[LD 0212] **AUGUST 2013** **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY /

B.Sc. RADIO DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY & RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 marks**

Answer ALL questions

I. Elaborate on: **(3 x 10 = 30)**

1. Write short note on location of x-ray department in a hospital.
2. Describe the role of an administration in an X-ray department.
3. Describe important principles of radiation protection.

II. Write notes on: **(8 x 5 = 40)**

1. What is use periodic in-service training?
2. What is the concept of ALARA?
3. How are the radiation effects classified?
4. Construction of the dark room?
5. Explain X-ray room lighting.
6. Explain the Thyroid shielding?
7. Write short note on TLD?
8. Write short note on Maximize shielding?

III. Short Answers on: **(10 x 3 = 30)**

1. Patient holding.
2. What is chronic radiation dermatitis?
3. Film badges.
4. Write effective dose limits for tissue and organs.
5. Cassette conveyors.
6. Lead aprons.
7. What are the rest and recovery areas.
8. Calculation of space required for radiology in the non teaching hospital.
9. Environmental factors.
10. Effects of radiation on reproductive organs.

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[LE 0212] **FEBRUARY 2014** **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY /

B.Sc. RADIO DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY & RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 marks**

Answer ALL questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain two broad categories of harmful effects of radiation.
2. Summary of NCRP recommendation for radiation lose limits.
3. Describe the groups of patient at the area in an x-ray department and importance.

II. Write notes on: **(8 x 5 = 40)**

1. What are the sources of internal radiation exposure
2. Explain Medical radiation
3. What is meant by ALARA? Explain its significance.
4. Write does limit recommended by the NCRP
5. Write short notes on radiation protection and need for protection of a pregnant radiographer?
6. How to reduce unnecessary patient dose?
7. Write short notes on cassette conveyors?
8. Write short notes on minimize time.

III. Short Answers on: **(10 x 3 = 30)**

1. What are two building materials available for the construction of radiation protecting walls?
2. Who are ultimate persons for ensuring the radiation protection recommendation in India?
3. X-ray room lighting.
4. What is chronic radiation dermatitis.
5. What are clinical features of radiation sickness?
6. Briefly describe work space factors.
7. Environmental factors calculation of space required in the non teaching hospital.
8. TLD.
9. Lead aprons.
10. Three steps of quality controls.

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[LF 0212] **AUGUST 2014** **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY / RADIOLOGY DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY & RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 marks**

Answer ALL questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe in detail the three principles of radiation protection.
2. Explain about the biological effects of radiation.
3. Write in detail about the different methods of personnel monitoring and bring out advantages of one over other.

II. Write notes on: **(8 x 5 = 40)**

1. Effective dose.
2. Workload calculation in diagnostic radiology.
3. Dose limits for radiation workers.
4. Internal exposure.
5. Back ground radiation exposure.
6. Radiation protection of patients.
7. Equipment radiation safety.
8. Biological dosimeter.

III. Short Answers on: **(10 x 3 = 30)**

1. What is recommended total filtration required to operate x-ray tube safely?
2. Recommended thickness of protection device aprons and gloves.
3. Table – Top exposure rate and Target to Table Top distance in fluoroscopy
4. Location of X-ray unit and area requirement for radiography procedures.
5. The exposure level at the distance of 50 cm is 16 mR/hr. What would be the exposure level at the distance of 1 m and 25 cm?
6. Deterministic effect
7. Dose limit for students/trainees.
8. Viewing window in CT scan.
9. Mobile X-ray unit cable length.
10. Tissue weighting factors.

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[LG 0215] **FEBRUARY 2015** **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY /

B.Sc. RADIO DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY & RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 marks**

Answer ALL questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the procedure and methods of AERB regulatory requirements to design of diagnostic X-ray installation with neat layout sketch.
2. Explain about the somatic and hereditary effects of radiation with example.
3. Write in detail about the area monitoring and assess the status of radiation safety.

II. Write notes on: **(8 x 5 = 40)**

1. What are the early effects of radiation?
2. Control of hazard due to external exposure.
3. Dose limits for public.
4. ICRP 60.
5. Leakage radiation and permissible limit for x-ray tube housing.
6. Radiation protection of workers.
7. Fluoroscopy equipment radiation safety.
8. Registration of X-ray unit with AERB.

III. Short Answers on: **(10 x 3 = 30)**

1. What are procedures and tools to reduce patient dose?
2. Chromosome aberration.
3. Late effect of radiation.
4. Annual dose limit of radiation worker and pregnant radiation worker.
5. The level of exposure in working area is 2 mR/hr. How long one should permit to work per day without exceeding the weekly permissible dose limit?
6. Equivalent dose.
7. Use factor.
8. Protection of general public.
9. What is the relationship between time and exposure?
10. Occupational exposure.

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[LH 0815] **AUGUST 2015** **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY / RADIOLOGY DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 marks**

Answer ALL questions

I. Elaborate on: **(3 x 10 = 30)**

1. Plan a diagnostic X-ray room setup with schematic diagram confirming AERB recommendations.
2. Explain in detail various radiation protection tools / devices.
3. What is ALARA? Explain various methods to reduce patient dose in Fluroscopy.

