Reg. No.										

MANIPAL UNIVERSITY

PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – JUNE 2015

SUBJECT: CLINICAL NUCLEAR MEDICINE TECHNIQUES

Monday, June 01, 2015

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

✍ **Answer ALL questions.**

1. A 30 years old lactating female patient has been referred to rule out Right PUJ obstruction. Discuss the patient preparation, the imaging protocol, image processing and renogram patterns.

(20 marks)

2. Describe the procedure protocol for LVEF estimation.

(20 marks)

3. A 2 months old baby with a history of recurrent cough and cold has been referred to the Dept. of Nuclear Medicine for a GER scan. Write about:

3A. Patient preparation

3B. Ideal pharmaceutical

3C. Acquisition protocol

3D. How will you calculate the percentage reflux

(3+2+10+5 = 20 marks)

4. **Write short notes on:**

4A. Ideal pharmaceuticals for infection imaging

4B. Gall bladder ejection fraction

4C. Bone marrow imaging

4D. Lung perfusion Scintigraphy

(5 marks × 4 = 20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – JUNE 2015

SUBJECT: THERAPEUTIC NUCLEAR MEDICINE PROCEDURES

Wednesday, June 03, 2015

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

✍ **Answer ALL the questions.**

✍ **Long Questions:**

1. A male patient suffering from carcinoma of the prostrate and having multiple painful bone metastasis has come to your department for palliation therapy.

1A. Enumerate the different radionuclides available to help this patient.

1B. Enumerate the physical characteristics of the radionuclide which you would choose for therapy along with its advantages and disadvantages.

1C. What precautions would you take while treating this patient to decrease the radiation hazard?

(5+10+5 = 20 marks)

2. A clinically thyrotoxic patient has been referred to Nuclear Medicine Department for 131I therapy. How will you proceed? Discuss the procedure protocol.

(20 marks)

3. What are the ideal characteristics for a radionuclide/radiopharmaceutical for radiation synovectomy? Discuss any two agents.

(20 marks)

4. **Write short notes on:**

4A. Lay out plan for "Isolation Ward" for 131 I high dose therapy for carcinoma thyroid. (Diagram only)

4B. Radiation detectors in 131-I therapy

4C. Patient preparation for 131 I whole body scan

4D. Treatment of Malignant Ascitis

(5 marks × 4 = 20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – JUNE 2015

SUBJECT: HEALTH PHYSICS AND RADIATION PROTECTION

Friday, June 05, 2015

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

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

1A. What is contamination? How will you control it and what are the precautions to be taken to avoid it?

1B. Define HVL and TVL. How many HVLs make one TVL?

1C. Define exposure rate constant. What would be the radiation level at 80cm from:

i) 100GBq I-131 ii) 100GBq Tc-99m

1D. Mention the recommended dose limits for occupational radiation workers.

1E. Discuss about the Genetic effects of radiation.

(5 marks × 4 = 20 marks)

2. **Answer the following:**

2A. Write in detail about absorbed fraction method of internal dosimetry.

(20 marks)

2B. Write in detail about the responsibilities of RSO and licence in Nuclear Medicine Facility.

(20 marks)

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

ii) Write in detail about the classical method of Gamma ray internal dosimetry.

(10+10 = 20 marks)

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PG DIPLOMA IN NUCLEAR MEDICINE TECHNOLOGY EXAMINATION – JUNE 2015

SUBJECT: BIOSTATISTICS AND RESEARCH METHODOLOGY AND ADVANCES IN NUCLEAR MEDICINE

Monday, June 08, 2015

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. The data gives the Intelligence quotient (I. Q.) of 36 children. Construct frequency table along with relative frequencies using the class intervals, less than 90, 90 – 100, 100 – 110, so on.

95	105	120	93	108	65	99	103	112	118	109	76
110	101	98	100	116	113	139	105	120	106	113	121
99	103	98	117	109	130	85	94	98	101	117	115

(4 marks)

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

   i) IQ ii) Stages of Cancer

(2 marks)

3. Given that the height of males is approximately normal distributed with a mean of 69 inches and SD of 3 inches. What percent of males are taller than or equal to 72 inches? Also construct the reference range.

(4 marks)

4. **Write a short note on:**

   i) Simple random sampling ii) Descriptive epidemiology

(5 marks × 2 = 10 marks)

5A. Compute mean and coefficient of variation for the following data regarding the heart rate (bmp) of eight rat pups from an experiment that involved the carotid artery.

500 570 560 570 450 560 570 420

5B. The following scores represent a nurses' assessment of the condition of 12 patients at time of admission to a trauma center. Determine the median and interquartile range.

18 13 4 15 3 12 8 18 7 10 19 5

(8 marks × 2 = 16 marks)

6. Construct a pie chart for the following data:

BMI Category	**Underweight**	**Normal**	**Overweight**	**Obese**
Number of persons	30	90	45	15

(4 marks)

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

1. **Answer ALL questions.**

1A. Mention five PET Radiopharmaceuticals.

1B. In brief mention on their modes of production.

1C. Write about their clinical significance in PET Imaging.

(20 marks)

2. **Write short notes on:**

2A. Advances in radionuclide generators

2B. Various lung ventilation imaging agents

2C. Monoclonal antibodies – radiopharmaceuticals

2D. Advances in treatment of Hepatocellular carcinoma in nuclear medicine

(5 marks × 4 = 20 marks)