral infections post transplant?  
4F. What are the side effects of Azathioprine?  
4G. What is hyperacute rejection?  
4H. What is paired donation?  
4I. What is meant by the term highly sensitized patient?  
4J. Name the common post-transplant neoplasia.

(2 marks × 10 = 20 marks)





## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. (RRT &amp; DT) DEGREE EXAMINATION – JUNE 2015

SUBJECT: MDT 605 – BASIC PRINCIPLES AND OVERVIEW OF TYPES OF RENAL REPLACEMENT THERAPY (HD &amp; PD) &amp; THEIR APPLICATION TO PATIENT CARE

Wednesday, June 10, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

## 1. Multiple choice questions- Select the single best answer:

1A. Serum creatinine can be raised in all the following contexts except:

- i) Gastrointestinal bleed
- ii) Dehydration
- iii) Trimethoprim administration
- iv) None of the above

1B. Macrocytic anemia is seen in

- i) Hyperparathyroidism
- ii) B12 deficiency
- iii) Iron overload
- iv) All of the above

1C. Iron deficiency is diagnosed by

- i) Low serum ferritin
- ii) High serum ferritin
- iii) High Iron to ferritin ratio
- iv) None of the above

1D. The Epoetin that can be given monthly?

- i) Epoetin alpha
- ii) Darbepoetin
- iii) Epoetin gamma
- iv) MIRCERA

1E. Hematological abnormalities seen in chronic kidney disease are all except

- i) Anemia
- ii) Burr cells
- iii) Thrombocytopenia
- iv) Thrombasthenia

- 1F. The most common cause of anemia in chronic kidney disease is
- Blood loss
  - Erythropoetin deficiency
  - Iron deficiency
  - Shortened red blood cell lifespan
- 1G. RIFLE criteria incorporates all except
- Age
  - Glomerular filtration rate
  - Creatinine
  - Urine output
- 1H. Of the following, the commonest cause of chronic kidney disease is
- Chronic glomerulonephritis
  - Diabetic nephropathy
  - Renovascular disease
  - Obstructive uropathy
- 1I. Seizures in chronic kidney disease could be due to
- Uremic encephalopathy
  - Hypocalcemia
  - Hyponatremia
  - All of the above
- 1J. 100 units of Heparin can be neutralized by \_\_\_\_\_ mg of protamine sulphate
- 10mg
  - 100mg
  - 1gram
  - 1mg

(1 mark × 10 = 10 marks)

2. **Long essay questions:**

- 2A. Discuss the complications of uremia.
- 2B. Discuss the principles of diet in the end stage renal disease patient.

(10 marks × 2 = 20 marks)

3. **Short essay questions:**

- 3A. Describe the management of anemia of chronic kidney disease.
- 3B. Discuss the renal replacement therapy options in acute kidney injury in children.
- 3C. Discuss anticoagulation in relation to hemodialysis.
- 3D. Describe the pathogenesis of chronic kidney disease mineral bone disorder.

- 3E. How is serum creatinine used to assess renal function?
- 3F. What are the possible complications one would expect with the first hemodialysis session in a uremic patient?

(5 marks × 6 = 30 marks)

4. **Short notes questions:**

- 4A. What is the relevance of serum Albumin in end stage renal disease?
- 4B. Name four main causes of malnutrition in chronic kidney disease.
- 4C. Why is vitamin deficiency common in end stage renal disease?
- 4D. Mention four drugs/toxins that can be removed through extracorporeal treatments.
- 4E. What are phosphate binders?
- 4F. What are the dietary sources of potassium?
- 4G. How can imaging help in the management of acute kidney injury?
- 4H. Which factors influence progression of chronic kidney disease?
- 4I. What are the causes of iron deficiency in the chronic hemodialysis patient?
- 4J. Mention two long term complications of continuous ambulatory peritoneal dialysis.

(2 marks × 10 = 20 marks)

