

MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2007****SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND MEDICAL STATISTICS**

Monday, December 10, 2007

Time: 3 Hrs.

Max. Marks: 80

- ✍ Answer ALL the questions.
- ✍ Draw diagrams and flow charts wherever appropriate.
- ✍ USE TWO SEPARATE ANSWER BOOKS FOR SECTION 'A' & SECTION 'B'.

SECTION – 'A': IMMUNOLOGY, RADIOIMMUNOASSAY: 50 MARKS

1. Write short notes on any **FOUR**:
 - 1A. Migration Inhibition test.
 - 1B. Immediate hypersensitivity.
 - 1C. Immunofluorescence technique.
 - 1D. Cellular co-operations.
 - 1E. Structure of Immunoglobulin.

(5×4 = 20 marks)

2. Write short notes on any **SIX**:
 - 2A. Principle of RIA.
 - 2B. QC parameters.
 - 2C. Characteristics of Antiserum.
 - 2D. Low and High specificity tracer.
 - 2E. Solid phase RIA.
 - 2F. Conditions for a good assay.
 - 2G. Shewart chart.

(5×6 = 30 marks)

SECTION – 'B': MEDICAL STATISTICS: 30 MARKS

- 3A. Mention the function of statistics.
- 3B. What are the limitations of statistics?
- 3C. List the uses of statistics in Nuclear Medicine.
- 3D. Define standard deviation and variance.

(1½+1+1½+1 = 5 marks)

4. What are the advantages of graphical representations over tabular data?

(5 marks)

5. The ranking of 10 students in two subject A and B are as follows:

A	3	5	8	4	7	10	2	1	6	9
B	6	4	9	8	1	2	3	10	5	7

What is the Coefficient of rank correlation?

(5 marks)

- 6A. Define sensitivity.

- 6B. A study 99m Tc Bone scans in 1000 patients produced the following data:

Test Result

	-	+
Well	836 = TN	44 = FB
Ill	26 = FN	94 = TP

What is the sensitivity of the test?

($2\frac{1}{2} + 2\frac{1}{2} = 5$ marks)

- 7A. What are the three types of measurement errors? Explain them.

- 7B. What is the optimal division of a 1.5 minutes total counting time and the resulting uncertainty in the net sample counting rate, when the total counting rate (R_{s+b}) is 1500 cpm and background counting rate (R_b) is 100 cpm.

(5+5 = 10 marks)



MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2007

SUBJECT: RADIATION BIOLOGY AND INVITRO NUCLEAR MEDICINE

Tuesday, December 11, 2007

Time: 3 Hrs:

Max. Marks: 80

✍ Answer ALL the questions.

SECTION – 'A' : RADIATION BIOLOGY : 30 MARKS

1. Short notes:

- 1A. GI syndrome due to acute radiation syndrome.
- 1B. Human fetal irradiation.
- 1C. Double strand break.
- 1D. Linear No Threshold Model.
- 1E. Concept of LD 50.
- 1F. Hematopoietic Syndrome.

(5×6 = 30 marks)

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

2. Long answers:

- 2A. 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)
- 2B. 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
 - i) What radiopharmaceutical would you choose for the study? Write about the physical property.
 - ii) Procedure protocol for the estimation of Red Cell Mass.

(5+10 = 15 marks)

3. Write short notes on any FOUR:

- 3A. Principles of radiorespirometry.
- 3B. Instrumentation for radiometry.
- 3C. Plasma Volume estimation.
- 3D. In Vivo cross matching.
- 3E. Total Body water estimation.

(5×4 = 20 marks)



MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2007****SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION**

Wednesday, December 12, 2007

Time: 3 Hrs.

Max. Marks: 80

Answer ALL the questions.

1. "Computer is a mandatory part of the SPECT system"-Justify. Add a note on Analogue and Digital Gamma camera.
(20 marks)
2. Write a note on CT, MRI and compare with radionuclide procedures.
(20 marks)
3. What is attenuation? Explain its significance in TCT and SPECT.
(20 marks)
4. Write short notes on:
 - 4A. Jascack Phantom
 - 4B. Scatter Correction
 - 4C. PET radiopharmaceuticals
 - 4D. Whole body counters

(5×4 = 20 marks)

