

# MANIPAL UNIVERSITY

**FRIST YEAR MASLP / MOT / MSc. MLT / MSc. RT / MSc. ECHOCARDIOGRAPHY /  
OPTOMETRY / MSc. MIT / MSc. RRT & DT DEGREE EXAMINATION – JUNE 2017**

**SUBJECT: STATISTICS & RESEARCH METHODS / ADVANCED BIOSTATISTICS & RESEARCH  
METHODOLOGY / BIOSTATISTICS / ADVANCED BIOSTATISTICS & RESEARCH  
METHODOLOGY / PAPER IV: EPIDEMIOLOGY & BIOSTATISTICS / PAPER IV: RESEARCH  
METHODOLOGY & BIOSTATISTICS / 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)



Reg. No.										
----------	--	--	--	--	--	--	--	--	--	--

## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017

SUBJECT: IMMUNOLOGY AND IMMUNOLOGICAL TECHNIQUES

Monday, June 05, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

✍ Answer ALL the questions.

✍ Draw diagrams if necessary.

- 1A. Define vaccines. Discuss on different types of vaccines.
- 1B. Define Monoclonal Antibodies. Describe hybridoma technique. Add a note on clinical applications of Monoclonal Antibodies.
- 1C. Discuss on Histocompatibility testing.

(10 marks × 3 = 30 marks)

2. Write detailed notes on:

- 2A. Primary lymphoid organs
- 2B. TCR-CD3 complex
- 2C. Immunofluorescence
- 2D. Classical and alternative pathway of complement activation system
- 2E. Humoral immune response

(5 marks × 5 = 25 marks)

3. Write short notes on:

- 3A. Mechanism of inflammation
- 3B. Kinin cascade
- 3C. Antigenic determinants
- 3D. Test for degranulation in neutrophils
- 3E. Lymphocyte trafficking

(3 marks × 5 = 15 marks)



Reg. No.									
----------	--	--	--	--	--	--	--	--	--

## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017

SUBJECT: MOLECULAR BIOLOGY AND APPLIED GENETICS

Wednesday, June 07, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

✍ Answer ALL questions.

✍ Draw diagrams wherever necessary.

1A. Explain the process of translation of mRNA in detail.

1B. What is cell cycle? Explain the regulation of cell cycle.

1C. What are the causes of DNA damage? Discuss the various DNA repair mechanisms.

(10 marks × 3 = 30 marks)

2. Write detailed notes on:

2A. Cloning vectors

2B. cDNA library

2C. Genetics of cancer

2D. Human Genome Project

2E. Polymerase chain reaction

(5 mark × 5 = 25 marks)

3. Write brief notes on:

3A. Down's syndrome

3B. DNA finger printing

3C. DNA sequencing

3D. Lac operon

3E. FISH

(3 marks × 5 = 15 marks)



Reg. No.									
----------	--	--	--	--	--	--	--	--	--

## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017

SUBJECT: CLINICAL PATHOLOGY AND HAEMATOLOGY

Friday, June 09, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

- ✍ Answer ALL questions.
- ✍ Draw diagrams wherever necessary.

- 1A. Classify haemolytic anaemia. Discuss clinical symptoms and laboratory diagnosis of  $\beta$  thalassemia.
- 1B. Describe the microscopic examination of urine with its clinical significance.
- 1C. Define haematopoiesis. Elaborate on erythropoiesis with mechanisms of action of Erythropoietin.

(10 marks  $\times$  3 = 30 marks)

2. Write detailed notes on:

- 2A. Chronic Myeloid Leukemia
- 2B. Hereditary spherocytosis
- 2C. Platelet function test
- 2D. Stool concentration method
- 2E. PNH

(5 marks  $\times$  5 = 25 marks)

3. Write short notes on:

- 3A. PAS staining
- 3B. Neutrophilia
- 3C. Transudate and exudate
- 3D. vWD
- 3E. Benedict's test

(3 marks  $\times$  5 = 15 marks)



Reg. No.									
----------	--	--	--	--	--	--	--	--	--

**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017**

**SUBJECT: IMMUNOPATHOLOGY**

Monday, June 12, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

- ✍ **Answer ALL questions.**
- ✍ **Draw diagrams if necessary.**

- 1A. Define and classify hypersensitivity reaction. Describe immune complex mediated reactions.
- 1B. Define autoimmunity. Explain the mechanism of autoimmunity. Discuss any one organ specific autoimmune disease.
- 1C. Define AIDS. Describe the pathogenesis, immunological features and laboratory diagnosis of HIV infection.

