

MANIPAL UNIVERSITY

SECOND SEMESTER M.Sc. EXERCISE AND SPORTS SCIENCE / M.Sc. MRP / M.Sc. MIT / M.Sc. HIM / M.Sc. HHIA / M.Sc. CLINICAL PSYCHOLOGY DEGREE EXAMINATION – JUNE 2017

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

Friday, June 02, 2017

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

1. Define the following:

- 1A. Any three measures of central tendency
- 1B. Qualitative and quantitative variables with examples
- 1C. Sampling errors and non-sampling errors
- 1D. Sampling frame, probability sampling and non-probability sampling

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

- 2A. Write the properties of normal distribution. List any two applications of normal distribution.
- 2B. The mean rate of adenosine triphosphate among a sample of 30 insulin resistant children was found to be 6 $\mu\text{mol/g}$ of muscle/min with standard deviation of 2 $\mu\text{mol/g}$ of muscle/min. Find the 95% and 99% confidence intervals for the mean rate of adenosine triphosphate for the study population.

(5+5 = 10 marks)

- 3A. Define type I error, type II error, level of significance and power of a statistical test of significance.
- 3B. Hypothermia is a problem for extremely low birth weight infants. A study was conducted to investigate whether wrapping these infants in polyethylene bags in the delivery room and while they are being transferred to the neonatal intensive care unit affects the survival of babies. The results of the study conducted among 140 extreme low birth weight babies are given in the following table:

Warming treatment	Number of infants		Total
	Lived	dead	
Polyethylene bag	63	7	70
Traditional	61	9	70
Total	124	16	140

Test at 5% level of significance whether mortality among the extreme low birth weight infants is associated with the kind of warming treatment given. The table value for 5% level of significance is 3.84.

(4+6 = 10 marks)

4. Discuss independent sample t test and paired t test with an example.

(10 marks)

5. Explain case control study under the headings:

- i) design with the help of a flow chart
- ii) measure of strength of association
- iii) merits
- iv) demerits

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

6A. Write a short note on randomization in clinical trials.

6B. A randomized controlled trial has been planned to compare the effects of low fat diet with the diet recommended by the American Diabetic Association. The outcome variable is the total cholesterol (in mg/dL). What is the minimum number of subjects required in each group to detect a difference in total cholesterol of 20 mg/dL between the two groups with 90% power and 5% level of significance? Based on the earlier experience the standard deviation of total cholesterol in the population is about 35 mg/dL. The table value for 90% power and 5% level of significance is 1.28 and 1.96 respectively.

(5+5 = 10 marks)

7. **Write short notes on:**

- 7A. Validity of diagnostic test
- 7B. Structure of research thesis
- 7C. Meta-analysis
- 7D. Logistic regression

(5 marks × 4 = 20 marks)



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MANIPAL UNIVERSITY

SECOND SEMESTER M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2017

SUBJECT: MIT 201: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASOUND

Monday, June 05, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

✍ Draw suitable diagrams wherever required.

✍ Major questions:

1. Classify ultrasound transducer. Explain characteristics and advancements of electronic transducer.

(20 marks)

2. Short Answers:

2A. Define special resolution and temporal resolution. Write a note on resolution of ultrasound image.

2B. Explain Doppler artifacts.

2C. Write a note on extended field of view imaging.

2D. Write a note on bio effects and safety considerations during ultrasonography.

2E. Explain ultrasound protocol for abdomen.

2F. Define acoustic impedance and explain its significance in ultrasonography.

(10 marks × 6 = 60 marks)



MANIPAL UNIVERSITY**SECOND SEMESTER M.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2017****SUBJECT: MIT 202: ADVANCED TECHNIQUES & INSTRUMENTATION OF COMPUTED TOMOGRAPHY**

Wednesday, June 07, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

1. Explain quality assurance program in CT.

(20 marks)

2. **Short Notes:**

2A. CT Perfusion imaging

2B. CT image display

2C. CT protocol for abdomen and pelvis

2D. HRCT protocol for interstitial lung diseases

2E. CT Isotropic imaging

2F. CT dosimetry

(10 marks × 6 = 60 marks)

