MANIPAL UNIVERSITY

FIRST YEAR MOT/M.Sc. MLT/M.Sc. RT (NR)/MASTER OF OPTOMETRY/M.Sc. MIT/ M.Sc. ECHOCARDIOGRAPHY & (2012 PT)/MSc. CARDIAC CATHETERIZATION AND INTERVENTIONAL TECHNOLOGY DEGREE EXAMINATION – JUNE 2014

SUBJECT: ADVANCED BIOSTATISTICS & RESEARCH METHODOLOGY/BIOSTATISTICS/RESEARCH METHDOLOGY & BIOSTATISTICS/EPIDEMIOLOGY & BIOSTATISTICS

Tuesday, June 03, 2014

Time: 10:00 – 13:00 Hrs.   Max. Marks: 80

✍ **Answer ALL the questions.**

1A. Define the various measures of dispersion.
1B. Distinguish between sampling and non-sampling errors.

(5+5 = 10 marks)

2A. Write a short note on binomial distribution.
2B. Define sampling distribution and standard error. A sample of 40 liver cirrhosis subjects were selected and the mean serum potassium level was observed to be 5.4 mEq/L with standard deviation of 1.8 mEq/L. Find the 99% confidence interval for mean serum potassium level among liver cirrhosis subjects. (The standard normal table value for 99% confidence level is 2.58).

(5+ (2+3) = 10 marks)

3A. Define type I error, type II error, Level of significance, Power and P value.
3B. What do you mean by non-parametric tests? What are the advantages and disadvantages of non-parametric tests over parametric tests?

(5+5 = 10 marks)

4. Twenty four experimental animals with vitamin D deficiency were divided equally into two groups. Group 1 received treatment consisting of a diet that provided vitamin D. The second group was not given any treatment. At the end of the experimental period, serum calcium levels were measured with the following results.

Group	Mean (mg/100ml)	Standard deviation (mg/100ml)
Treated	11.1	1.5
Untreated	7.8	2.0

4A. Name the statistical test used to test whether mean serum calcium levels differs significantly between the two groups.
4B. Write the null hypothesis and alternate hypothesis for the above test.
4C. What are the assumptions for this test?
4D. Compute the test statistic value.
4E. Briefly explain how do you take a decision about the acceptance or rejection of null hypothesis?

(1+1+2+4+2 = 10 marks)

5A. A study was planned to find the prevalence of overweight among people in the age group of 40 to 50 years in an urban community. What is the minimum sample size required for the study if the absolute margin of error is fixed at 3% and confidence level of 95%? A similar study conducted three years before in the same population reported the prevalence of overweight as 18%. (The standard normal table for 95% confidence level is 1.96).

5B. What do you mean by blinding in RCTs? Briefly explain the various types of blinding.

(5+5 = 10 marks)

6. With the help of a flow chart explain the design of a case control study. Define the measure of strength of association between exposure and event in a case control study. Enumerate the advantages and disadvantages in a case control study.

(4+2+4 = 10 marks)

7A. In order to assess the validity of a diagnostic test, it was applied on 250 individuals with disease and 600 without disease. The test resulted in a positive diagnosis for 200 out of those with disease and 100 of those without disease. Construct appropriate 2 × 2 table and calculate sensitivity, specificity, positive predictive value and negative predictive value of the test.

7B. Write a short note on survival analysis.

(5+5 = 10 marks)

8. Explain the structure of a research protocol.

(10 marks)

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FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2014

SUBJECT: RADIOGRAPHIC PROCEDURES

Thursday, June 05, 2014

Time: 10:00 – 13:00 Hrs.   Maximum Marks: 80

✍ **Answer ALL the questions.**

1. Describe the radiographic anatomy of the urinary system and explain MCU and ASU procedures in detail.

(20 marks)

2. **Short notes:**

2A. Biphasic study of upper GIT
2B. Peroral pneumocolon and retrograde small bowel examination
2C. Sailography
2D. View for "Bicipital groove"
2E. Enteroclysis
2F. Stenver's view

(10 marks × 6 = 60 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2014

SUBJECT: INSTRUMENTATION OF CONVENTIONAL RADIOLOGY EQUIPMENTS

Saturday, June 07, 2014

Time: 10:00 – 13:00 Hrs.   Maximum Marks: 80

✍   **Answer ALL the Questions.**

✍   **Major Question:**

1.   What is generator? Explain different types of generators in detail with diagram.

(20 marks)

2.   **Write short notes on:**

2A.   Fuses and its application

2B.   Main voltage compensation

2C.   Ionization timers

2D.   Grid cutoff

2E.   Tube rating

2F.   Safety rules for radiographers

(10 marks × 6 = 60 marks)

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FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2014

SUBJECT: PRINCIPLES OF RADIOGRAPHIC EXPOSURE

Monday, June 09, 2014

Time: 10:00 – 13:00 Hrs.   Maximum Marks: 80

✎ **Essay Question.**

1. Describe the Interaction of X-rays with matter and their clinical significance.

(20 marks)

✎ **Short Notes:**

2A. Give details about the radiographic Grids. Add notes on the grid cut off and the remedies to reduce it.

2B. Explicate Hurter and Driffield Curve.

2C. Describe and compare Manual and Automatic Processing in detail.

2D. Outline Radiographic contrast and the factors influencing it. List out why an exposed radiographic film has series of shadows with different densities.

2E. Narrate Day light processing in detail.

2F. Illustrate the maintenance and quality control tests for Automatic Film Processor.

(10 marks × 6 = 60 marks)

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✎ **Essay Question.**

1.   Compare Computed Radiography and Digital Radiography.

(20 marks)

2.   **Short Notes:**

2A. Illustrate the equipment for Cranial & Skeletal radiography.

2B. Discuss about the methods used for evaluating the spatial resolution and contrast resolution of a digital imaging system.

2C. Describe the application and implementation stages of Picture Archiving and Communication System.

2D. Depict the device used for brightness amplification of a fluoroscopic image.

2E. Explain the principles and equipment for Tomography.

2F. Explicate Capacitor Discharge and Cordless Mobile equipment's.

(10 marks × 6 = 60 marks)

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✍ **Answer ALL questions.**

1.   Describe Ultrasound contrast agents in detail.

(20 marks)

2.   **Short notes:**

2A.   Interaction of Ultrasound with matter

2B.   Beam former

2C.   Ultrasound artefacts

2D.   Quality assurance tests for Ultrasonography equipments

2E.   Advanced Ultrasound transducers

2F.   Ultrasound display modes

(10 marks × 6 = 60 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2014

SUBJECT: ADVANCED TECHNIQUE & INSTRUMENTATION OF CT

Monday, June 16, 2014

Time: 10:00 – 13:00 Hrs.   Maximum Marks: 80

✍   **Answer ALL the questions.**

1.   Write detail note on 3D computed tomography scanner in detail.

(20 marks)

2.   **Write short note on:**

2A.   CT - Endoscopy

2B.   CT scan protocol of liver

2C.   CT protocol of lower limb angiography

2D.   Role of CT technologist in pediatric patient management

2E.   Flat panel detectors

2F.   Application of CT scanner in trauma patient

(10 marks × 6 = 60 marks)