(10 marks × 3 = 30 marks)

**2. Write briefly on:**

- 2A. Tumor and tumor markers
- 2B. Sjogren's syndrome
- 2C. B cell deficiency
- 2D. Glomerulonephritis
- 2E. Dermatomyositis
- 2F. Immunomodulators
- 2G. Tuberculosis

(5 marks × 7 = 35 marks)

**3. Write short notes on:**

- 3A. Asthma
- 3B. Drug allergy
- 3C. Graft versus host relationship in pregnancy
- 3D. Haemophilia
- 3E. Thrombocytopenic purpura

(3 marks × 5 = 15 marks)



# MANIPAL UNIVERSITY

## FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017

### SUBJECT: GENERAL MICROBIOLOGY (SPECIALIZATION: BIOCHEMISTRY)

Wednesday, June 14, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

- ✍ Answer ALL questions.
- ✍ Draw diagrams wherever necessary.

- 1A. Write in detail about antibacterial agents and their mode of action.
  - 1B. How does the scanning electron microscope operate and in what way does its function differ from that of TEM?
  - 1C. Discuss genetic engineering. Add a note on its applications.
- (10 marks × 3 = 30 marks)

2. Write detailed notes on:

- 2A. Anaerobic culture methods
- 2B. Disc diffusion methods
- 2C. Flagella
- 2D. Beta lactamase drugs
- 2E. Endospore formation

(5 marks × 5 = 25 marks)

3. Write short notes on:

- 3A. Tyndallisation
- 3B. McIntosh Fildes's jar
- 3C. Enriched media
- 3D. Pour plate culture
- 3E. Transformation

(3 marks × 5 = 15 marks)



# MANIPAL UNIVERSITY

## FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017

### SUBJECT: CLINICAL BIOCHEMISTRY (SPECIALIZATION: MICROBIOLOGY)

Wednesday, June 14, 2017

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

✍ **Answer ALL questions.**

✍ **Draw diagrams wherever necessary.**

- 1A. Discuss the processes and procedures of internal quality control in a clinical biochemistry laboratory.
- 1B. Define and classify diabetes mellitus. Explain the various metabolic changes and associated complications of diabetes mellitus.
- 1C. Discuss urinalysis for abnormal chemical constituents.

(10 marks × 3 = 30 marks)

2. **Write detailed notes on:**

- 2A. Serum T3, T4 and TSH with their clinical significance
- 2B. Renal glomerular function tests
- 2C. Serum bilirubin estimation with clinical correlation
- 2D. Chemical hazards and safety precautions
- 2E. Lipoproteins

(5 marks × 5 = 25 marks)

3. **Write brief notes on:**

- 3A. Discrete analysers
- 3B. Non-invasive pancreatic function tests
- 3C. Modular automation system
- 3D. Disposal of radioactive waste
- 3E. Cardiac enzymes

(3 marks × 5 = 15 marks)



Reg. No.										
----------	--	--	--	--	--	--	--	--	--	--

**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2017**

**SUBJECT: BIOMEDICAL TECHNIQUES**

Friday, June 16, 2017

Time: 10:00 – 11: 30 Hrs.

Maximum Marks: 40

---

**✍ Answer ALL questions.**

1. Classify chromatography. Explain about principle, requirements and applications of affinity chromatography.

(3+3+6+3 = 15 marks)

2. **Write detailed notes on:**

- 2A. SDS PAGE
- 2B. Liquid scintillation counter
- 2C. Oxidative phosphorylation
- 2D. Atomic absorption spectrophotometry
- 2E. HPLC

(5 marks × 5 = 25 marks)

