Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 17-May-2023

Time: Three Hours | Max. Marks: 40 Marks

Physics of Radiology – (RS-3)

Q.P. Code: 1353

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1353 and 1354 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) — 1 x 10 = 10 Marks

1. Write a note on X-ray tube with a neat diagram.
2. Explain the factors affecting the X-ray beam quality.

SHORT ESSAYS (Answer any Three) — 3 x 5 = 15 Marks

3. X-ray spectrum
4. Rectification and its types
5. Filtration
6. Properties of X-rays

SHORT ANSWERS (Answer any Five) — 5 x 3 = 15 Marks

7. P-N junction diode
8. Line focus principle
9. Maximum Permissible Dose
10. Half Value Thickness
11. Symbolic representation of an atom
12. Pair production

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 17-May-2023

Time: 3 Hours | Max. Marks: 40 Marks

Physics of Radiology – (RS-3)
Q.P. Code: 1354

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1353 and 1354 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) 1 x 10 = 10 Marks

1. What is the aim of radiation protection? Explain the concept of ALARA and various methods to apply it.
2. Describe with a neat diagram the construction and working of a rotating anode X-ray tube.

SHORT ESSAYS (Answer any Three) 3 x 5 = 15 Marks

3. Write a note on air-gap technique.
4. Personal monitoring devices.
5. Briefly describe characteristic and Bremsstrahlung radiations.
6. Explain grids and types of grids.

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

7. Half valve layer.
8. Circuit breaker.
9. Thermionic emission.
10. Cathode ray tube.
11. Work load and use factor.
12. Grid ratio.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 19-May-2023

Time: Three Hours | Max. Marks: 60 Marks

Radiographic Photography and Image Processing (RS-3)

Q.P. CODE: 1355

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

LONG ESSAYS (Answer any Two) 2 x 10 = 20 Marks

1. Describe in detail the structure and functions of intensifying screen.
2. Enumerate and explain the constituents of developer and functions of each.
3. Describe the planning of dark room with a neat diagram and explain the types of dark room entrances.

SHORT ESSAYS (Answer any Five) 5 x 5 = 25 Marks

4. Differentiate between screen and non-screen films.
5. Write a note on safe lights used in dark room.
6. Describe the construction of a radiographic cassette and types of cassettes.
7. Dry bench and wet bench.
8. Discuss the film faults and their types.
9. Describe the loading and unloading of cassettes in detail.
10. Explain the principle of digital radiography.

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

11. Fixer composition.
12. Latent image.
13. Film density.
14. Pass box.
15. Define quantum mottle.
16. Hangers and types.
17. Importance of pH in film processing.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Medical Imaging Technology Degree Examination – 17-May-2023

Time: Three Hours | Max. Marks: 100 Marks

RADIATION PHYSICS

Medical Physics & Radiation Safety in Radio Diagnosis (RS-4)

Q.P. CODE: 3290

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) 2 x 10 = 20 Marks

1. Explain the biological effects of radiation with acute radiation syndrome
2. Write in detail about the x-ray circuits
   OR
   Discuss briefly about the main voltage compensation

SHORT ESSAYS (Question No 5 & 10 choice) 10 x 5 = 50 Marks

3. Bridge rectification
4. Discuss the rating charts of x-ray tube
5. Explain rectifiers and rectification and application of rectifiers
   OR
   Explain principle, working, construction and types of transformers
6. Radiolysis of water
7. Explain the role of radiographer in radiation protection in the radiology department
8. Discus about the mobile and portable x-ray machines and differentiate them
9. Explain angiographic room design and structural shielding
10. Name four QA test for the x-ray tube and explain any of one
    OR
    Scintillation detectors in detail
11. Explain the fluoroscopic x-ray tube
12. What is half value layer and explain the measurement of the half value layer?

SHORT ANSWER 10 x 3 = 30 Marks

13. Properties of alpha radiation
14. Radiation weighting factors
15. 28^{th} day rule
16. Last Menstrual Period (LMP)
17. Specific activity
18. Genetic radiation effects
19. Functions of autotransformer
20. Radiation signages
21. Alpha decay
22. Isotopes and isotones

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Medical Imaging Technology Degree Examination – 19-May-2023

Time: Three Hours | Max. Marks: 100 Marks

IMAGING PHYSICS AND DARK ROOM TECHNIQUES (RS-4)

Q.P. CODE: 3291

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) 2 x 10 = 20 Marks

1. Explain the steps of manual processing and make a brief note on constituents if developer and fixer

2. Draw the characteristic curve, write in detail about the regions of characteristic curve
   OR
   Write in detail about planning and construction of darkroom

