

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2015

SUBJECT: IMMUNOLOGY, RADIOIMMUNOASSAY AND COUNTING STATISTICS

Tuesday, June 16, 2015

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. Write short notes on:
1A. Non Specific and Specific Immunity
1B. Antibody structure and their types
2. What is hypersensitivity -1 reaction? Briefly write about the different agents which can cause these reactions.
(10 marks × 2 = 20 marks)

SECTION – B: RADIOIMMUNOASSAY

3. "Characterization of Antiserum depends upon different properties." Mention those properties and give a brief note on each.
- 4A. Compare between solid phase and liquid phase assay.
4B. Write short note on Monoclonal Antibodies.
5. How a standard plot can be drawn in RIA? Describe the various types of standard plots with their advantages and disadvantages.
6. Quality control samples were not found in the RIA kit which is supplied by the company. What you should do to run the assay in an ideal condition and write the parameters.
7. Write about factors which are influencing the sensitivity of RIA.
(10 marks × 5 = 50 marks)

SECTION – C: COUNTING STATISTICS

8. Explain the Rose Model equation in imaging.
9. Preliminary measurements in a sample counting procedure indicated gross and background counting rate of $R_g = 900$ cpm $R_b = 100$ cpm respectively. Find optimal division of a 1.25 minute total counting time and the resulting uncertainty in the net sample counting rate.
(5 marks × 2 = 10 marks)



MANIPAL UNIVERSITY

THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2015

SUBJECT: RADIATION BIOLOGY AND IN VITRO NUCLEAR MEDICINE

Thursday, June 18, 2015

Time: 10:00-13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

SECTION – ‘A’ : RADIATION BIOLOGY : 30 MARKS

1. Write short notes on:

- 1A. Law of Bergonie and Tribondeau
- 1B. Stages of Acute Radiation Syndromes
- 1C. Concept of LD50/30
- 1D. Deterministic effects Vs Stochastic effects
- 1E. Compton effect

(6 marks × 5 = 30 marks)

SECTION – ‘B’: IN VITRO NUCLEAR MEDICINE (50 MARKS)

2. Write short notes on:

- 2A. Plasma volume estimation
- 2B. Schilling test I
- 2C. Radiomicrobiology
- 2D. Calculation of half-life of RBC - radioisotope technique
- 2E. Principals of IRMA

(6 marks × 5 = 30 marks)

3. A male patient suffering from iron deficiency anemia has been referred to the department of Nuclear Medicine for a Ferro kinetic study. Write in details the patient preparation and the procedure protocol for:

- a) Plasma iron clearance
- b) Iron utilization

(20 marks)



MANIPAL UNIVERSITY
THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2015
SUBJECT: RADIOPHARMACY – II

Saturday, June 20, 2015

Time: 10:00-11:30 Hrs.

Max. Marks: 40

✍ **Answer ALL questions.**

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

1A. ^{99m}Tc - RBC labeling

1B. Tumor imaging agents

1C. ^{99m}Tc -GHA and ^{99m}Tc - DMSA(III)

1D. Mechanism of localization of radiopharmaceuticals by Active transport and Chemisorption

(5 marks \times 4 = 20 marks)

2. Write about Indium Radiopharmaceuticals. How does gallium localize in the region of interest? Compare Gallium and Indium radiopharmaceuticals as infection imaging agents.

(3+2+5 = 10 marks)

3. Write the characteristics of I-123, I-125 and I-131 radionuclide used for radioiodination. Enlist all the methods of iodination techniques. Describe in detail about Chloramine T method only.

(3+2+5 = 10 marks)



MANIPAL UNIVERSITY**THIRD YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2015****SUBJECT: NUCLEAR MEDICINE INSTRUMENTATION**

Tuesday, June 23, 2015

Time: 10:00-13:00 Hrs.

Max. Marks: 80

- ✍ **Answer ALL questions**
✍ **Draw neat and labelled diagrams/ circuits as and when required.**

1. Explain on quenching and the correction method(s) adopted for same in liquid scintillation counters.
(20 marks)
2. Explain on attenuation and the correction methods adopted in SPECT.
(20 marks)
3. Compare and contrast between the different detectors used in PET. Which one is the most commonly used and why?
(20 marks)
4. **Write short notes on:**
 - 4A. Sample volume effect
 - 4B. Filters
 - 4C. Principle of CT
 - 4D. Whole Body Counters

(5 marks × 4 = 20 marks)

