MANIPAL UNIVERSITY
THIRD YEAR B. Sc. M.R.T. DEGREE EXAMINATION – MAY/JUNE 2012
SUBJECT: BIOSTATISTICS AND RESEARCH METODOLOGY
Monday, May 28, 2012

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

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1. What are the principles of qualitative research?

                                                           (5 marks)

2. Write a note on Validity and Reliability.

                                                           (5 marks)

3. Describe qualitative and quantitative variables with examples.

                                                           (5 marks)

4. Classify the following into different scales of measurements (Nominal, Ordinal, Interval and Ratio).
4A. Weight
4B. Temperature (°K)
4C. Stages of Cancer
4D. IQ
4E. Telephone number

                                                           (5 marks)

5. Explain simple random sampling.

                                                           (5 marks)

6A. Present the data given below on percentage of children benefitted by polio immunization in a country from 2006 – 2010 by a simple bar diagram.

Year	2006	2007	2008	2009	2010
Polio (%) Immunization	80	83	88	95	98

6B. Form a frequency table along with relative frequencies for the ages of 48 patients given below. (Class intervals: 0–15, 15–30, 30–45, so on).

31	07	39	43	62	30	38	10	36	29	40	22
40	65	15	30	39	53	47	64	33	46	17	32
36	42	76	50	30	34	25	36	39	36	42	47
32	39	24	57	37	47	27	43	43	54	40	39

                                                           (5+5 = 10 marks)

7A. List the merits and demerits of mean and median.

7B. Following are the weights (in kg) of a sample of 10 students

     45   64   60   69   46   64   61   65   52   54

     Compute range and standard deviation of the above data.

(5+5 = 10 marks)

8.. Suppose the systolic blood pressure of adult males is approximately normally distributed with mean 130 mmHg and standard deviation 10 mmHg. In a sample of 600 apparently normal adult males, how many will be with systolic blood pressure?

8A. More than 140 mmHg

8B. In the range 120 – 150 mmHg

(5 marks)

9. How do you interpret correlation with the help of scatter diagram?

(5 marks)

10. Discuss sample registration system as a source of health information system.

(5 marks)

11. Distinguish between incidence and prevalence with an example. Write a short note on rates and ratios.

(10 marks)

12. Define descriptive epidemiology. Describe the different methods in epidemiology.

(10 marks)

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THIRD YEAR B. Sc. M.R.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: PRINCIPLES AND PRACTICE OF RADIOTHERAPY PART II

Wednesday, May 30, 2012

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

✍ **Answer all the questions.**

1. What are the principles of palliative care? What is meant by hospice?

(10 marks)

2. Write in brief the treatment of cervical cancer with radiotherapy.

(10 marks)

3. How are lung cancers classified by pathology? Write the role of radiotherapy in definitive treatment of a stage II non-small cell lung cancer.

(10 marks)

4. What are the common brain tumours? Write the treatment with radiotherapy of a patient with astrocytoma.

(10 marks)

5. What is a CT simulator, how it differs from conventional CT? Discuss its role in radiotherapy treatment planning.

(10 marks)

6A. Compare X-knife and γ-knife.
6B. Explain LDR, MDR, HDR and PDR brachytherapy.

(5+5 = 10 marks)

7A. Write a short note on bolus materials used in radiotherapy.
7B. Compare Cobalt – 60 and Cesium – 137 as teletherapy sources.

(10 marks)

8. Enumerate the steps in radiotherapy (external beam) planning. Discuss simulation and verification in detail.

(10 marks)

MANIPAL UNIVERSITY

THIRD YEAR B.Sc. M.R.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: PHYSICS OF RADIOTHERAPY PART II

Friday, June 01, 2012

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

1. **Answer all the questions:**

1A. Define Collimator Scatter factor and Phantom Scatter factor.

1B. Plot the PDD curve for a photon and electron beams. Also define different parameters such as D_{max}, R_{50}, R_p.

1C. Write short notes on basal dose rate and reference dose in the Paris system of implants.

1D. Discuss any two quality assurance check to be done for a Brachytherapy unit.

1E. Write the differences between an individualized wedge and universal wedge.

1F. Write a short note on EPID.

$(5 \times 6 = 30$ marks)

✍ **Answer all of the following questions:**

2. Describe Linear Accelerator in detail with a neat diagram.

3. Discuss any five quality assurance check to be done for a Co-60 teletherapy unit.

4. Define the Percentage Depth Dose and explain the factors it depends on.

5. Write in detail about different methods to correct contour irregularities.

6. Explain in detail how field separation is achieved geometrically.

$(10 \times 5 = 50$ marks)