SHORT ESSAYS (Question No 5 & 10 choice) 10 x 5 = 50 Marks

3. Secondary radiation grids
4. Latent image formation
5. Film propagation automatic processor
   OR
   Exposure factors
6. Crossover effects
7. Construction of the x-ray cassette
8. Explain duplitized and single emulsion films
9. Factors affects development of the film
10. Developer solution replenishment
    OR
    Explain briefly CRT films
11. Types of fog
12. Film entry detection in automatic processor

SHORT ANSWER 10 x 3 = 30 Marks

13. Methods of silver recovery
14. Dry bench and wet bench
15. Luminescence
16. Standby mode of automatic processor
17. Safe light filter
18. Single emulsion film
19. Importance of Ph in fixer
20. Fixing agent and function
21. Darkroom entrance types
22. Acidity and alkalinity

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Medical Imaging Technology Degree Examination – 22-May-2023

Time: Three Hours | Max. Marks: 100 Marks

RADIOGRAPHIC POSITIONING AND TECHNIQUES (RS-4)

Q.P. CODE: 3292

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) 2 x 10 = 20 Marks

1. Write the projections for shoulder joint – AP weight bearing, scapula –Y view and shoulder axial
2. Explain in detail the different views involved in the imaging of "temporal bone"
   OR
   Describe various methods of radiography to demonstrate the "Mastoid air cells"

SHORT ESSAYS (Question No 5 & 10 choice) 10 x 5 = 50 Marks

3. Write notes on high and low kV techniques
4. Apico – Lordotic view of the chest
5. Explain the view to demonstrate the Atlas and Axis bone
   OR
   Skiers thumb projection
6. **Occlusal** dental radiographic technique
7. Radiographic view in suspected torn ligament of patella
8. Towne's view
9. Special views for Scaphoid
10. Mention the indications for "Erect Abdomen" and explain the projection
    OR
    Projection for Bicipital groove of the humerus
11. Describe basic projections of Lumbo-sacral joint
12. Describe Macro-radiography and its application

SHORT ANSWER 10 x 3 = 30 Marks

13. True lateral of hip joint
14. Explain the patient preparation for KUB radiograph
15. Benefits performing arrested inspiration chest radiography
16. 10 day, 14 day and 28 day rules – explain
17. Explain the formation of wrist joint with a diagram
18. Difference between AP and PA chest radiograph
19. Difference between male and female pelvis
20. Hand – oblique view
21. Methods of immobilization in pediatric radiography
22. Ankle AP view

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 19-May-2023

Time: Three Hours | Max. Marks: 60 Marks

Radiographic Photography and Image Processing (RS-3)

Q.P. CODE: 1355

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

LONG ESSAYS (Answer any Two) 2 x 10 = 20 Marks

1. Describe in detail the structure and functions of intensifying screen.
2. Enumerate and explain the constituents of developer and functions of each.
3. Describe the planning of dark room with a neat diagram and explain the types of dark room entrances.

SHORT ESSAYS (Answer any Five) 5 x 5 = 25 Marks

4. Differentiate between screen and non-screen films.
5. Write a note on safe lights used in dark room.
6. Describe the construction of a radiographic cassette and types of cassettes.
7. Dry bench and wet bench.
8. Discuss the film faults and their types.
9. Describe the loading and unloading of cassettes in detail.
10. Explain the principle of digital radiography.

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

11. Fixer composition.
12. Latent image.
13. Film density.
14. Pass box.
15. Define quantum mottle.
16. Hangers and types.
17. Importance of pH in film processing.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 23-Nov-2023

Time: Three Hours Max. Marks: 40

Physics of Radiology – (RS-3)
Q.P. Code: 1353

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1353 and 1354 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) 1 x 10 = 10 Marks

1. Explain the different processes through which photons interact with matter
2. Explain the process of production of X-rays. What are the factors influencing the intensity and quality of X-rays?

SHORT ESSAYS (Answer any Three) 3 x 5 = 15 Marks

3. Explain the construction and parts of a transformer
4. Explain in detail about full wave rectification
5. What is heel effect? Explain with a neat diagram
6. Define Ohm's law and Kirchoff's law of voltage

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

7. Methods of cooling X-ray tubes
8. Types of transformers
9. What is heating effect of electric current?
10. What is half value thickness?
11. Define Becquerel and Curie
12. Draw the block diagram of a basic X-ray circuit

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 23-Nov-2023

Time: 3 Hours | Max. Marks: 40 Marks

Physics of Radiology – (RS-3)

Q.P. Code: 1354

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1353 and 1354 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) 1 x 10 = 10 Marks

1. Explain with a neat diagram the construction and working of image intensifier tube.
2. Explain biological effects of radiation in detail and write a note on chromosomal aberrations.

