

## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012


SUBJECT: MOLECULAR BIOLOGY AND APPLIED GENETICS

Saturday, June 02, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

 **Answer ALL questions.**

 **Draw diagrams wherever necessary.**

- 1A. Outline the construction of a recombinant DNA. Add a note on cDNA.
- 1B. Describe the process of transcription in eukaryotes with a neat diagram. Add a note on splicing.
- 1C. Enumerate the various cytogenetic techniques for chromosome analysis. Discuss about the Karyotyping.

(10×3 = 30 marks)

2. **Write detailed notes on:**

- 2A. DNA supercoiling
- 2B. Prenatal screening and diagnosis
- 2C. Lac operon
- 2D. Cell cycle regulation
- 2E. Polymerase chain reaction

(5×5 = 25 marks)

3. **Write brief notes on:**

- 3A. DNA fingerprinting
- 3B. Transgenic organisms
- 3C. Point mutation
- 3D. Ames test
- 3E. Down's syndrome

(3×5 = 15 marks)



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**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012**

**SUBJECT: CLINICAL PATHOLOGY AND HAEMATOLOGY**

Tuesday, June 05, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Define and classify anemia. Discuss symptoms and lab diagnosis of iron deficiency anaemia.
- 1B. Write basic screening tests done in lab for coagulation disorder. Discuss hemophilia.
- 1C. Discuss physical examination of urine with abnormal findings.

(10×3 = 30 marks)

**2. Write detailed notes on:**

- 2A. Hairy cell leukemia
- 2B. Myelopoiesis
- 2C. Microscopic examination of urine
- 2D. Bleeding time
- 2E. Perl's Prussian blue stain

(5×5 = 25 marks)

**3. Write short notes on:**

- 3A. Philadelphia chromosome
- 3B. Anisocytosis
- 3C. Synovial fluid
- 3D. Supravital stain
- 3E. Transudate and exudate

(3×5 = 15 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012****SUBJECT: IMMUNOPATHOLOGY**

Thursday, June 07, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

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

- 1A. Define immunomodulators. Describe the different types of immunomodulators.  
1B. Describe the granulomatous reactions.  
1C. What is autoimmunity? Explain the clinical and immunological features of rheumatoid arthritis.

(10×3 = 30 marks)

**2. Write notes on:**

- 2A. Thyroid diseases  
2B. Di George syndrome  
2C. Graft-host relationship in pregnancy  
2D. Kidney transplantation  
2E. Glomerulonephritis  
2F. Delayed hypersensitivity reactions  
2G. Pemphigus vulgaris

(5×7 = 35 marks)

**3. Write short notes on:**

- 3A. Anti nuclear antibodies  
3B. Erythroblastosis foetalis  
3C. Atopic eczema  
3D. Myasthenia gravis  
3E. Bare lymphocyte syndrome

(3×5 = 15 marks)



## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: GENERAL MICROBIOLOGY  
(SPECIALIZATION: BIOCHEMISTRY)

Saturday, June 09, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Explain the mode of action of beta lactam drugs. Add a note on bacterial resistance to beta lactam drugs.
- 1B. Describe anaerobic culture methods in detail.
- 1C. Mention various methods of gene transfer occurring between bacteria and discuss on bacterial Transduction.

(10×3 = 30 marks)

2. **Write briefly on:**

- 2A. Hfr conjugation
- 2B. Autoclave
- 2C. Compound microscope
- 2D. Cell surface appendages in bacteria
- 2E. Disinfectants

(5×5 = 25 marks)

3. **Write short notes on:**

- 3A. Antony van Leeuwenhoek
- 3B. Ziehl Neelsen staining
- 3C. Inspissation
- 3D. Chemostat
- 3E. Bacterial plasmids

(3×5 = 15 marks)



# MANIPAL UNIVERSITY

## FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012

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

Saturday, June 09, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Enumerate the adrenal hormones and their functions. Describe the mechanism of action of epinephrine.
- 1B. What are the metabolic derangements in diabetics? Explain the laboratory diagnosis of diabetes mellitus.
- 1C. Enumerate the diagnostic enzymes. Discuss cardiac enzymes.

(10×3 = 30 marks)

2. **Write detailed notes on the following:**

- 2A. Continuous flow analyzers
- 2B. Hyperlipoproteinemias
- 2C. Emergency management of clinical laboratory accidents
- 2D. Diagnostic tests for renal tubular dysfunction
- 2E. Mechanism of action of thyroxine

(5×5 = 25 marks)

3. **Write brief notes on:**

- 3A. Control of errors from analytical variables
- 3B. Handling and disposal of chemical waste from clinical laboratory
- 3C. Urine sugar
- 3D. Histamine stimulation test
- 3E. Non-invasive tests for pancreatic exocrine function

(3×5 = 15 marks)



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**MANIPAL UNIVERSITY**

**FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012**

**SUBJECT: BIOMEDICAL TECHNIQUES**

Monday, June 11, 2012

Time: 10:00 – 11: 30 Hrs.

Maximum Marks: 40

✍ **Answer ALL questions.**

1. Write in detail about principle, procedure, components and applications of HPLC.  
(15 marks)

2. **Write notes on:**

2A. Applications of radioisotopes in medicine and research

2B. Paper electrophoresis

2C. High energy compounds

2D. pH meter and its applications

2E. Components of spectrophotometer

(5×5 = 25 marks)



# MANIPAL UNIVERSITY

## FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – DECEMBER 2012

### SUBJECT: BIOSTATISTICS

Monday, December 17, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

☞ Answer ALL the questions.

