

MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION –AUGUST 2006**SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND MEDICAL STATISTICS**

Monday, August 14, 2006

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 MARKS1. Write short notes on any **FOUR**:

- 1A. Type III Hypersensitivity reaction.
 1B. Complement fixation test.
 1C. Variation in Immunoglobulin.
 1D. Burnet and Fenner's Hypothesis.
 1E. Non specific autoimmune diseases.

(5×4 = 20 marks)

2. Write short notes on any **SIX**:

- 2A. Magnetic separation.
 2B. Dose response curve.
 2C. Sample blank tubes.
 2D. ELISA.
 2E. Centrifuge.
 2F. Non specific binding.
 2G. Coated tubes.

(5×6 = 30 marks)

SECTION – 'B': MEDICAL STATISTICS: 30 MARKS

3. Which are the different types of diagrammatic representations? Explain any one of them.

(2+3 = 5 marks)

4A. List the properties of normal distribution.

4B. Find the Standard Deviation of the following distributes

Age:	20-25	25-30	30-35	35-40	40-45	45-50
No. of People	170	110	80	45	40	35

(2+3 = 5 marks)

5. You are given the following data:

	x	y
Arithmetic Mean	36	85
Standard deviation	11	8

Correlation coefficient between x and y is 0.66

- Find two regression equations.
- Estimate value of x when $y=75$.

(5 marks)

6A. Define disease prevalence.

6B. Calculate the disease prevalence in the following:

Test Result

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

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

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

- 7B. i) If the gross counting rate with source is R_g and background count rate is R_b calculate the % uncertainty in R_s .
- ii) In 3 minute counting measurements, gross sample counts are 8000 and background counts are 1000. What is the net sample counting rate and its % uncertainty?

($5+(2\frac{1}{2}+2\frac{1}{2}) = 10$ marks)



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THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – AUGUST 2006**SUBJECT: RADIATION BIOLOGY & INVITRO NUCLEAR MEDICINE**

Wednesday, August 16, 2006

Time: 3 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

✍ Answer Both Section 'A' and Section 'B' in TWO SEPARATE ANSWER BOOKS.

SECTION – 'A' : RADIATION BIOLOGY: 30 MARKS

1. Define radiation. Describe about the bone marrow and central nervous system syndrome and its pathological consequences.
2. Is liver a radiosensitive organ? Describe the effect of ionizing radiation on liver.
3. What is the difference between excitation and ionization? Explain by giving examples.
4. What are ionizing and non ionizing radiations? Give examples to each. Describe briefly about the cellular effects of ionizing radiation.
5. Add a note on the factors affecting the shape of the survival curve.
6. Add a short note on genetically significant dose (GSD).

(5×6 = 30 marks)

SECTION – 'B': INVITRO NUCLEAR MEDICINE: 50 MARKS

7. Write in detail about compartmental analysis including the mathematical representation of its model.
(15 marks)
8. A male patient suffering from B12 deficiency has been referred to Nuclear Medicine department to find out cause for the deficiency. What test will you carry out to say that the patient is suffering from the lack of intrinsic factor?
(15 marks)
9. Short notes:
 - 9A. Data plotting in Radiorespirometry.
 - 9B. Plasma volume estimation.
 - 9C. Total Body Water estimation.
 - 9D. Neutron Activation Analysis.

(5×4 = 20 marks)



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SECOND YEAR B.Sc. N.M.T. DEGREE EXAMINATION – AUGUST 2006**SUBJECT: RADIOPHARMACY**

Thursday, August 17, 2006

Time: 3 Hrs.

Max. Marks: 80

✍ **Answer all questions.**

1. What are the advantages of ^{99m}Tc -EC over ^{99m}Tc -DTPA? Describe the various renal agents.
(20 marks)
2. Which are the various routes of administration of radiopharmaceuticals? With suitable examples write down the different mechanism of localization of radiopharmaceuticals.
(20 marks)
3. Which are the different radiochemical and chemical impurities expected from ^{99m}Tc radiopharmaceuticals prepared from the yield by solvent extraction method?
(20 marks)
4. Write short notes on any **FOUR**:
 - 4A. Radio iodination.
 - 4B. Palliative radiopharmaceuticals
 - 4C. Radiolysis of water
 - 4D. ^{99}Mo - ^{99m}Tc generator
 - 4E. Reducing agents.

(5×4 = 20 marks)

