

## MANIPAL UNIVERSITY

**FRIST YEAR MASLP / MOT / MSc. MLT / MSc. RT / MSc. ECHOCARDIOGRAPHY / MSc. CARDIAC CATHETERIZATION & INTERVENTIONAL TECHNOLOGY / OPTOMETRY / MSc. MIT / MSc. RRT & DT / DEGREE EXAMINATION – JUNE 2016**

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

Thursday, June 02, 2016

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

- 1A. Explain the situation for use and computation procedure of mean and median.
- 1B. What is cluster sampling? Explain the procedure with example. List the advantages and disadvantages of this technique. (5+5 = 10 marks)
- 2A. Suppose the ages at time of onset of a certain disease are approximately normally distributed with a mean of 12 years and a standard deviation of 3 years. A child has just come down with the disease. What is the probability that the child is:
- i) Between the ages of 9 and 12 years?
  - ii) Over 15 years?
- 2B. Write a short note on Poisson distribution. (5+5 = 10 marks)
- 3A. Define the following terms:
- i) Power of a test
  - ii) P-value
  - iii) Type one and type two errors in testing of hypothesis
- 3B. Describe with example the situation in which you would use independent sample t-test. What is the null hypothesis tested? List the assumptions. ((1+2+2) +5 = 10 marks)
- 4A. Differentiate parametric and non-parametric tests. Explain the situation for Kruskal-Wallis test.
- 4B. Write a short note on the application of Chi-square test. (5+5 = 10 marks)
- 5A. A hospital administrator wishes to know what proportion of discharged patients is unhappy with the care received during hospitalization. How large a sample should be drawn if we let the error margin  $d = 0.1$ , the confidence coefficient is 0.95, and the anticipated percentage of unhappy patients is 30? (Given  $Z_{1-\alpha/2} = 1.96$ ).
- 5B. Write a short note on Logistic Regression. (5+5 = 10 marks)

6. Discuss Cohort study under:

6A. Basic design

6B. Basic features

6C. Basic steps

6D. Merits and demerits

(10 marks)

7. Explain the structure of a scientific research paper.

(10 marks)

8. Write short notes on the following:

8A. Randomized controlled trials

8B. Sensitivity and specificity of a diagnostic test

(5+5 = 10 marks)



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## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: IMMUNOLOGY AND IMMUNOLOGICAL TECHNIQUES

Saturday, June 04, 2016

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Define cytokines. Describe the properties and functions of cytokines. Add a note on cytokine receptors.
- 1B. Define vaccines. Discuss on different types of vaccines.
- 1C. Enumerate primary and secondary lymphoid organs. Discuss on Thymus with the help of diagram.

(10 marks × 3 = 30 marks)

2. **Write briefly on:**

- 2A. Detection of immune complexes
- 2B. Nephelometry
- 2C. MHC molecules
- 2D. Agglutination tests
- 2E. Mechanism and mediators of inflammation

(5 marks × 5 = 25 marks)

3. **Write short notes on:**

- 3A. Class switching
- 3B. Lymphocyte trafficking
- 3C. Immunodiffusion
- 3D. Ig G
- 3E. Lymphocytotoxicity test

(3 marks × 5 = 15 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016****SUBJECT: MOLECULAR BIOLOGY AND APPLIED GENETICS**

Tuesday, June 07, 2016

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Enumerate the various cytogenetic techniques used for chromosome analysis. Explain chromosome banding in detail.  
1B. Discuss the human genome project. Add a note on transgenic organism.  
1C. Describe the steps in recombinant DNA technology. Add a note on cDNA.