1. Define the following:

- 1A. P- value
- 1B. Null hypothesis
- 1C. Power
- 1D. Type II error
- 1E. Level of significance

(1×5 = 5 marks)

- 2A. What do you mean by dispersion? Define various measures of dispersion.
- 2B. Define a random sample. Describe the method of cluster sampling with its merits and demerits.

(5+5 = 10 marks)

- 3A. Enumerate the characteristics of normal distribution using a neat diagram.
- 3B. A local health department wishes to estimate the prevalence of malnutrition among children under five years of age in its locality. How many children should be included in the sample so that the prevalence may be estimated to within 4% points of the true value with 95% confidence, if it is known that the true rate is unlikely to exceed 20%?

(5+5 = 10 marks)

- 4A. The following table shows the results of a survey conducted among 300 subjects living in a metropolitan city in India. Each subject were asked which of two policies they favoured with respect to smoking in public places.

Level of education	Policy favoured towards smoking		Total
	No restriction	Allowed in designated areas	
Above Plus Two	26	49	75
Plus Two and below	105	120	225

Does this sample provide sufficient evidence to conclude that there is an association between level of education and attitude towards smoking in public places. (Chi-square with 1 df at 5% level of significance=3.84).

4B. A case-control study was conducted to assess whether use of high fat diet plays a role in the development of cancer. A total of 240 histologically confirmed colorectal cancer cases and 480 disease free controls were enrolled in the study. Among them 60% of the cases and 25% of the controls were exposed to high fat diet. Construct a 2x2 table based on this data. Calculate an appropriate measure to identify the strength of association between high fat diet and risk of colorectal cancer. Interpret the findings.

(5+(2+2+1) = 10 marks)

5. Explain randomized controlled trials under the titles design, analysis, merits and demerits.

(10 marks)

6. Outline the format of reporting in scientific journals.

(10 marks)

7. **Write short notes on:**

7A. Analysis of Variance

7B. Logistic regression

7C. Correlation

7D. Mann Whitney U test

7E. Meta-analysis

(5x5 = 25 marks)



Level of education	50% restriction	Policy favored towards smoking	Total
Above Post Grad	20	40	60
Post Grad and below	100	130	230



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## MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: MOLECULAR BIOLOGY AND APPLIED GENETICS

Wednesday, December 19, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 70

✍ **Answer ALL questions.**

✍ **Draw diagrams wherever necessary.**

1A. Describe the cell cycle. How is it regulated?

1B. Discuss about the human genome project. Add a note on gene therapy.

1C. Explain the process of transcription in eukaryotes.

(10×3 = 30 marks)

2. **Write short notes on:**

2A. Topoisomerases

2B. Tryptophan operon

2C. Site directed mutagenesis

2D. RFLP

2E. Cloning vectors

(5×5 = 25 marks)

3. **Write brief notes on:**

3A. Mismatch repair mechanisms

3B. Satellite DNA

3C. Polymerase chain reaction

3D. Frame shift mutations

3E. Recombinant vaccines

(3×5 = 15 marks)



## MANIPAL UNIVERSITY

FIRST YEAR M. Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012  
SUBJECT: BIOSTATISTICS

Tuesday, May 29, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

1A. Define mean, median, mode, standard deviation and coefficient of variation for 'n' observations.

1B. Explain stratified random sampling method.

(5+5 = 10 marks)

2. Fifty patients with congestive heart failure were weighed before and after receiving a novel diuretic agent and the average weight loss (the difference between the two weights) for this sample was found to be 3.5 KG with a standard error of 2.6 Kg.

2A. Name the statistical test used for testing whether the agent is effective in reducing the weight.

2B. State the null and alternate hypothesis.

2C. Write the test statistic for this test.

2D. Mention the assumptions for the validity of this test.

2E. How do you take a decision on the acceptance or rejection of null hypothesis?

(2×5 = 10 marks)

3A. What do you mean by sampling distribution and standard error? What are the factors that affect the width of a confidence interval for mean?

3B. Write a short note on binomial distribution.

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

4. What do you mean by randomization in randomised controlled trials (RCTs)? Explain different methods of randomization in RCTs.

(1+9 = 10 marks)

5A. A hospital administrator wishes to estimate the mean weight of babies born in the hospital. How large a sample of birth records should be taken if the administrator wants a 95% confidence interval with margin error of 1.2 Kg? Assume that a reasonable estimate of the population standard deviation is 5 Kg.

5B. Write a short note on cross sectional study design.

(5+5 = 10 marks)

6. Explain the structure of a research thesis.

(10 marks)

7. Write short notes on:

7A. Chi square test

7B. Survival analysis

7C. Validity of a diagnostic test

7D. One way ANOVA

(5×4 = 20 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – MAY/JUNE 2012****SUBJECT: IMMUNOLOGY AND IMMUNOLOGICAL TECHNIQUES**

Thursday, May 31, 2012

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Define MHC genes. Describe their structure and functions.  
1B. What is Immunoelectrophoresis? Discuss on the principle, procedure and applications.  
1C. Describe the technique employed for the production of monoclonal antibodies.

(10×3 = 30 marks)

**2. Write detailed notes on:**

- 2A. Inflammation  
2B. Primary lymphoid organs  
2C. Lymphocytotoxicity test  
2D. Detection of immune complexes  
2E. Maturation and differentiation of T cells

(5×5 = 25 marks)

**3. Write short notes on:**

- 3A. Functions of Complement  
3B. Antigen presenting cells  
3C. IgG  
3D. Haemagglutination  
3E. Western Blotting

(3×5 = 15 marks)

