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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: BIOSTATISTICS

Tuesday, May 28, 2013

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

✍ **Answer all questions.**

1. Define the following:

1A. Alternate hypothesis

1B. Type II error

1C. P- value

1D. Level of significance

1E. Parameter

$(1 \times 5 = 5$ marks$)$

2A. Define various measures of central tendency and write the situations where each one is appropriate.

2B. Explain the method of systematic sampling and state its merits and demerits.

$(5+5 = 10$ marks$)$

3A. A researcher identified coronary risk factors among men and women in a long term health care facility. Of the 250 male subjects, 62 had hypertension. Of the 1100 female subjects, 265 had hypertension. Construct 95% confidence interval for difference in proportions of hypertension between male and females and interpret it.

3B. A sample of 500 students participated in a study to evaluate the level of their knowledge of risk factors for a certain group of diseases and the result is given below:

Course	Knowledge of risk factors		
	Good	Poor	Total
Paramedical	72	50	122
Engineering	58	320	378
Total	130	370	500

Do these data suggest that there is an association between knowledge of risk factors for the group of disease and major field of study from which the present sample is drawn? (Let α=0.05, Chi square for 1 degree of freedom= 3.84).

$(5+5 = 10$ marks$)$

4A. Explain the design, conduct and analysis of cohort study.

4B. A group of 5000 men with the habit of chewing tobacco and another group of 8000 men without the habit were followed up for a specified length of time, to assess the association between tobacco chewing and oral cancer. At the end of follow up 45 cases were observed among the chewing group and 22 cases among non-chewers group. Construct a 2×2 table for this information. Obtain the strength of association between tobacco chewing habits and oral cancer. Interpret the findings.

(10+5 = 15 marks)

5A. Discuss about materials and methods in a research report.

5B. Briefly explain the multivariate technique used for the analysis of time-to event data.

(5+5 = 10 marks)

6. Write short notes on:

6A. Sample size determination for estimation of mean

6B. Wilcoxon signed rank test

6C. Analysis of Variance

6D. Regression

6E. Systematic reviews

6F. Binomial distribution

(5×6 = 30 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: RADIOGRAPHIC PROCEDURES

Thursday, May 30, 2013

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

✍ **Answer all the questions.**

1.   Discuss the indications, contraindication and techniques of mammography.

(20 marks)

2.   **Short notes:**

2A.   Discuss the anatomy of male urethra.

2B.   Coronary angiography.

2C.   Pelvimetry.

2D.   Hysterosalpingography.

2E.   T- tube cholangiography.

2F.   MR contrast media.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: INSTRUMENTATION OF CONVENTIONAL RADIOLOGY EQUIPMENTS

Saturday, June 01, 2013

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

✍ **Answer ALL questions.**

1.   Write a detail note on different heat deception method from x-ray tube.

(20 marks)

2.   **Write short notes on:**

2A.   State the Inverse Sqare Law. What determines the penetrating power of an x-ray beam? How can penetration power to be changed?

2B.   Name the ten properties of x ray. Discuss the difference between Bremsstrahlung and Characteristic x-ray radiation.

2C.   Write a note on standby circuit and filament boosting circuit.

2D.   Define Conductor and Insulator with example.

2E.   What Property of valve tube makes them suitable for use in rectification? Why are valve tubes not conductive during the inverse half cycle?

2F.   State five laws of electrostatics.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: PRINCIPLES OF RADIOGRAPHIC EXPOSURE

Tuesday, June 04, 2013

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

✍ **Answer all questions.**

1.   Write a detailed note on characteristic curve.

(20 marks)

2.   **Write short note on:**

2A. Where is the best location for the darkroom? How should the walls be shielded?

2B. What is meant by time – temperature development? Mention operation theater development.

2C. Write short note on difference between silver halides and metallic silver. Explain function of gelatin emulsion binder in detail.

2D. Write detail note on factors of screen construction affecting speed and sharpness.

2E. Write a short note on different types of film drier. Mention Drying system in automatic film processor.

2F. Discuss the various kinds of darkroom entrances, including the advantage and disadvantage of each with diagram.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: INSTRUMENTATION OF SPECIALIZED RADIOLOGY EQUIPMENTS

Thursday, June 06, 2013

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

✍ **Answer all questions.**

1. Write a detailed note on quality control test for conventional radiography.

    (20 marks)

2. **Write short note on:**

2A. Describe the xerographic process, and list the advantage and disadvantage in comparison with ordinary film radiography.

2B. Explain Direct and Indirect fluoroscopy in detail with labeled diagram.

2C. Short note on general features of a telecommand table in detail.

2D. Discuss the advantage of high kVp chest radiography. Explain the depth resolution. How is quantom mottle controlled in radiography at High KVp?

2E. Short note on serial changer with labeled diagram.

2F. What is the purpose of europium in a photostimulable phosphor? How latent image made visible in computer radiography?

    (10×6 = 60 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASOUND

Saturday, June 08, 2013

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

1.   Instrumentation of ultrasound. Brief about scan converter.

(20 marks)

2.   **Short Notes:**

2A.   Artifacts in ultrasound.

2B.   Display modes of ultra sound.

2C.   Interventional ultrasonography.

2D.   Harmonic imaging.

2E.   Ultra sound controls.

2F.   Indication, preparation, care and techniques while Ultrasonography of kidney.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: ADVANCED TECHNIQUE & INSTRUMENTATION OF CT

Tuesday, June 11, 2013

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

✎   **Answer all questions.**

1.   Write a detail note on Quality Control for Computed Tomography scanners.

(20 marks)

2.   **Write short note on:**

2A.   CT Bronchoscopy.

2B.   Dual source CT scan.

