Reg. No.										

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2014

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS

Wednesday, December 17, 2014

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 specific and non-specific immunity. What are the biological functions of immunoglobulins?

2. **Write short notes on:**

2A. Immunoprecipitation

2B. Hypersensitivity-III reaction

(10 marks × 2 = 20 marks)

SECTION – B: RADIOIMMUNOASSAY

3. What is the main principle of RIA? How it differs from the other immunoassays?

4. Describe the importance of a tracer in RIA. Which one is the best tracer and state the reason(s).

5. Write very briefly on the different tubes used in liquid phase RIA.

6. A patient came to the RIA lab to check T3, T4, and TSH levels. What should be the ideal steps adopted for the collection, preparation and storage of a patient blood sample.

7. Write about the systemic and random errors occurring in RIA. Also mention the reasons for the same.

(10 marks × 5 = 50 marks)

SECTION – C: COUNTING STATISTICS

8. A sample is counted in a well counter using a "narrow" pulse height analyzer window (N), and net sample and background counts are 500 counts and 200 counts respectively. The sample is counted with the same system but using a 'wide' window (W) and the net sample and background counts are 800 counts and 400 counts respectively. Which window setting offers the statistical advantage?

9. Explain types of Measurement error.

(5 marks × 2 = 10 marks)

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2014

SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION

Thursday, December 18, 2014

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

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

1. What is an uptake probe? Explain with neat and labelled diagram the working principle of Thyroid uptake probe.

(20 marks)

2. Explain various reconstruction techniques adopted in Nuclear Medicine Imaging.

(20 marks)

3. Compare and contrast between SPECT and Planar Imaging in Nuclear Medicine.

(10 marks)

4. How PET scanner detectors differ from scintillation gamma camera detectors?

(10 marks)

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

5A. Treadmill
5B. Partial Volume effect
5C. Quenching
5D. MTF

(5 marks × 4 = 20 marks)

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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2014

SUBJECT: RADIOPHARMACY – II

Friday, December 19, 2014

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

Answer ALL questions.

1. **Write in short about the following:**

1A. Comparison characteristics of Tl-201 Thallous chloride and - ^{99m}Tc MIBI Radiopharmaceuticals

1B. Comparison between ^{153} Sm-EDTMP and ^{89} $SrCl_2$ radiopharmaceuticals

1C. Technetium labeled Bone imaging radiopharmaceuticals

1D. Mechanism of localization by compartmental localization and cell sequestration

(5 marks × 4 = 20 marks)

2. What is the aim of the designing of new radiopharmaceutical? Briefly describe the factors which influence the designing of a new radiopharmaceutical.

(2+8 = 10 marks)

3. Classify and enlist the various Infection and inflammation imaging agents useful in the Nuclear Medicine. Explain any one radiopharmaceutical's preparation protocol biodistribution and quality control in detail.

(10 marks)