✍ **Answer ALL the questions.**

1A. Define mean, median, mode, standard deviation and coefficient of variation for 'n' observations.

1B. Explain stratified random sampling method.

(5+5 = 10 marks)

2. Fifty patients with congestive heart failure were weighed before and after receiving a novel diuretic agent and the average weight loss (the difference between the two weights) for this sample was found to be 3.5 KG with a standard error of 2.6 Kg.

2A. Name the statistical test used for testing whether the agent is effective in reducing the weight.

2B. State the null and alternate hypothesis.

2C. Write the test statistic for this test.

2D. Mention the assumptions for the validity of this test.

2E. How do you take a decision on the acceptance or rejection of null hypothesis?

($2\times5 = 10$ marks)

3A. What do you mean by sampling distribution and standard error? What are the factors that affect the width of a confidence interval for mean?

3B. Write a short note on binomial distribution.

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

4. What do you mean by randomization in randomised controlled trials (RCTs)? Explain different methods of randomization in RCTs.

(1+9 = 10 marks)

5A. A hospital administrator wishes to estimate the mean weight of babies born in the hospital. How large a sample of birth records should be taken if the administrator wants a 95% confidence interval with margin error of 1.2 Kg? Assume that a reasonable estimate of the population standard deviation is 5 Kg.

5B. Write a short note on cross sectional study design.

(5+5 = 10 marks)

6. Explain the structure of a research thesis.

(10 marks)

7. **Write short notes on:**

7A. Chi square test

7B. Survival analysis

7C. Validity of a diagnostic test

7D. One way ANOVA

($5\times4 = 20$ marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: RADIOGRAPHIC PROCEDURES

Thursday, May 31, 2012

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

✎   **Answer ALL the questions.**

1.   Write about dose reduction technique in general radiography   .

(20 marks)

2.   **Short notes:**

2A. Lymphaniography

2B. Sterio radiography

2C. Dental radiography

2D. ERCP

2E. Write about frog leg view and pelvimetry

2F. Myelography

(10×6 = 60 marks)

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✍   **Answer ALL the questions.**

1.   Generation and distribution of electrical energy? And various power losses?

(20 marks)

2.   **Write short notes on:**

2A.   Fuses and relays

2B.   Mains voltage compensation

2C.   Grid controlled x-ray tube

2D.   Interlocking stator and delay circuit

2E.   Grids

2F.   Circuit breaker

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: PRINCIPLES OF RADIOGRAPHIC EXPOSURE

Tuesday, June 05, 2012

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

✍ **Answer ALL the questions.**

1. Write briefly about characteristic curve.

(20 marks)

✍ **Write short note on:**

2A. Sharpness and describe about various types of sharpness

2B. Film materials and their spectral sensitivity

2C. Image formation in general radiography

2D. Cassettes

2E. X-ray production

2F. Quality assurances for automatic film processor

(10×6 = 60 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: INSTRUMENTATION OF SPECIALIZED RADIOLOGY EQUIPMENTS

Thursday, June 07, 2012

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

✍ **Answer ALL the questions.**

1. Write about CR and DR.

(20 marks)

✍ **Write short notes on:**

2A. Mobile x-ray equipment

2B. Tomographic equipment

2C. Remote control x-ray table

2D. Image intensifier unit

2E. Vidicon camera

2F. Equipment for mammography

(10×6 = 60 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASOUND

Saturday, June 09, 2012

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

✍ **Answer ALL the questions.**

1.   Principles of Doppler. Add brief note on various types.

(20 marks)

✍ **Write short notes on:**

2A.   Biologic effects of ultra sound

2B.   3D and 4D ultrasound imaging

2C.   Beam former

2D.   Scan converter

2E.   Volume contrast imaging

2F.   Ultra sound contrast agents

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2012

SUBJECT: ADVANCED TECHNIQUE & INSTRUMENTATION OF CT

Monday, June 11, 2012

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

✍ **Answer ALL the questions.**

1.   Technical considerations in CT angiography.

(20 marks)

✍ **Write short notes on:**

2A.   CT bronchoscopy

2B.   CT three phase protocol for abdomen / pelvis

2C.   CT biopsy

2D.   CT urography

2E.   Dual source x-ray tube

2F.   MDCT v/s conventional CT

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: RADIOGRAPHIC PROCEDURES

Tuesday, December 18, 2012

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

✍ **Answer ALL the questions.**

1.   Brief on techniques in mammography and requirements for the study.

(20 marks)

2.   **Short notes:**

2A.   Sialography

2B.   Write in detail about ERCP

2C.   Describe various views to visualize knee anatomy

2D.   Barium enemia

2E.   Xero radiography

2F.   Fallopian tube recanalization

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: BIOSTATISTICS

Monday, December 17, 2012

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

✍   **Answer ALL the questions.**

1.   **Define the following:**

1A.   P- value

1B.   Null hypothesis

1C.   Power

1D.   Type II error

1E.   Level of significance

(1×5 = 5 marks)

2A.   What do you mean by dispersion? Define various measures of dispersion.

