MRT

Reg. No.										

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. R.R.T. & D.T./B.Sc. C.V.T./B.Sc. M.R.T/B.Sc. R.T./B.Sc. M.L.T./ FOURTH YEAR B.O.T./B.P.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: BIOSTATISTICS & RESEARCH METHODOLOGY/RESEARCH METHODOLOGY & STATISTICS/BIOSTATISTICS/ BASIC BIOSTATISTICS & RESEARCH METHODOLOGY/RESEARCH METHODOLOGY AND BIOSTATISTICS

Wednesday, June 01, 2016

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

✍ **Answer ALL the questions.**

1. Differentiate between nominal and ordinal variables with examples.

(4 marks)

2. **Classify the following into the four different scales of measurement:**

2A. Cell counts

2B. Blood group

2C. Pain score

2D. IQ

(4 marks)

3. **State true or false:**

3A. Pearson's correlation coefficient always takes values ≥ 0

3B. Incidence is not affected by the duration of disease

3C. Convenience sampling is a procedure that assures that each element in the population have equal chance of being included in the sample

3D. Health information system is sample based

(4 marks)

4. At rest pulse rates for 22 athletes at a meet are

68	60	78	70	63	68	66	57	74	65	57
66	73	67	68	56	74	64	67	77	72	64

4A. Compute mean, median and range of this data

4B. Construct a frequency distribution table along with relative frequencies for this data using class intervals 55 – 60, 60 – 65, 65 – 70 and so on.

4C. Draw a frequency polygon for the frequency table constructed above.

(6+5+4 = 15 marks)

5. Obtain interquartile range for the data regarding number of dental caries in twelve children less than ten years of age.

6 0 2 1 0 4 6 0 4 2 8 3

(8 marks)

6. Define coefficient of variation. Mean and standard deviation of pulse rate for a group of individuals is 76 and 3 beats per minute respectively. The mean and standard deviation of height is 64 and 2 inches respectively. Which of the two characteristics is more consistent?

(5 marks)

7. **Define the following:**

7A. Case fatality rate

7B. Total fertility rate

7C. Crude death rate

(2 marks × 3 = 6 marks)

8. The amount of weight gained during pregnancy was assessed and was found to be approximately normally distributed with a mean weight gain of 10 kgs and a standard deviation of 3kgs. Calculate the proportion of pregnant women who gained weight.

8A. At most 16 kgs

8B. Between 10 to 13 kgs

8C. At least 7 kgs

(3 marks × 3 = 9 marks)

9. **Write short notes on:**

9A. Inter rater reliability

9B. Descriptive epidemiology

9C. Systematic sampling

9D. Sample registration system

9E. Components of health information system

(5 marks × 5 = 25 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B. Sc. M.R.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: PRINCIPLES AND PRACTICE OF RADIOTHERAPY PART II

(2011 SCHEME)

Friday, June 03, 2016

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

Answer ALL the questions.

1. How is a patient receiving radiotherapy for breast cancer generally positioned? Write the common schedules of radiotherapy used following breast conservation surgery.

2. Write in brief on the immobilization technique for a patient being planned for radiotherapy for oral cavity. What is the common dose of radiotherapy used?

3. What are the risk factors for the development of non-small cell lung cancer? Write the common signs and symptoms.

4. What are the common presenting complaints of Hodgkin's lymphoma? Write an outline of treatment of Hodgkin's lymphoma.

5. Write a short note on working of Cobalt-60 teletherapy unit.

6. Discuss about the various radionuclides used in Brachytherapy. Why radium is discontinued?

7. What are the different steps used while planning a 3DCRT.

8. What is meant by the GTV, CTV and PTV? How a radiotherapy treatment schedule is commonly prescribed?

(10 marks × 8 = 80 marks)

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MANIPAL UNIVERSITY

THIRD YEAR B.Sc. M.R.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: PHYSICS OF RADIOTHERAPY

(2011 SCHEME)

Monday, June 06, 2016

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

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1. **Answer ALL the questions.**

1A. Write a short note on beam modify devices.

1B. Discuss any three quality assurance check to be done for a Co-60 teletherapy unit.

1C. Plot the isodose curves for a low energy open beam and high energy wedged beam. Explain them briefly.

1D. Define TMR. What are the factors depend on it?

1E. Write a short note on klystron.

1F. What are the different techniques of implanation in brachytherapy?

(5 marks × 6 = 30 marks)

2. **Answer ALL of the following questions:**

2A. Define the PDD derive relation between PDD and TMR.

2B. Discuss about various wedge systems.

2C. Explain in detail how field separation is achieved geometrically.

2D. Write in detail about Cobalt 60 Teletherapy unit.

2E. Write in detail about the various Portal Imaging modalities available.

(10 marks × 5 = 50 marks)

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THIRD YEAR B.Sc. M.R.T. DEGREE EXAMINATION – JUNE 2016

SUBJECT: RADIATION PROTECTION, STANDARDS AND REGULATIONS

(2011 SCHEME)

Wednesday, June 08, 2016

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

Answer the following:

1A. Define equivalent and effective doses.

1B. Write about the important features of Type A and Type B package.

(5+5 = 10 marks)

2. Write in detail about safety features and work practices in beam therapy in terms of planning as well as equipment.

(10 marks)

3. What are the basic guidelines for disposal of radioactive waste? Explain each with an example.

(10 marks)

4. Write briefly about the planning of a diagnostic X-ray room with typical room layout.

(10 marks)

5. Explain the three principles of Radiological protection. What is the annual dose limits prescribed by ICRP for occupational and public exposure. Do these include the exposures due to natural background radiation and medical exposure?

(10 marks)

6A. How is external radiation hazard controlled? Explain each.

6B. The dose rate at 4m from a particular gamma source is 4000 mR/hr. At what distance will it give a dose rate of 4 mR/hr?

(6+4 = 10 marks)

7. Discuss about somatic effects and hereditary effects.

(10 marks)

8A. What are the suitable shielding material for gamma rays, high-energy beta rays and fast neutrons? Give the basis of their selection.

8B. The exposure rate at 1m from the patient where technologist stands is 1000 μGy /hr. What is the exposure rate if the distances are 2m, 3m and 4m?

(5+5 = 10 marks)