Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - APRIL-2019

[Time: 3 Hours] [Max. Marks: 80]

Advanced Technique and Instrumentation of MRI

Q.P. CODE: 9545

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Explain image formation and acquisition in MRI.
2. Write the protocol and parameter of abdominal imaging in MRI.
3. Describe various techniques of MRI angiography.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Care and maintenance test in MRI
5. Discuss types of coils used in MRI and its uses.
6. Black blood imaging in MRI and its uses
7. Motor nerve protocol and technique in MRI
8. Protocol for hepatobiliary imaging
9. Safety parameters in MRI
10. Explain about the application of contrast agent in MRI.
11. Phase contrast angiography
12. Parallel imaging technique
13. Gating mechanism in MRI

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Types of magnet
15. BOLD
16. Contraindications of MRI
17. Epilepsy protocol
18. Phase contrast velocity
19. FLAIR
20. Gibbs artifact
21. Faradays cage
22. Name all the metabolites found in MR spectroscopy
23. Precession frequency
24. Biological effect of MRI
25. Mention the parameters of proton density weighted sequence.

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - APRIL-2019

[Time: 3 Hours] [Max. Marks: 80]

Interventional Radiology Techniques

Q.P. CODE: 9546

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Describe the pre procedures and post procedures care of interventional radiology procedures.
2. Explain the principle and utility of DSA.
3. Basic technique for abdominal aortic angiogram. Types of catheters in angiography.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Explain about flat panel detector.
5. Pressure injector and pulse oximeter.
6. CO2 angiography.
7. Plumbicon camera tube.
8. Cutting biopsy needles a) Description, b) Measurements, c) Purpose of use, d) Types
9. Catheters, needle and equipments used in interventional radiology
10. Peel –away sheath
11. Protective device used in Cathlab
12. Angiographic X-ray tube design
13. Single and biplane angiographic equipment

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Embolic materials
15. Diagram of vascular sheath
16. Crash trolley
17. PTC and its uses
18. Any five methods adopted for reducing the risk of contrast reaction during a interventional procedures
19. Pre procedure check list for DSA
20. Venous assess in iliac vein obstruction
21. Vascular plugs
22. Complications of catheter angiography
23. End hole vs Side hole catheters
24. Define road mapping
25. Cine camera

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - APRIL-2019

[Time: 3 Hours] [Max. Marks: 80]

Care of Patients in Diagnostic Radiology

Q.P. CODE: 9547

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Explain in detail about handling emergencies in radiology.
2. Explain barrier nursing techniques. Add a note on responsibilities of technologist.
3. Explain in detail of patient care during cardio vascular system investigation.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Infection control to be taken by a technologist
5. Briefly explain about TDS
6. Care of patient during and after limb angiography
7. First aid in x ray department
8. Preparation of patient undergoing CT enteroclysis
9. Legal responsibilities of technologist
10. Preparation of patient and trolley for cystourethrography investigation
11. Various modes of transmission of infection and their prevention measures
12. Role of technologist in patient education and aspects of patient comfort
13. Post procedure care of patient undergoing various fluoroscopic examination

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. ALARA concept
15. Post procedure care after contrast CT
16. Laying of sterile trolley
17. Patient transfer technique
18. Interacting with terminally ill patients
19. Need of informed consent
20. Ten day rule
21. Various methods of sterilization
22. Contraindications of X rays
23. Patient care during contrast administration
24. Instruction given before receiving patient for renal Doppler
25. Patient care during MRI procedure

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - APRIL-2019

[Time: 3 Hours] [Max. Marks: 80]

Radiation Evaluation and Protection in Diagnostic Radiology

Q.P. CODE: 9548

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Discuss in detail about rules and regulations of AERB pertaining to radiology department.
2. Discuss in detail about radiation protection in angiography room.
3. Explain about various personal monitoring devices with their advantages and disadvantages.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Discuss about calibration instruments.
5. Discuss about filtration and its types.
6. Explain about film badge.
7. Discuss about extremity dosimeter.
8. Explain about gonad shield and its types and its benefits.
9. Explain about whole body radiation syndrome.
10. Explain about early and late effects of radiation.
11. Radiation protection for paediatric patients
12. Discuss about the construction, working principle and advantages of GM counter.
13. Discuss about pocket dosimeter with its advantages.

