Reg. No.										

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2010

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS

Tuesday, June 08, 2010

Time: 14:00-17:00 Hrs. Max. Marks: 80

✍ **Use same answer book for Section 'A' & Section 'B' and use separate answer book for Section 'C'.**

SECTION – A: IMMUNOLOGY

1. Write short notes on:

1A. Immunoglobulin Structure

1B. T and B lymphocytes

1C. Precipitin Reactions

1D. AutoImmunity

(5×4 = 20 marks)

SECTION – B: RADIOIMMUNOASSAY

2A. Sensitivity of RIA.

2B. Sample Collection in RIA.

2C. Internal and External Quality Assurance in RIA.

2D. Antiserum –Reagent in RIA.

2E. Positive and Negative Bias.

2F. Endogeneous Antibodies.

2G. RIA -an Indirect assay.

2H. Equipment in RIA

2I. Propagation of Errors –Significance in RIA.

2J. RIA Vs ELISA.

(5×10 = 50 marks)

SECTION – C: COUNTING STATISTICS

3A. Write down the general formula for propagation of errors and derive the formula for the error propagation in multiplication of two data.

(5 marks)

3B. i) If the gross counting rate with source is Rg and background count rate in Rb, calculate the percentage uncertainty in Rs

ii) In 3 minutes counting measurements, gross sample counts are 8000 and background are 1000, what is the net sample counting rate and its percentage uncertainty?

(2½+2½ = 5 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2010

SUBJECT: RADIATION BIOLOGY AND IN VITRO NUCLEAR MEDICINE

Thursday, June 10, 2010

Time: 14:00-17:00 Hrs. Max. Marks: 80

✍ **Answer all the questions.**

SECTION – 'A' : RADIATION BIOLOGY : 30 MARKS

1. Answer all the questions:

1A. Law of Bergonie and Tribondeau.

1B. Stochiastic and Deterministic effect.

1C. Single strand break.

1D. Linear No Threshold Model.

1E. Concept of LD 50

1F. Hematopoietic Syndrome due to acute radiation exposure.

(5×6 = 30 marks)

SECTION – 'B' : IN VITRO NUCLEAR MEDICINE : 50 MARKS

✍ **Answer all the questions.**

✍ **Long Answers:**

2. What are the applications of Carbon Breath Analysis? Compare C-14, C-11 and C-13 as tracers for carbon breath analysis.

(9+6 = 15 marks)

3. An elderly male patient has been referred to the department of nuclear medicine with a suspicion of Polycythemia vera for Red Cell Mass estimation. Write in details.

3A. What radiopharmaceutical would you choose for the study? Write about the physical property.

3B. Procedure protocol for the estimation of Red Cell Mass.

(5+10 = 15 marks)

4. Short Notes:

4A. Principles of radiorespirometry.

4B. Instrumentation for radiometry.

4C. Plasma Volume estimation.

4D. In Vivo cross matching.

(5×4 = 20 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2010

SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION

Saturday, June 12, 2010

Time: 14:00-17:00 Hrs. Max. Marks: 80

1. Explain various routine Q.C. tests for SPECT system.

(20 marks)

2. Explain various quench Correction Methods in Liquid Scintillation Counter.

(20 marks)

3. Write an essay about different Detectors which can be used in PET. Which one is the most commonly used Detector and why?

(20 marks)

4. Write short notes on:

4A. Fourier Transformation.

4B. Partial Volume Effect in SPECT.

4C. Electrocardiogram (ECG).

4D. Whole Body Counters.

(5×4 = 20 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2010

SUBJECT: RADIOPHARMACY – II

Tuesday, June 15, 2010

Time: 14:00-15:30 Hrs. Max. Marks: 40

Answer All the Questions.

1. A new radiopharmaceutical has been introduced. Write down its journey to reach this level. (10 marks)

2. Mention the various 99mTc renal agents. Write in details about the renal dynamic agents. (2+8 = 10 marks)

3. Write short notes on:

3A. Cardiac agents.

3B. PET radiopharmaceuticals.

3C. Hepatobiliary agents.

3D. Nebulizer.

(5×4 = 20 marks)