

MANIPAL UNIVERSITY

**THIRD/FOURTH 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./B.O.T./B.P.T. DEGREE EXAMINATION – JUNE 2015**

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

Monday, June 01, 2015

Time: 10:00-13:00 Hrs.

Max. Marks: 80

☞ Answer ALL the questions.

1. Define statistics and list its role in health sciences. (5 marks)

2. Describe Validity and Reliability. (5 marks)

3. Give the difference between nominal and ordinal variables with examples. (5 marks)

4. Classify the following into different scales of measurements (Nominal, Ordinal, Interval and Ratio).
 - a) Temperature ($^{\circ}F$) b) City c) Age
 - d) Gender e) Stage of disease (I/II/III/IV)(5 marks)

5. Briefly describe Probability and Non Probability sampling. (5 marks)

- 6A. In a study of 126 patients admitted in a hospital, it was assessed whether patients were 'Current smoker', 'Past smoker' or 'Never smoker'. The frequencies of these categories are shown in table below. Represent the data with the help of a pie chart.

Smoking status	Frequency
Current smoker	42
Past smoker	21
Never smoker	63

- 6B. 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, and so on.

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

(5+5 = 10 marks)

- 7A. Why do we use coefficient of variation? How is it different from standard deviation? Explain with an example.

- 7B. Compute the median, range and inter-quartile range for the following data:
SBP (mmHg): 120 125 121 123 125 127 122 128 123 126 122
(5+5 = 10 marks)
8. It was observed that the incubation period in days of patients with infectious hepatitis follows normal distribution with a mean of 20 days and standard deviation of 4 days. What percentage of the patients have incubation period:
- 8A. Below 12 days
8B. Between 24 and 28 days
(5 marks)
9. What is Karl-Pearson's correlation coefficient? List its properties.
(5 marks)
10. Write a note on health information system and its requirements.
(5 marks)
- 11A. Explain the terms prevalence and incidence with examples.
11B. Define crude birth rate and infant mortality rate.
(6+4 = 10 marks)
12. Define epidemiology. Enumerate its uses. Describe case series analysis.
(10 marks)



MANIPAL UNIVERSITY**THIRD YEAR B. Sc. M.R.T. DEGREE EXAMINATION – JUNE 2015****SUBJECT: PRINCIPLES AND PRACTICE OF RADIOTHERAPY PART II
(2011 SCHEME)**

Wednesday, June 03, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

Answer ALL the questions.

1. What is the role of palliative care in cancer?
(10 marks)
2. Process of Simulation and Verification in Radiotherapy.
(5+5 = 10 marks)
3. Brief note on shielding materials in radiotherapy. Add a note on moulding materials as well.
(5+5 = 10 marks)
4. List the Bolus Materials used in radiotherapy. Mention the use of these in brief.
(7+3 = 10 marks)
- 5A. Expand HDR, LDR, PDR, IGRT, IMRT.
5B. Discuss in brief about 3DCRT.
(5+5 = 10 marks)
6. Write in detail about a linear accelerator used in cancer treatment.
(10 marks)
7. Cobalt 60 as a teletherapy source.
(10 marks)
8. How do you plan treatment (Simulate, treat and verify setup) for a patient with glioblastoma of the frontal lobe of the brain?
(10 marks)



MANIPAL UNIVERSITY

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

SUBJECT: PHYSICS OF RADIOTHERAPY
(2011 SCHEME)

Friday, June 05, 2015

Time: 10:00-13:00 Hrs.

Max. Marks: 80

PART – A

1. Answer all the questions.

1A. Define R_{100} , R_{85} , R_{50} and R_p .

1B. Define field flatness and symmetry.

1C. Write the merits and demerits of a manual brachytherapy unit and after loading units.

1D. Discuss about standing and travelling waveguides.

1E. Define TAR. Explain the factors depend on it.

1F. Write a short note on wedge system.

(5 marks \times 6 = 30 marks)

PART – B

2. Answer all of the following questions:

2A. Discuss about various beam modifying devices.

2B. Describe the source strength specification in brachytherapy unit.

2C. Write in detail about ICRU volumes.

2D. Write in detail about field shaping in radiation therapy.

2E. Define PDD. Explain the factors depend on it.

(10 marks \times 5 = 50 marks)



MANIPAL UNIVERSITY**THIRD YEAR B.Sc. M.R.T. DEGREE EXAMINATION – JUNE 2015****SUBJECT: RADIATION PROTECTION, STANDARDS AND REGULATIONS
(2011 SCHEME)**

Monday, June 08, 2015

Time: 10:00-13:00 Hrs.

Max. Marks: 80

✍ Answer the following:

- 1A. A survey meter located near a radioactive source reads 15mR/hr. How long can a worker stay in the same area and still keep his dose below 1 mrem?
- 1B. Write briefly about excepted package. Write a note on Transport Index and Categories of Transport Containers for Radioactive Sources.
(3+7 = 10 marks)
2. Discuss in detail the emergency situations that may arise in Radiotherapy department housing a HDR brachytherapy machine. How will you handle the situation?
(10 marks)
3. Discuss the factors to be taken into account for calculating the wall thickness for Teletherapy installations.
(10 marks)
4. How is external radiation hazard controlled? Explain each with a numerical example.
(10 marks)
5. Discuss the different daily quality assurance tests to be performed on LINAC.
(10 marks)
6. Discuss the duties of a Radiation safety officer.
(10 marks)
7. What are the basic guidelines for disposal of radioactive waste? Explain each with an example.
(10 marks)
8. Discuss about somatic effects and hereditary effects.
(10 marks)