2B.   Define a random sample. Describe the method of cluster sampling with its merits and demerits.

(5+5 = 10 marks)

3A.   Enumerate the characteristics of normal distribution using a neat diagram.

3B.   A local health department wishes to estimate the prevalence of malnutrition among children under five years of age in its locality. How many children should be included in the sample so that the prevalence may be estimated to within 4% points of the true value with 95% confidence, if it is known that the true rate is unlikely to exceed 20%?

(5+5 = 10 marks)

4A.   The following table shows the results of a survey conducted among 300 subjects living in a metropolitan city in India. Each subject were asked which of two policies they favoured with respect to smoking in public places.

Level of education	Policy favoured towards smoking		Total
	No restriction	Allowed in designated areas	
Above Plus Two	26	49	75
Plus Two and below	105	120	225

Does this sample provide sufficient evidence to conclude that there is an association between level of education and attitude towards smoking in public places. (Chi-square with 1 df at 5% level of significance=3.84).

4B.   A case-control study was conducted to assess whether use of high fat diet plays a role in the development of cancer. A total of 240 histologically confirmed colorectal cancer cases and 480 disease free controls were enrolled in the study. Among them 60% of the cases and 25% of the controls were exposed to high fat diet. Construct a 2×2 table based on this data. Calculate an appropriate measure to identify the strength of association between high fat diet and risk of colorectal cancer. Interpret the findings.

$$(5+(2+2+1) = 10 \text{ marks})$$

5.   Explain randomized controlled trials under the titles design, analysis, merits and demerits.

(10 marks)

6.   Outline the format of reporting in scientific journals.

(10 marks)

7.   **Write short notes on:**

7A.   Analysis of Variance
7B.   Logistic regression
7C.   Correlation
7D.   Mann Whitney U test
7E.   Meta-analysis

$$(5×5 = 25 \text{ marks})$$

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: INSTRUMENTATION OF CONVENTIONAL RADIOLOGY EQUIPMENTS

Wednesday, December 19, 2012

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

✍ **Answer ALL the questions.**

1.   Write in detail about interlocking circuits.

(20 marks)

2.   **Short notes:**

2A.   Thermal and magnetic relays.

2B.   Falling load generator.

2C.   Six and twelve pulse twelve rectifier.

2D.   Battery powered generators.

2E.   Electronic and ionization timer.

2F.   Switches.

(10×6 = 60 marks)

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✍ **Write short notes on:**

1A. X-ray unit used in operation theatres

1B. Brightness gain in fluoroscopy

1C. Recording devices of fluoroscopic image

1D. Remote control table

1E. Mammography x-ray tube

1F. Skull table

(10×6 = 60 marks)

✍ **Write essay on:**

2. Discuss elaborately about the working principles of various types of tomography equipments.

(20 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASOUND

Friday, December 21, 2012

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

✍ **Answer ALL the questions.**

1.   Bioeffects and safety considerations in ultra sound.

(20 marks)

2.   **Short notes:**

2A.   Artifacts in ultrasound

2B.   Ultrasound elastography

2C.   3D and 4D ultra sound

2D.   Beam former

2E.   Colour doppler

2F.   Harmonic imaging

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2012

SUBJECT: ADVANCED TECHNIQUE & INSTRUMENTATION OF CT

Saturday, December 22, 2012

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

✍ **Answer ALL the questions.**

1.   Technical considerations, applications, advantages and limitations of virtual endoscopy.

(20 marks)

2.   **Write short notes on:**

2A.   Technical aspects in HRCT lung

2B.   Equipment component and data flow in CT fluoroscopy

2C.   Physical principles in multislice CT scanner

2D.   Quality control tests for CT scanner

2E.   CT calcium scoring

2F.   Pediatric CT assessment protocol for the abdomen

(10×6 = 60 marks)

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