Reg. No.										

MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND MEDICAL STATISTICS

Tuesday, June 14, 2005

Time: 3 Hrs. Max. Marks: 80

- **Answer ALL the questions.**
- **Draw diagrams and flow charts wherever appropriate.**
- **USE TWO SEPARATE ANSWER BOOKS FOR SECTION 'A' & SECTION 'B'**

SECTION – 'A': IMMUNOLOGY, RADIOIMMUNOASSAY: 50 MARKS

1. Write short notes on any **FOUR**:

1A. Delayed type of hypersensitivity.

1B. Cytotoxic reactions.

1C. Role of T and B lymphocytes.

1D. Monoclonal antibody production technology.

1E. Complement mediated cytotoxic reactions.

(5×4 = 20 marks)

2. Write short notes on any **SIX**:

2A. Monoclonal antibody production.

2B. Antibody production.

2C. Second antibody.

2D. Separation agents in RIA.

2E. Storage of RIA samples.

2F. Control samples.

2G. Schewart chart.

(5×6 = 30 marks)

SECTION – 'B': MEDICAL STATISTICS: 30 MARKS

4. Answer the following:

4A. If the background counting rate is R_b and gross counting rate with sample is R_g, how will you calculate the % uncertainty? Explain the effect of background counts?

4B. What is the optimal division of a 10 minutes total counting time and the resulting uncertainty in the net sample counting rate, when the total counting rate (R_{s+b}) is 1875cpm and background counting rate (R_b) is 15 cpm.

(5×2 = 10 marks)

5. How Biostatistics is helpful in health science studies?

(5 marks)

6. Briefly describe graphical presentation of data.

(5 marks)

7. Suppose in a hospital, the birth weights of newborns are normally distributed with mean 2750 grams and standard deviation 250 grams. In a sample of 3000 births, how many will be

a) Less than 2500 grams b) Between 2500 and 3250 grams.

(5 marks)

8. Describe various measures of dispersion with their merits and demerits.

(5 marks)

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MANIPAL ACADEMY OF HIGHER EDUCATION

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: RADIATION BIOLOGY & INVITRO NUCLEAR MEDICINE

Wednesday, June 15, 2005

Time: 3 Hrs. Max. Marks: 80

- **Answer all the questions.**
- **Draw diagrams and flow charts wherever appropriate.**

SECTION – 'A' : RADIATION BIOLOGY: 30 MARKS

1. What are the genetic effects of radiation? Describe in detail.
2. What is LD50 effect? Describe giving specific examples.
3. Describe in brief the prenatal effects of ionizing radiation.
4. Define free radical. Explain the indirect effects of ionizing radiation in biological system.
5. Draw a typical shouldered in vitro mammalian cell survival curve and explain the parameters D_0, D_q, and N.
6. Is testis a radiosensitive organ? Describe the effects of ionizing radiation on testes.

(5×6 = 30 marks)

SECTION – 'B': INVITRO NUCLEAR MEDICINE: 50 MARKS

7. A patient has been admitted in the emergency department with a history of road traffic accident followed by severe bleeding. How will you estimate the total blood volume of the patient before the physician goes in for replacement therapy?

(15 marks)

8. What is accuracy, bias and error? How can you get most accurate results in RIA?

(15 marks)

9. Short notes:

9A. Data plotting in Radiorespirometry.

9B. Total Body Water estimation.

9C. Carbon Breath Analysis.

9D. Neutron activation analysis.

(5×4 = 20 marks)

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MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION

Thursday, June 16, 2005

Time: 3 Hrs. Max. Marks: 80

1. What is 'Image Reconstruction'? Describe the various methods of image reconstruction.

(20 marks)

2. What is the significance of COR study in SPECT QC? Is it applicable for planar QC test – why? List the various causes of COR offsets.

(20 marks)

3. What is "Filtering"? Write about its significance. Name any four filters known to you. Add a note on 'cut off' and 'order'.

(20 marks)

4. Write short notes on:

4A. Electronic Collimation.

4B. BGO Detectors.

4C. Coincidence Detection.

4D. Carbon 11.

(5×4 = 20 marks)