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Concept of doubling dose
15. Occupancy factor
16. Define somatic effect.
17. Define equivalent dose.
18. Name the different types of gas filled detectors.
19. Principle and advantages of GM counter
20. Give two examples of deterministic effects of radiation.
21. Name the indirect effects of radiation
22. ICRP dose limits for occupational worker and public
23. Block diagram of film badge
24. Define dosimeter.
25. Dose reduction in mammography

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - April-2019

[Time: 3 Hours] [Max. Marks: 80]

Nuclear Medicine Imaging Techniques
Q.P. CODE: 9549

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Principle of a reactor and the various radio isotopes produced by it for application in nuclear medicine
2. Classify renal radio pharmaceutical agents. Explain in detail each one of them.
3. Describe the various radionuclides used in diagnostic nuclear medicine.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Explain the relationship between decay constant and half life.
5. Scintillation spectrometer operation and its types
6. Explain the general characteristic of the radionuclides produced by neutron activation.
7. Give the physical properties of radionuclides such as C^{11}, N^{13}, O^{16}, F^{18}, Tc 99m, I-131, I-123 with their half lifes.
8. Explain about the image reconstruction methods in SPECT.
9. Nuclear fission and Nuclear fusion
10. Compare features of three types of collimators which can be used with a gamma camera
11. Explain about semiconductor detectors.
12. Disposal of radioactive wastes
13. Multi crystal camera

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Bone graft viability
15. Diagram of PMT
16. Any five properties of Iodine 131
17. Name few radiation measuring devices
18. Pocket dosimeter
19. Advantages of TLD badges
20. Line spread function
21. Types of thyroid tests in nuclear medicine
22. Types of noise
23. Specific activity
24. Different procedures adopted for handling radioactive spill
25. Define Half life.

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - SEP-2019

[Time: 3 Hours] [Max. Marks: 80]

Advanced Technique and Instrumentation of MRI

Q.P. CODE: 9545

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Discuss in detail the advanced imaging technique in MRI.
2. Describe in detail about MRI artifacts.
3. What are the three logical or functional gradients required to obtain on image?

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. MRI contrast media
5. Explain about STIR, SPIR and FLAIR sequence.
6. Discuss about static imaging of cardiac images. Mention few difference of static and cine images.
7. Contrast to Noise ration in MRI
8. Sequence looping
9. MRI protocol for sella
10. Phase encoding
11. K-space
12. Discuss on Fourier transformation.
13. Phased array coils

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Nyquist frequency
15. Surface coils
16. Mention the important difference between T1 and T2 relaxation.
17. Utility of helium in MRI
18. Protocols used for MRI Knee
19. Clipping artifact
20. Non-selective pulse
21. SMASH and GRAPPA
22. Prospective gating and retrospective gating
23. DIR
24. Faraday's cage
25. Name few fast imaging sequence

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Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - OCT-2019

[Time: 3 Hours] [Max. Marks: 80]

Interventional Radiology Techniques
Q.P. CODE: 9546

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Explain about the principle of DSA.
2. What are the radiation safety to be followed in Cath lab?
3. Explain about diagnostic and therapeutic interventional procedures. Explain PTBD in detail.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Image intensifier
5. Role of Radio frequency ablation
6. Transcatheter brush biopsy
7. Seldinger technique
8. Discuss about road map subtracted and non-subtracted angiography.
9. Direct puncture embolizaiton
10. Angioplasty balloons
11. Procedures done for AVM
12. Quality assurance tests done for DSA equipments
13. Antegrade ureteric stent

