Reg. No.										

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS

Tuesday, December 15, 2015

Time: 10:00-13:00 Hrs. Max. Marks: 80

- **Answer ALL the questions.**
- **Use same answer book for Section 'A' & Section 'B' and use separate answer book for Section 'C'.**

SECTION – A: IMMUNOLOGY

1. Write about the Antigens and Antibodies. Draw a labeled neat diagram to show the parts of antibody and their function.

(10 marks)

2. Write short notes on:

2A. Autoimmunity

2B. Types of Hypersensitivity

(5+5 = 10 marks)

SECTION – B: RADIOIMMUNOASSAY

3. **Write a note on followings:**

3A. Compare RIA and IRMA

3B. Plot different types of standard curve and its importance

3C. Quality control parameters for RIA

3D. Importance of Precision Profile in RIA

3E. Setting up of typical RIA assay

(10 marks × 5 = 50 marks)

SECTION – C: COUNTING STATISTICS

1A. Explain the Effects of background in counting experiment.

1B. As an experiment, calculate the ratio of two source activity from independent counts taken for equal counting times (background is negligible).

Counts from Source 1 = 16265, counts from source 2 = 8192

(5 marks × 2 = 10 marks)

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: RADIATION BIOLOGY AND IN VITRO NUCLEAR MEDICINE

Wednesday, December 16, 2015

Time: 10:00-13:00 Hrs. Max. Marks: 80

✍ **Answer ALL the questions:**

SECTION A: RADIATION BIOLOGY (30 MARKS)

1. **Short notes:**

1A. Dose response models
1B. LD 50/60
1C. Hydrolysis of water
1D. Double and single strand break
1E. Hematologic Syndrome

(6 marks × 5 = 30 marks)

SECTION B: IN VITRO NUCLEAR MEDICINE (50 MARKS)

2. **Short notes:**

2A. Dual isotope technique for Schilling's Test
2B. Red cell survival - radioisotope technique
2C. Plasma iron clearance
2D. Tracer and Ligand in RIA
2E. Red cell mass estimation - radioisotope technique

(6 marks × 5 = 30 marks)

3. What is radiorespirometry? With a neat and labeled diagram, briefly explain radiorespirometric procedure.

(20 marks)

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: RADIOPHARMACY – II

Thursday, December 17, 2015

Time: 10:00-11:30 Hrs. Max. Marks: 40

✍ **Answer ALL questions.**

1. Write in short about the following:

1A. Production and characteristics of I-131.

1B. Labeling of 99mTc- Leukocytes

1C. Chloramine –T Radio iodination method

1D. Bone Palliative agents

(5 marks × 4 = 20 marks)

2. Describe mechanism of localization of following radiopharmaceuticals:

2A. 99mTc-DTPA for Brain Imaging

2B. 99mTc-IDA for hepatobiliary

2C. I-131 in Thyroid

2D. 99mTc- Sulphur colloid

2E. Thallium-201 for MPI

(10 marks)

3. Write down the steps to reconstitute the Sulphur colloid kit labeled with 99mTc to be used for liver scan supplied by BRIT in hospital radio pharmacy. Write reactions involved in the formation of 99mTc-sulphur Colloid. What are the precautions to be taken during reconstitution?

(10 marks)

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION

Friday, December 18, 2015

Time: 10:00-13:00 Hrs. Max. Marks: 80

- **Answer ALL questions.**
- **Draw neat and labelled diagrams/circuits as and when required.**

1. Explain on PET detectors and scanner designs.

(20 marks)

2. Explain on the attenuation correction techniques adopted in Nuclear Medicine Imaging.

(20 marks)

3. Where and why coincidence and anti-coincidence circuits are used in Nuclear Medicine?

(10 marks)

4. "Gamma camera's QC tests are sufficient enough to ensure good working of SPECT system". Opine on the above given statement.

(10 marks)

5. **Write short note on the following:**

5A. Nyquist frequency
5B. Normalization
5C. Sample preparation in LS counting
5D. Flat field collimator

(5 marks × 4 = 20 marks)