MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2012

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS

Tuesday, June 12, 2012

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. Describe the synthesis of antibody with neat labeled diagram.

2. Write about the antigen-antibody reaction in precipitation, agglutination.

(10×2 = 20 marks)

SECTION – B: RADIOIMMUNOASSAY

3. Write about the nomenclature of different assays.

4. Write short notes on: a) Tracer b) ligand

5. Write short notes on: a) Solid phase assay b) Liquid phase assay

6. What are the reasons for RIA results arise in accurately write short notes on each reason.

7. Write short notes on:
   a) Principle of IRMA b) Labeling of antibodies in IRMA

(10×5 = 50 marks)

SECTION – C: COUNTING STATISTICS

8. Define and explain propagation of errors.

9. Calculate: a) EF by using propagation of error concept b) Standard deviation using following data:

   $N_{diastole} = 2000$, $N_{systole} = 1200$ and $N_{bkg} = 4$. With 95.5% confidence

(5×2 = 10 marks)

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2012

SUBJECT: RADIATION BIOLOGY AND IN VITRO NUCLEAR MEDICINE

Thursday, June 14, 2012

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

✍   **Answer all the questions.**

SECTION – 'A' : RADIATION BIOLOGY : 30 MARKS

1. **Short Notes:**

1A. Law of Bergonie and Tribondeau

1B. Human cell cycle

1C. Concept of LD50/30

1D. Deterministic effects Vs Stochastic effects

1E. Photoelectric Effect.

$(6 \times 5 = 30$ marks)

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

2. **Short Notes:**

2A. Ideal characteristics of tracer for the estimation of blood volume.

2B. Plasma iron turnover rate.

2C. Dual isotope technique for Schilling's Test.

2D. Calculation of half-life of RBC - radioisotope technique.

2E. Solid phase Immuno Assay.

$(6 \times 5 = 30$ marks)

3. A patient has been admitted in the emergency department with a history of road traffic accident and severe blood loss. How will you estimate the

a)   Total blood volume of the patient

b)   Do in vivo cross matching of blood

(20 marks)

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2012

SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION

Saturday, June 16, 2012

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

1. Write on the significance of Attenuation Correction in SPECT and Methods of Attenuation Correction.

(20 marks)

2. Explain the differences between SPECT and PET on the basis of its instrumentation.

(20 marks)

3. Describe the instrument which will give the % Iodine Uptake of Thyroid.

(20 marks)

4.   Write short notes:

4A. Convolution and Deconvolution
4B. COR Test
4C. Poor Man's PET
4D. Functional MRI

(5×4 = 20 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2012

SUBJECT: RADIOPHARMACY – II

Tuesday, June 19, 2012

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

✍ **Answer all Questions.**

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

1A. Compare the characteristics of I-123 and I-131 radiopharmaceuticals.

1B. ^{99m}Tc- Sulphur colloid.

1C. Radio iodination method.

1D. Sodium ortho Phosphate P-32 Palliative agent.

(5×4 = 20 marks)

2. Describe various mechanism of localization of radiopharmaceuticals. Support the answers with suitable examples.

(10 marks)

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

(3+7 = 10 marks)

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