

MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2009****SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS**

Monday, June 08, 2009

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

✍ Write short notes on:

- 1A. Avidity and Affinity
- 1B. Precipitin reactions
- 1C. Migration Inhibition Test
- 1D. Hypersensitivity type II

(5×4 = 20 marks)

SECTION – B: RADIOIMMUNOASSAY

✍ Write short notes on:

- 2A. Liquid phase RIA Vs Solid phase RIA.
- 2B. Classification of Assays.
- 2C. Different types of Data processing.
- 2D. Precision, Accuracy and Bias.
- 2E. Antiserum-Reagent in RIA.
- 2F. Coated tubes.
- 2G. I125 –Ideal Radionuclide for RIA.
- 2H. FluoroImmunoAssay.
- 2I. Biological Targetting.
- 2J. QC parameters in RIA.

(5×10 = 50 marks)

SECTION – C: COUNTING STATISTICS

✍ Answer the following:

- 3A. Write down the general formula for the propagation of error and derive the formula for the error propagation in addition of two data.
- 3B. What is the optimum division of 10 minutes total counting time and the resulting uncertainty in the net sample counting rate, when the total counting rate R_{s+b} is 1875 cpm and background counting rate is 15 cpm?

(5×2 = 10 marks)



MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2009****SUBJECT: RADIATION BIOLOGY AND IN VITRO NUCLEAR MEDICINE**

Tuesday, June 09, 2009

Time: 14:00-17:00 Hrs.

Max. Marks: 80

✍ **Answer all the questions.****SECTION – 'A' : RADIATION BIOLOGY : 30 MARKS**

- 1A. Linear Quadratic model.
- 1B. Stochastic and Deterministic effects.
- 1C. Hematopoietic syndrome.
- 1D. Cellular injury due to radiation.
- 1E. Compton scatter
- 1F. Free Radical.

(5×6 = 30 marks)

SECTION – 'B' : IN VITRO NUCLEAR MEDICINE : 50 MARKS✍ **Long Questions:**

2. A male patient suffering from increased destruction of the RBC has been referred to the department Of Nuclear Medicine. How will you estimate the
 - i) The half-life of the circulating RBCs?
 - ii) Do in vivo cross matching?

(10+5 = 15 marks)

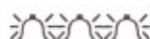
3. Describe the various methods of data processing in RIA with a graphic representation of each. Add a note on advantages and limitations of autoanalyser.

(12+3 = 15 marks)

4. Short Notes:

- 4A. Zero, first and second order reactions.
- 4B. Fick's principle in tracer kinetics.
- 4C. Plasma iron turn over.
- 4D. Schilling test I and Schilling test II.

(5×4 = 20 marks)



MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2009****SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION**

Wednesday, June 10, 2009

Time: 14:00-17:00 Hrs.

Max. Marks: 80

1A. Explain the following in brief:

- i) True Coincidence
- ii) Scatter Coincidence
- iii) Random Coincidence

1B. Time of Flight.

(12+8 = 20 marks)

2. Write notes on:

- 2A. Partial Volume effect in SPECT.
- 2B. Attenuation Correction in SPECT.

(10+10 = 20 marks)

3. Differentiate between Liquid Scintillation Counter and Well Counter on the basis of principle and application.

(20 marks)

4. Write short notes on:

- 4A. Thyroid Uptake Probe
- 4B. Ultrasonography
- 4C. Filtered Back Projection
- 4D. List of Data Processing Steps in SPECT.

(5×4 = 20 marks)



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MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2009****SUBJECT: RADIOPHARMACY – II**

Thursday, June 11, 2009

Time: 14:00-15:30 Hrs.

Max. Marks: 40

✍ Answer all the questions.

1. Differentiate between ^{99m}Tc Radiopharmacy and PET Radiopharmacy.
(10 marks)

2. What is Radiation Synovectomy? List the various radiation synovectomy radiopharmaceuticals and give their applications.
(10 marks)

3. Write short notes on:
 - 3A. Radioiodinated antibodies.
 - 3B. ^{99m}Tc myocardial perfusion agents.
 - 3C. ^{153}Sm -EDTMP and $^{89}\text{SrCl}_2$
 - 3D. Chloramine T method.(5×4 = 20 marks)

