

# MANIPAL UNIVERSITY

**FIRST YEAR (M.Sc. MLT / M.Sc. NMT (NR) / M.Sc. MIT) / SECOND SEMESTER  
M.Sc. HHIA DEGREE EXAMINATION – DECEMBER 2014**

**SUBJECT: BIOSTATISTICS/ PAPER IV – ADVANCED BIOSTATISTICS AND RESEARCH  
METHODOLOGY/ BIOSTATISTICS/EPIDEMIOLOGY & BIOSTATISTICS**

Wednesday, December 17, 2014

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

1. List any two types of probability sampling? Describe any one of them in detail.  
(1+4 = 5 marks)
2. Briefly explain various scales of measurement with suitable examples.  
(5 marks)
3. Describe the concept of sampling distribution and standard error. In a study conducted on a sample of 1600 subjects, the prevalence of a particular condition was estimated to be 10%. Calculate 95% confidence interval for this estimate.  
(5+5 = 10 marks)
4. Explain the rationale for and the concept of tests of significance. What are the steps involved in performing tests of significance.  
(6+4 = 10 marks)
5. A team of cardiologists conducted a study to investigate the association between oral contraceptive use and hypertension. The results of the study are given below:

	Hypertensive	Normotensive	Total
Oral contraceptive	8	32	40
Other	15	45	60
Total	23	77	100

At 1% level of significance, do these data provide sufficient evidence to indicate the association between method of contraceptive use and hypertension? ( $\chi^2_{1df}(0.01) = 6.64$ )

(10 marks)

6. What are the requirements for calculating minimum sample size for estimating proportion and how they influence the required minimum sample size?

(5 marks)

7. Distinguish between:
- 7A. Case report and case series studies
  - 7B. Correlational and other descriptive studies
  - 7C. Incidence rate and prevalence rate
  - 7D. Relative risk and odds ratio
  - 7E. Retrospective and prospective study designs
- (10 marks)
8. A cohort study was conducted to find the effect of oral contraceptive (OC) use on breast cancer. Ten thousand women free from breast cancer were selected for the study and followed up for 10 years. Forty out of 8000 non users of OC and 14 out of 2000 OC users developed breast cancer. Calculate appropriate measure of strength of association and interpret the same.
- (5 marks)
9. Take a suitable example and explain the situation for the application of logistic regression.
- (5 marks)
10. In order to assess the validity of a test, it was applied on 100 individuals with a disease and 100 without the disease. The test resulted in a positive diagnosis for 80 out of those with disease and 10 of those without disease. Construct appropriate 2×2 table and calculate sensitivity, specificity, positive predictive value and negative predictive value of the test.
- (5 marks)
11. Explain the components of a scientific report.
- (10 marks)



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**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2014**

**SUBJECT: RADIOGRAPHIC PROCEDURES**

Thursday, December 18, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

1. Write briefly about contrast media.

(20 marks)

2. **Write short notes:**

2A. Brief about Dacrocystography

2B. Explain percutaneous transhepatic biliary drainage

2C. Write in detail about Intravenous urogram

2D. Anatomy and various views of wrist joint

2E. Mass miniature radiography

2F. Barium meal

(10 marks × 6 = 60 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2014****SUBJECT: PRINCIPLES OF RADIOGRAPHIC EXPOSURE**

Friday, December 19, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

**✍ Essay question.**

1. What are the methods used in enhancing or improving the image Quality? Discuss in detail about the grid types and function.

(20 marks)

**2. Write short notes on:**

- 2A. Discuss Radiographic mottle.  
2B. Discuss about technique, advantages and application of micro and macroradiography  
2C. What are the viewing accessories? Describe them. What are the viewing conditions?  
2D. Discuss the spectral sensitivity of film materials.  
2E. Write a note on film materials.  
2F. Describe the steps involved in conversion of Latent image in to visible image.

(10 marks × 6 = 60 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2014****SUBJECT: INSTRUMENTATION OF SPECIALIZED RADIOLOGY EQUIPMENTS**

Saturday, December 20, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions:**

✍ **Major question:**

1. Write a detailed note on anode and filter used in mammography. Relate its significance with clinical conditions.

(20 marks)

2. **Short notes on:**

- 2A. Write a note on digital fluoroscopy.  
2B. Define quality control and acceptance test. Explain the test to describe total filtration of an X-ray tube.  
2C. Write a note on CCD camera.  
2D. Write a note on rapid serial changer.  
2E. Write a note on capacitor discharge mobile equipment.  
2F. Explain multi field image intensifier. Mention the significance of the size of input phosphor in image intensifier.

(10 marks × 6 = 60 marks)



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**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2014**

**SUBJECT: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASONOGRAPHY**

Monday, December 22, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Major Question:**

1. Explain in detail the instrumentation of ultrasound scanner with a labeled diagram.

(20 marks)

2. **Write short notes on:**

2A. The causes for side lobe and grating lobe artifacts and mention remedies

2B. Principle of Doppler and Doppler equation

2C. Working principle of 3D ultrasound transducers

2D. The diagnostic importance of shadowing and enhancement artifacts

2E. Thermal index and mechanical index

2F. Application of ultrasound in interventional procedures

(10 marks × 6 = 60 marks)



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## MANIPAL UNIVERSITY

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

SUBJECT: ADVANCED TECHNIQUE & INSTRUMENTATION OF CT TECHNIQUES

Tuesday, December 23, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

1. Write detail note on indications, contraindication, procedure and techniques of CT perfusion.  
(20 marks)

2. Write short one on:

2A. HRCT protocol

2B. Current trends and vendors of CT

2C. Layout and room design of CT scanner

2D. CT Denta scan

2E. CT – Extremities

2F. CT pulmonary angiography

(10 marks × 6 = 60 marks)

