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**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)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – DECEMBER 2014****SUBJECT: MOLECULAR BIOLOGY AND APPLIED GENETICS**

Thursday, December 18, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Explain the eukaryotic DNA replication in detail.  
1B. Discuss about the various types of vectors used in the recombinant DNA technology.  
1C. What is mutation? Discuss about the different types of mutations and various mutagens.

(10 marks × 3 = 30 marks)

**2. Write short notes on:**

- 2A. DNA repair  
2B. Lac operon  
2C. Cell cycle regulation  
2D. Human genome project  
2E. Polymerase chain reaction

(5 marks × 5 = 25 marks)

**3. Write brief notes on:**

- 3A. Comparative genome hybridization  
3B. Gene therapy  
3C. Ames test  
3D. tRNA  
3E. Antibody diversity

(3 marks × 5 = 15 marks)





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## MANIPAL UNIVERSITY

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

SUBJECT: CLINICAL PATHOLOGY AND HAEMATOLOGY

Friday, December 19, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

✍ **Answer ALL the questions.**

- 1A. Classify anemia based etiology. Discuss symptoms and lab diagnosis of anemia due to G6 PD deficiency.
- 1B. Discuss multiple myeloma with clinical symptoms and lab diagnosis.
- 1C. Discuss about CSF examination. Tabulate the difference between traumatic tap and subarachnoid hemorrhage.

(10 marks × 3 = 30 marks)

2. **Write detailed notes on:**

- 2A. Leukemoid reaction
- 2B. Collection and preservation of urine sample
- 2C. Acute lymphocytic leukemia
- 2D. Lab diagnosis of iron deficiency anemia
- 2E. Tests to detect protein in urine

(5 marks × 5 = 25 marks)

3. **Write short notes on:**

- 3A. Urine specific gravity
- 3B. Estimation of hemoglobin by cyanmethemoglobin method
- 3C. Granulocytes
- 3D. Leishman's stain
- 3E. Crystals in synovial fluid

(3 marks × 5 = 15 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – DECEMBER 2014****SUBJECT: IMMUNOPATHOLOGY**

Saturday, December 20, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 80

- ☞ Answer ALL the questions.  
☞ Draw diagrams if necessary.

- 1A. Describe phagocytic defects  
1B. Classify autoimmune diseases. Discuss SLE  
1C. Explain kidney transplantation

(10 marks × 3 = 30 marks)

**2. Write notes on:**

- 2A. Transfusion reactions  
2B. Progressive systemic sclerosis  
2C. Immunomodulators  
2D. Immunology of AIDS  
2E. Tuberculosis  
2F. Pemphigus vulgaris  
2G. Contact dermatitis

(5 marks × 7 = 35 marks)

**3. Write short notes on:**

- 3A. Evaluation of circulating immune complexes  
3B. Serum sickness  
3C. Infertility  
3D. Diabetes mellitus  
3E. Food hypersensitivity reactions

(3 marks × 5 = 15 marks)



**MANIPAL UNIVERSITY****FIRST YEAR M.Sc. M.L.T. DEGREE EXAMINATION – DECEMBER 2014****SUBJECT: GENERAL MICROBIOLOGY  
(SPECIALIZATION: BIOCHEMISTRY)**

Monday, December 22, 2014

Time: 10:00 – 13:00 Hrs.

Maximum Marks: 70

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

- 1A. Classify and discuss antibiotic sensitivity tests (AST).
- 1B. Classify sterilization methods. Discuss moist heat sterilization.
- 1C. Describe the structure and functions of a bacterial cell with a neat labelled diagram.  
(10 marks × 3 = 30 marks)

**2. Write briefly on:**

- 2A. Culture methods used in bacteriology
- 2B. Difference between Gram positive and Gram negative cell wall
- 2C. Phase contrast microscope
- 2D. Bacterial Endospores
- 2E. PCR  
(5 marks × 5 = 25 marks)

**3. Write short notes on:**

- 3A. Joseph Lister
- 3B. IMVIC test
- 3C. Enrichment and Enriched media
- 3D. Negative staining
- 3E. Inspissation  
(3 marks × 5 = 15 marks)



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## MANIPAL UNIVERSITY

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

SUBJECT: BIOMEDICAL TECHNIQUES

Tuesday, December 23, 2014

Time: 10:00 – 11: 30 Hrs.

Maximum Marks: 40

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

1. Explain about principle, types of gels and detection system used in gel electrophoresis.

(3+7+5 = 15 marks)

2. Write notes on:

- 2A. Isoelectric focussing
- 2B. Types of resins used in ion exchange chromatography
- 2C. Ion selective electrode
- 2D. Applications of isotopes in medicine and research
- 2E. Spectrophotometer

(5 marks × 5 = 25 marks)

