

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. R.R.T. & D.T. DEGREE EXAMINATION – MAY/JUNE 2012
SUBJECT: MDT 603 – ADVANCED BIOSTATISTICS & RESEARCH METHODOLOGY

Tuesday, May 29, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

- 1A. Define mean, median, mode, standard deviation and coefficient of variation for 'n' observations.
1B. Explain stratified random sampling method. (5+5 = 10 marks)
2. Fifty patients with congestive heart failure were weighed before and after receiving a novel diuretic agent and the average weight loss (the difference between the two weights) for this sample was found to be 3.5 KG with a standard error of 2.6 Kg.
2A. Name the statistical test used for testing whether the agent is effective in reducing the weight.
2B. State the null and alternate hypothesis.
2C. Write the test statistic for this test.
2D. Mention the assumptions for the validity of this test.
2E. How do you take a decision on the acceptance or rejection of null hypothesis? (2×5 = 10 marks)
- 3A. What do you mean by sampling distribution and standard error? What are the factors that affect the width of a confidence interval for mean?
3B. Write a short note on binomial distribution. ((2+3)+5 = 10 marks)
4. What do you mean by randomization in randomised controlled trials (RCTs)? Explain different methods of randomization in RCTs. (1+9 = 10 marks)
- 5A. A hospital administrator wishes to estimate the mean weight of babies born in the hospital. How large a sample of birth records should be taken if the administrator wants a 95% confidence interval with margin error of 1.2 Kg? Assume that a reasonable estimate of the population standard deviation is 5 Kg.
5B. Write a short note on cross sectional study design. (5+5 = 10 marks)
6. Explain the structure of a research thesis. (10 marks)
7. **Write short notes on:**
7A. Chi square test
7B. Survival analysis
7C. Validity of a diagnostic test
7D. One way ANOVA (5×4 = 20 marks)



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FIRST YEAR M.Sc. R.R.T. & D.T. DEGREE EXAMINATION – MAY/JUNE 2012
SUBJECT: MDT 601 – ANATOMY AND PHYSIOLOGY RELATED TO URINARY
TRACT INCLUDING KIDNEY

Thursday, May 31, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

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

1A. One mole of a substance is

- a) Atomic weight in grams b) Atomic weight in milligrams
c) Atomic weight in Kg d) Atomic weight in pounds

1B. One equivalent is defined as Weight in grams that combines/ replaces

- a) 1 gram of oxygen b) 1 gram of hydrogen
c) 1 gram of carbon d) 1 gram of nitrogen

1C. Renal biopsy may be indicated in

- a) Proteinuria b) Hematuria
c) Acute kidney injury d) All of the above

1D. The main process involved in renal excretion is

- a) Filtration b) Reabsorption
c) Secretion d) All of the above

1E. The Juxtaglomerular apparatus is found in the

- a) PCT b) Loop of Henle
c) DCT d) Collecting tubule

1F. Osmotic pressure is proportional to

- a) Number of particles in the solvent b) Weight of the solute in the solvent
c) Valence of the solute d) Molecular weight of the solute

1G. Which of the following is a non effective osmole

- a) Urea b) Sodium
c) Potassium d) None of the above

1H. The kidneys receive _____ % of cardiac output

- a) 30 b) 20
c) 15 d) 10

1I. The glomerulus does not filter

- a) Water b) Urea
c) Albumin d) Sodium

- 1J. The final product of the renin angiotensin system is
- | | |
|------------------|------------------|
| a) Renin | b) Angiotensin 1 |
| c) Angiotensin 2 | d) Aldosterone |

(1×10 = 10 marks)

2. **Long essay questions:**

- 2A. Describe the functional anatomy of the nephron.
2B. Derive the Henderson- Hasselbach equation. What is meant by acidemia?

(10×2 = 20 marks)

3. **Short essay questions:**

- 3A. Illustrate the renin angiotensin aldosterone system.
3B. What is the role of ADH in water balance?
3C. What are the actions of vitamin D? Briefly describe the derangements in CKD.
3D. How is epoietin therapy monitored?
3E. What is meant by creatinine clearance? How is it measured?
3F. Illustrate the coagulation cascade.