SHORT ESSAYS (Answer any Three) 3 x 5 = 15 Marks

3. Main voltage compensation
4. Explain Thermo-luminescent dosimeters in detail.
5. Explain Earthing and its types.
6. Describe briefly Mobile x-ray unite.

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

7. Explain spinning top test.
8. Fuse
9. Define 10day and 28day rule.
10. Define use factor and Occupancy factor.
11. Crossed hatched grids
12. Space charge

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Imaging Technology Degree Examination – 28-Nov-2023

Time: Three Hours | Max. Marks: 60 Marks

Radiographic Photography and Image Processing (RS-3)

Q.P. CODE: 1355

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

LONG ESSAYS (Answer any Two) 2 x 10 = 20 Marks

1. Describe in detail about radiographic image and factors affecting it.
2. Explain different types of cassettes and its structure.
3. Describe in detail daylight film handling system with neat diagram.

SHORT ESSAYS (Answer any Five) 5 x 5 = 25 Marks

4. Working principle of Digital radiography
5. Intensifying screen and its types
6. Automatic processor
7. Developer and fixer composition
8. Characteristic curve
9. Silver recovery-any one method
10. Film speed and resolution

SHORT ANSWERS (Answer any Five) 5 x 3 = 15 Marks

11. Hangers
12. Film fog
13. Intensification factor
14. Safe light test
15. x-Ray viewing equipment
16. Magnification radiography
17. Phosphors

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Medical Imaging Technology Degree Examination – 23-Nov-2023

Time: Three Hours | Max. Marks: 100 Marks

RADIATION PHYSICS

Medical Physics & Radiation Safety in Radio Diagnosis (RS-4)

Q.P. CODE: 3290

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) 2 x 10 = 20 Marks

1. What is rectification? Explain the types of rectifiers
2. Discuss the X-ray spectrum
   OR
   Explain the interactions of X-rays and Gamma rays with matter

SHORT ESSAYS (Question No 5 & 10 choice) 10 x 5 = 50 Marks

3. Discuss the working principle of Pocket Dosimeter
4. Explain the “Line focus principle”
5. Methods of x-ray tube cooling
   OR
   Transformer losses
6. Explain the wave and particle nature of electromagnetic radiation
7. Mains voltage drop – causes and remedy
8. Metal ceramic x-ray tube
9. Primary and secondary barriers in radiation protection
10. Charged coupled device (CCD)
    OR
    Television monitor
11. Radiation protection in pediatric patients
12. Capacitor discharge generator

SHORT ANSWER 10 x 3 = 30 Marks

13. Classify Nuclides
14. Brief about the cardinal principles of radiological protection
15. High tension cables
16. Define – space charge effect and thermionic emission
17. Aperture diaphragm
18. Explain focused grids, its advantages and disadvantages
19. Draw any three radiation signage
20. Define – Half Value Layer (HVL) And Linear Attenuation Coefficient (LAC)
21. Explain the terms – Oxygen Enhancement Ratio (OER) and Absorbed Dose
22. Draw a neat diagram of stationary anode x-ray tube

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Medical Imaging Technology Degree Examination – 02-Dec-2023

Time: Three Hours | Max. Marks: 100 Marks

RADIOGRAPHIC POSITIONING AND TECHNIQUES (RS-4)

Q.P. CODE: 3292

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) 2 x 10 = 20 Marks

1. Explain in detail positioning for shoulder in trauma setting
2. Routine and supplementary views for chest x-ray
   OR
   Routine and supplementary projections for C-spine and how is it different from neck x-rays

SHORT ESSAYS (Question No 5 & 10 choice) 10 x 5 = 50 Marks

3. Explain the positioning for zygomatic arches
4. Routine views and positioning for PNS
5. Explain cephalometry in detail
   OR
   Explain OPG in detail
6. View taken for facial bone trauma
7. Explain in detail Judet view
8. Write briefly about orbital foramina and orbital views
9. Write the difference between chest AP vs PA view
10. Explain carpel tunnel view in detail
    OR
    Explain in detail views for mastoid
11. Explain submentovertex view
12. Explain in detail x-rays taken for acute abdomen

SHORT ANSWER 10 x 3 = 30 Marks

13. Indication for swimmers view
14. AP wagging jaw (Ottonello method)
15. Name all the cranial bones
16. Explain the positioning for lumbar spine erect lateral
17. Indications for chest lateral view
18. Positioning for Intercondylar fossa of knee
19. Views for sphenoid sinus
20. Indications and contraindications for Rhese view
21. SI joint view
22. Waters view