(10 marks × 3 = 30 marks)

**2. Write detailed notes on:**

- 2A. Topoisomerases  
2B. Lac operon  
2C. Spontaneous mutations  
2D. RFLP  
2E. Meiosis

(5 marks × 5 = 25 marks)

**3. Write brief notes on:**

- 3A. Mutagens  
3B. Z- DNA  
3C. Therapeutic proteins  
3D. Ames test  
3E. Gene mapping

(3 marks × 5 = 15 marks)



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## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: CLINICAL PATHOLOGY AND HAEMATOLOGY

Thursday, June 09, 2016

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

✍ **Answer ALL questions.**

✍ **Draw diagrams wherever necessary.**

- 1A. Elaborate on symptoms and lab diagnosis of megaloblastic anemia due to folic acid deficiency.
- 1B. Discuss chronic myeloid leukemia. Add a note on Philadelphia chromosome.
- 1C. Give an account of microscopic examination of cerebrospinal fluid with clinical significance.  
(10 marks × 3 = 30 marks)

2. **Write detailed notes on:**

- 2A. Aplastic anemia
- 2B. Lab diagnosis of multiple myeloma
- 2C. Romanowsky stain
- 2D. Pericardial fluid
- 2E. Tests for proteins in urine

(5 marks × 5 = 25 marks)

3. **Write short notes on:**

- 3A. Megakaryopoiesis
- 3B. Transudate and exudate
- 3C. Fouchet's test
- 3D. Hemoglobinopathy
- 3E. Fagot cells

(3 marks × 5 = 15 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016****SUBJECT: IMMUNOPATHOLOGY**

Saturday, June 11, 2016

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

- ✍ **Answer ALL the questions.**
- ✍ **Draw Diagrams if necessary.**

- 1A. Describe the mechanism of Tumor formation. Add a note on Tumor markers.
- 1B. Define AIDS. Describe the pathogenesis, immunological features and laboratory diagnosis of HIV infection.
- 1C. Enumerate connective tissue diseases. Describe the pathogenesis, immunological features and laboratory diagnosis of rheumatoid arthritis.

(10 marks × 3 = 30 marks)

**2. Write briefly on:**

- 2A. Immunological features and laboratory diagnosis of SLE
- 2B. Serum sickness
- 2C. Erythroblastosis foetalis
- 2D. Anaphylaxis
- 2E. Granulomatous reaction
- 2F. Bullous pemphigoid
- 2G. Hashimoto's thyroiditis

(5 marks × 7 = 35 marks)

**3. Write short notes on:**

- 3A. Pernicious Anaemia
- 3B. Atopy
- 3C. Penicillin allergy
- 3D. Arthus reaction
- 3E. Warm antibody diseases

(3 marks × 5 = 15 marks)



## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: GENERAL MICROBIOLOGY  
(SPECIALIZATION: BIOCHEMISTRY)

Monday, June 13, 2016

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Describe the parts and working principle of fluorescent microscope. Add a note on specimen preparation for fluorescent microscopy.
- 1B. Classify sterilization methods. Discuss chemical disinfection in detail.
- 1C. Draw a neat labeled diagram of bacterial cell. Describe cell surface appendages.  
(10 marks × 3 = 30 marks)

2. Write briefly on:

- 2A. Anaerobic culture methods
- 2B. Bacterial growth nutrition
- 2C. Drug resistance in bacteria
- 2D. Genetic engineering
- 2E. Bacterial classification

(5 marks × 5 = 25 marks)

3. Write short notes on:

- 3A. Ignaz Semmelweis
- 3B. Pour plate culture
- 3C. Indicator media
- 3D. Gram staining
- 3E. Cold sterilization

(3 marks × 5 = 15 marks)



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## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: BIOMEDICAL TECHNIQUES

Wednesday, June 15, 2016

Time: 10:00 – 11: 30 Hrs.

Maximum Marks: 40

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✍ **Answer ALL questions.**

✍ **Draw diagrams wherever necessary.**

1. Discuss about preparation of thin layer, solvent system and adsorbent, procedure and applications of thin layer chromatography.

(3+4+5+3 = 15 marks)

2. **Write detailed notes on:**

2A. Types of Column and column packing in chromatography

2B. Methods for detecting radio activity

2C. HPLC

2D. Affinity chromatography procedure

2E. Oxidative phosphorylation

(5 marks × 5 = 25 marks)