(5×6 = 30 marks)

4. **Short note questions:**

- 4A. What is the role of the softener in hemodialysis water treatment?
4B. Illustrate the collecting system of the kidney.
4C. What is eGFR?
4D. What is calculated serum osmolarity?
4E. What are the pitfalls of using the serum creatinine level to estimate renal function?
4F. What are actions of angiotensin II?
4G. Name the two main mechanisms by which the pH of ECF is maintained.
4H. Describe the macula densa.
4I. What is uremia?
4J. What stimulates the renin angiotensin system?

(2×10 = 20 marks)



MANIPAL UNIVERSITY**FIRST YEAR M.Sc. R.R.T. & D.T. DEGREE EXAMINATION – MAY/JUNE 2012****SUBJECT: MDT 602 – PATHOLOGY, MICROBIOLOGY & PHARMACOLOGY
RELATED TO KIDNEY AND DIALYSIS**

Saturday, June 02, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

Answer ALL the questions.**1. Multiple choice questions – select the single best answer:**1A. Indications for dialysis include all of the following **except**

- a) Metabolic acidosis b) Severe hyperkalemia
c) Pulmonary edema d) Hypokalemia

1B. Mechanism of solute transport in hemodialysis is

- a) Osmosis b) Convection
c) Percolation d) Diffusion

1C. Diffusion depends on

- a) Molecular weight b) Concentration gradient
c) Membrane resistance d) All of the above

1D. Hemofiltration depends on

- a) Diffusion b) Convection
c) Radiation d) All of the above

1E. Dialyser whole blood clearance depends on all of the following **except**

- a) Blood flow b) Percentage reduction of the waste
c) Concentration of the waste product d) Membrane characteristics

1F. Urea reduction ratio is

- a) Preurea- post urea/ preurea b) Posturea-preurea/post urea
c) Posturea-preurea/ preurea d) Preurea-posturea/posturea

1G. $Kt/V =$

- a) $\ln(1-URR)$ b) $-\ln(1-URR)$
c) $\ln(URR)$ d) $\ln(1/URR)$

1H. Access recirculation is absent in

- a) AV shunt b) AVF
c) AV graft d) Central vein catheter

1I. Most biocompatible hemodialysis membrane is

- a) Cellulose b) Cellulose acetate
c) Hemophan d) Polysulfone

- 1J. High flux membranes have KUF >
- | | |
|------------------|-----------------|
| a) 2ml/hr/mmHg | b) 5 ml/hr/mmHg |
| c) 10 ml/hr/mmHg | d) 8 ml/hr/mmHg |

(1×10 = 10 marks)

2. **Long essay questions:**

- 2A. Discuss the vascular access options available for hemodialysis and the importance of timely AV Fistula creation.
- 2B. Describe the role of ESA s in Chronic kidney disease.

(10×2 = 20 marks)

3. **Short essay questions:**

- 3A. What are the contraindications for and complications of CAPD?
- 3B. Discuss the RIFLE classification of AKI.
- 3C. Discuss the RRT options available for the hemodynamically unstable patient with AKI.
- 3D. Describe the pathogenesis and manifestations of renal osteodystrophy.
- 3E. Describe the haematological abnormalities seen in ESRD.
- 3F. Discuss the preventive measures necessary to reduce Hepatitis B transmission in the HD unit.

(5×6 = 30 marks)

4. **Short note questions:**

- 4A. Name all the complications of heparin.
- 4B. Mention the uses of citrate in the HD unit.
- 4C. How is CKD classified?
- 4D. Mention the common causes of AKI.
- 4E. How is Hepatitis B surveillance carried out in the HD unit?
- 4F. How is the secondary hyperparathyroidism of CKD treated?
- 4G. Mention the causes of vascular access recirculation.
- 4H. What are the common causes of ESRD?
- 4I. Name the common pathogens causing hemodialysis catheter infection.
- 4J. What are the complications of plasmapheresis?

(2×10 = 20 marks)

