Reg. No.										

MANIPAL UNIVERSITY

PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – DECEMBER 2016

SUBJECT: BIOSTATISTICS, RESEARCH METHODOLOGY AND ADVANCES IN NUCLEAR MEDICINE

Thursday, December 15, 2016

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

✍ **Use two separate answer books for SECTION 'A' & SECTION 'B'.**

SECTION – A: BIOSTATISTICS AND RESEARCH METHODOLOGY (40 MARKS)

1. Define qualitative and quantitative variables with examples.

(4 marks)

2. Categorize the following based on the scales of measurement (Nominal, Ordinal, Interval and Ratio):

a) Height b) Hospital number

(2 marks)

3. Given the heights of females is approximately normally distributed with a mean of 62 inches and a standard deviation of 2 inches. Obtain the proportion of females having height between 56 and 64 inches.

(2 marks)

4. **Write short notes on:**

4A. Simple random sampling.

4B. Epidemiology and its uses

(5 marks × 2 = 10 marks)

5. Construct a bar chart for the following data:

Blood Group	O	A	B	AB
Number of persons	120	40	100	70

(4 marks)

6. The duration of time for the first exposure to HIV infection to AIDS diagnosis is called the incubation period. The incubation periods of a random sample of 10 HIV infected individuals in given below (in years).

7.5 11.0 10.5 10.0 6.5 13.5 12.0 7.5 11.5 10.0

6A. Calculate mean, median and standard deviation of incubation period.

6B. If the value 13.5 were changed to 11.5, what happens to the mean and median? State whether each would increase, decrease or remain the same.

(10 marks)

7. The following data provides hemoglobin level of 12 patients who visited a clinic. Compute the quartiles.

12 15 13 17 10 11 14 17 15 9 14 9

(8 marks)

SECTION – B: ADVANCES IN NUCLEAR MEDICINE (40 MARKS)

1. Enumerate on various generator produced PET radioisotopes.

(20 marks)

2. Explain MIRD.

(20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – DECEMBER 2016

SUBJECT: CLINICAL NUCLEAR MEDICINE TECHNIQUES

Friday, December 16, 2016

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

✍ **Answer ALL the questions.**

1A. Mention various tumor imaging radiopharmaceutical.

1B. Write down the physical and biological characteristics of Ga^{67} Citrate.

(4+16 = 20 marks)

2. In detail describe about the procedure used for LVEF estimation.

(20 marks)

3. A patient suspected to have Paget's disease is referred to Nuclear Medicine department.

3A. Mention the study you will chose for the diagnosis along with patient preparation.

3B. List the radiopharmaceuticals and write the preparation of any one.

3C. Interpretation of the study

(9+9+2 = 20 marks)

4. **Write short notes on:**

4A. Perchlorate discharge test

4B. Patient preparation for I131 MIBG Scan

4C. Adrenal Cortex Scintigraphy

4D. Intervention used in Hepatobiliary Scintigraphy

(5 marks × 4 = 20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – DECEMBER 2016

SUBJECT: THERAPEUTIC NUCLEAR MEDICINE PROCEDURES

Saturday, December 17, 2016

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

✍ **Answer ALL questions.**

✍ **Long questions:**

1. A patient has undergone total thyroidectomy for Papillary carcinoma thyroid and referred to Nuclear Medicine department for 131I whole body scan and neck uptake. How will you prepare the patient? Discuss the protocol for the same.

(20 marks)

2. As a radiation safety officer how will you design an isolation ward with two beds for high dose I-131 therapy?

(20 marks)

3. What are the ideal characteristics for a therapeutic radionuclide used in nuclear medicine? Discuss any three therapeutic radionuclides.

(20 marks)

4. **Write short notes on:**

4A. Ionisation chamber based survey meter
4B. Half value thickness. Give HVT of 131-I in lead, concrete and brick
4C. Dosimetry
4D. 186-Re

(5 marks × 4 = 20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – DECEMBER 2016

SUBJECT: HEALTH PHYSICS AND RADIATION PROTECTION

Monday, December 19, 2016

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

1. **Answer any FOUR of the following questions:**

1A. Write a note on Transport Index and Categories of Transport Containers for Radioactive Sources.

1B. Briefly discuss the merits and demerits of TLD.

1C. Define roentgen, radiation absorbed dose.

1D. Write a short note on stochastic and deterministic effects.

1E. While handling a I – 131 source with remote handling tongs of length 30cm, the operator receives 20mR in a period of 5 min. What would be the exposure, if he uses a 2m long tongs and handles the source for 8min?

(5 marks × 4 = 20 marks)

2. **Answer all the questions:**

2A. Write in detail about MIRD method of internal dose calculation.

2B. Write in detail about transport of radioactive material.

2C. i) Describe the procedure monitoring contamination and decontamination.

ii) Explain Beta ray dosimetry.

(20 marks × 3 = 60 marks)