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Masking
15. Vascular plugs
16. Maintenance of IR room
17. Pigtail catheter
18. Indication of PTBD
19. Block diagram of image intensifier
20. Name neurointerventional procedures
21. Barrier nursing technique
22. Pixel shifting
23. Pressure injector
24. Carotid angioplasty
25. Radiation protective devices

Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - OCT-2019

[Time: 3 Hours] [Max. Marks: 80]

Care of Patients in Diagnostic Radiology

Q.P. CODE: 9547

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Write the management of adverse reaction of contrast and emergency drugs used in department.
2. What is medico-legal cases. Write the legal responsibility of imaging technologist.
3. Write the various responsibility of an imaging technologist in patient care.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Write the hospital acquiring infection.
5. Disposal of sharp needle add note on needle stick injury.
6. Write the possibility of projectile injuries in MRI.
7. Write about the isolation technique.
8. Write the transmission modes of infection.
9. Write the short note on PCPNDT act.
10. Write about counseling, education and convincing the patient.
11. What are three methods of reducing a patient exposure to ionizing radiation?
12. Pre and post care of patient during interventional procedures.
13. Write a short note on patient preparation for MRI.

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Hypovolemic shock.
15. Restraint techniques.
16. Respiratory distress.
17. Crash cart.
18. Three methods of moving the patient.
19. Psychological consideration.
20. Effective patient communication.
21. Medical malpractice.
22. Medico-legal cases.
23. Informed consent.
24. Defibrillation.
25. What is to be done to the used needle and syringes?

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Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - OCT-2019

[Time: 3 Hours] [Max. Marks: 80]

Radiation Evaluation and Protection in Diagnostic Radiology

Q.P. CODE: 9548

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Explain about biological aspects of radiation protection.
2. Explain the use of the radiation quantity, equivalent dose.
3. Discuss about ARS and its major response stages.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Collective effective dose
5. Describe threshold dose.
6. Liner energy transfer
7. ICRP
8. Effective dose limiting system
9. Explain about a) Measuring skin dose directly b) Bone marrow dose c) Genetically Significant Dose (GSD).
10. Discuss on the categories of radiation shielding.
11. Note on leak radiation
12. Optically stimulated luminescence dosimeter
13. Late somatic effects

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. What is attenuation?
15. What are the cause of genetic mutation?
16. Model for ALARA concept
17. Positive beam limitation
18. Gonodal dose
19. TLD
20. Collective effective dose
21. BERT
22. Advantages and disadvantages of TLD over film badge
23. Source to skin distance
24. Grid ration
25. Components of pocket ionization chamber

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Rajiv Gandhi University of Health Sciences

II Year M. Sc Medical Imaging Technology - OCT-2019

[Time: 3 Hours] [Max. Marks: 80]

Nuclear Medicine Imaging Techniques
Q.P. CODE: 9549

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

LONG ESSAY (Answer Any Two) **2 X 10 = 20 Marks**

1. Write the principle and construction of Tc99m generator.
2. Describe the application of radiation monitoring equipment.
3. Write the radiation safety for personal and public nuclear medicine.

SHORT ESSAY (Answer Any Eight) **8 X 5 = 40 Marks**

4. Write the characteristic of radio-pharmaceuticals.
5. Pin hole and parallel hole collimators in gamma camera.
6. Dose calibration in nuclear medicine.
7. Modes of radioactivecay.
8. Write the principle of tracer technique.
9. Write the bone scintigraphy procedure.
10. Precaution while handling the radioactive material.
11. Write about thyroid uptake system.
12. Explain briefly about pair production.
13. Write the preparation of pharmaceuticals.

SHORT ANSWERS (Answer Any Ten) **10 X 2 = 20 Marks**

14. Binding energy of an atom
15. Hot lab
16. Dose modifying factors
17. Indications for renal scan study
18. Wipe testing
19. MDP
20. PMT
21. Radiolabeling
22. Rectilinear scan
23. Avalanche photodiode
24. Rectilinear scan
25. Isotopes

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