2C.   CT Perfusion.

2D.   Factors affecting temporal Resolution of Computed tomography.

2E.   Isotropic Imaging.

2F.   Clinical applications of multislice CT scanner.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR MASLP (NR)/M.Sc. MLT/M.Sc. MIT/M.Sc. NMT/M.Sc. ECHOCARDIOGRAPHY DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: STATISTICS & RESEARCH METHODS/BIOSTATISTICS/PAPER IV: ADVANCED BIOSTATISTICS & RESEARCH METHODOLOGY/EPIDEMIOLOGY & BIOSTATISTICS

Wednesday, December 18, 2013

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

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1. Define Biostatistics and enumerate its applications in Para-medical research.

    (5 marks)

2. What are different methods of drawing a simple random sample? Explain any.

    (2+3 = 5 marks)

3. Define and explain the interrelations among the concepts of sampling distribution, standard error and confidence interval with an example.

    (10 marks)

4. **Distinguish between**
4A. Parametric and non-parametric tests
4B. Null and alternate hypothesis
4C. Two sided and one sided test
4D. Type I and type II error
4E. Level of significance and p-value

    (2×5 = 10 marks)

5. Prior to the time that germ theory of disease was established, the mortality rate from surgery was very high due to infection. Joseph Lister sprayed the air with carbolic acid and used it in patients dressing. Lister compared 80 operations in which this procedure was used with 70 others where it was not used. The results are given in the following table.

	Patient lived	Patient died	Total
Carbolic acid used	68	12	80
Carbolic acid not used	38	32	70
Total	106	44	150

    At 5% level of significance, test whether the outcome of the surgery is independent of the use of carbolic acid or not. ($\chi^2_{1df}(0.05) = 3.84$)

    (10 marks)

6. Explain with distinction positive and negative correlation and list the properties of Pearson's correlation coefficient.

(5 marks)

7. Discuss case-control and cohort study designs and enumerate their relative merits and demerits.

(10 marks)

8. A cohort study was conducted to find the effect of oral contraceptive (OC) use on breast cancer. Ten thousand women free from breast cancer were selected for the study and followed up for 10 years. Forty out of 8000 non users of OC and 14 out of 2000 OC users developed breast cancer. Calculate appropriate measure of strength of association and interpret the same.

(5 marks)

9. Explain the situation for the application of logistic regression with the help of a suitable example.

(5 marks)

10. Draw an appropriate dummy table and give the formula for sensitivity, specificity, positive predictive value and negative predictive value.

(5 marks)

11. Explain in detail the format of reporting in scientific journals.

(10 marks)

MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: RADIOGRAPHIC PROCEDURES

Thursday, December 19, 2013

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

✍ **Answer all the questions.**

1. Write a note on the anatomy of circle of willis with diagram. Explain blood supply of brain in detail.

(20 marks)

2. **Write short note on:**

2A. Radiographic evaluation criteria for camp Coventry method for knee intercondylar fossa

2B. Radiographic criteria and evaluation of modified law method

2C. Radiographic criteria and evaluation of Haas method

2D. Radiographic criteria and evaluation Jones method

2E. Write a short note on the comparison of CT myelography, MR myelography and conventional myelography.

2F. Write a short note on the factors influencing coating of barium suspension.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: PRINCIPLES OF RADIOGRAPHIC EXPOSURE

Saturday, December 21, 2013

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

✍ **Answer ALL questions.**

1. Discuss briefly radiographic image characteristics.

                                                                                    (20 marks)

2. **Write short notes on:**

2A. Macro-radiography

2B. Sensitometery

2C. Physical characteristic of the radiographic film

2D. Silver recovery in the fixer solution

2E. Comparison between CR, DR and conventional radiography image quality

2F. Effect of radiographic technical factors on image quality

                                                                        (10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: INSTRUMENTATION OF CONVENTIONAL RADIOLOGY EQUIPMENTS

Friday, December 20, 2013

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

✍ **Major question:**

1.   Define rectification. Explain different types of rectifiers in detail with diagram.

(20 marks)

✍ **Write short notes on:**

2A.   Phototimers

2B.   Earthing and its importance

2C.   Stabilizers and UPS

2D.   Tube rating

2E.   Magnetic and thermal relay

2F.   Relate turns ratio of transformers with x ray circuits.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: INSTRUMENTATION OF SPECIALIZED RADIOLOGY EQUIPMENTS

Monday, December 23, 2013

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

✍   **Answer ALL questions.**

✍   **Major question:**

1.   Write a note on multi field image intensifier. Explain spot film device and rapid serial changer.

(20 marks)

2.   **Write short notes on:**

2A.   Write a note on brightness gain.

2B.   What is special resolution? Write a note on methods to enhance the resolution of mammographic image.

2C.   Write a note on remote control table.

2D.   List the laws of electrostatics in short. Explain capacitor discharge mobile equipment.

2E.   Define quality assurance and quality control. Explain the test to define congruence of radiation and optical field.

2F.   Write a note on general dental radiography equipment.

(10×6 = 60 marks)

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MANIPAL UNIVERSITY

FIRST YEAR M.Sc. M.I.T. DEGREE EXAMINATION – DECEMBER 2013

SUBJECT: ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASOUND

Tuesday, December 24, 2013

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

✍ **Answer ALL questions.**

1. Discuss the basics of acoustics relevant to ultrasongraphy and describe various image display modes in ultrasonography.

(20 marks)

2. **Write short notes on:**

2A. Duplex scanning
2B. Ultrasound contrast agents
2C. Major sources of Doppler artifacts
2D. Linear array transducers
2E. Doppler spectral analysis
2F. Ophthalmic ultrasonography

(10×6 = 60 marks)

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