II. Write notes on: **(8 x 5 = 40)**

1. Factors affecting radiation in diagnostic X-rays.
2. Thermoluminescent dosimeter, its advantages over film badge.
3. How to reduce patient dose in X-ray studies on children?
4. AERB regulations on warning signs at a Diagnostic X-ray room.
5. Permissible dose limits for public and radiation worker.
6. Patient dose reduction in CT – explain on Pitch, CT dose modulation.
7. How to assess radiation workload?
8. Importance of quality control in radiation safety.

III. Short Answers on: **(10 x 3 = 30)**

1. Radiation effects on eye.
2. Use and features of thyroid shield.
3. Sources of background ionizing radiation.
4. Importance of X-ray beam collimation.
5. Latency period for radiation induced cancer.
6. Skin entrance dose, how to reduce it?
7. Equivalent Dose, How do we equate effects of different kinds of radiation?
8. Cumulative dose, why is this relevant in radiation safety?
9. Use of Lead goggles.
10. Inverse square law, its application.

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[LI 0216] FEBRUARY 2016 **Sub Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY / RADIO DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 Marks**

Answer All questions.

I. Elaborate on: **(3 x 10 = 30)**

1. Classify and discuss various biological effects of radiation.
2. What is ALARA? Explain various methods to reduce patient dose.
3. Explain in detail Thermo luminescent Dosimeter with diagram, advantages over Film badge.

II. Write notes on: **(8 x 5 = 40)**

1. Inverse square law - explain with an example.
2. What are electronic dosimeters – their usage in radiation survey?
3. AERB regulations on designing a Diagnostic X-ray room.
4. Discuss various radiation protection tools/devices.
5. Discuss on Warning signs that has to be displayed at a Diagnostic X-ray room.
6. How to assess radiation workload?
7. Importance of quality control in radiation safety.
8. What is Skin entrance dose, various factors that affect skin entrance dose?

III. Short answers on: **(10 x 3 = 30)**

1. Newer online registration for Radiation devices.
2. What is Last frame hold, how does this help?
3. How to check performance of a lead apron periodically?
4. Background ionizing radiation, enumerate the sources.
5. Notes on Radiation induced cancer.
6. Provide dose limits recommended for public and radiation worker.
7. Equivalent Dose, How do we equate effects of different kinds of radiation?
8. Cumulative dose, why is this relevant in radiation safety?
9. Use and features of gonad shield.
10. CT Dose modulation, effect on patient dose.

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[LJ 0816] AUGUST 2016 **Sub Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY / RADIO DIAGNOSIS TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time : Three Hours **Maximum : 100 Marks**

Answer All questions.

I. Elaborate on: **(3 x 10 = 30)**

1. Write in detail about the different methods of personnel monitoring and their advantages.
2. Explain about the biological effects of radiation.
3. Enumerate the general guidelines in planning a radiation facility which includes diagnostic radiology and radiotherapy? Draw a schematic diagram of a model plan of an X-ray room.

II. Write notes on: **(8 x 5 = 40)**

1. Genetically significant dose.
2. Equivalent dose.
3. Dose limits according to ICRP 60.
4. Responsibilities of a Radiological safety officer (RSO) in radiation protection.
5. Cosmic rays.
6. Lead apron.
7. Film badge.
8. Registration of X-ray unit with AERB.

III. Short answers on: **(10 x 3 = 30)**

1. What are procedures and tools to reduce patient dose?
2. Roentgen.
3. View boxes.
4. Annual dose limit of radiation worker and pregnant radiation worker.
5. Thyroid shield.
6. Chronic radiation dermatitis.
7. ALARA principle.
8. Tissue weighting factors.
9. Half value layer.
10. X-ray room lighting.

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[LK 0217] FEBRUARY 2017 **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY
SECOND YEAR
PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe in detail about the artificial sources of radiation and corresponding average annual human exposure to ionizing radiation.
2. Describe the Direct and Indirect action of radiation on biological molecules.
3. Discuss the personnel requirements and responsibilities given in AERB safety code for diagnostic radiology.

II. Write notes on: **(8 x 5 = 40)**

1. Explain briefly about sources of background ionizing radiation.
2. Explain the radiation dose response relationships.
3. Discuss about genetic effects of radiation.
4. Discuss the safety specifications for Mammography Installation with a neat layout diagram as per AERB safety guidelines.
5. Write the does limits recommended by the ICRP 2007 Recommendations.
6. Compare the risk of radiation with other industries.
7. Advantage and disadvantage of pocket dosimeter.
8. Write the specifications for protective devices used in diagnostic radiology department.

III. Short answers on: **(10 x 3 = 30)**

1. Three principles of radiation protection.
2. International Agencies responsible for Radiation safety.
3. What is meant by ALARA? Explain its significance.
4. What is Absolute Risk? Mention the absolute risk of a fatal radiation-induced malignant disease?
5. Linear Energy Transfer and Radio sensitivity.
6. Radiation effects on eye and current dose limit.
7. Workload and Workload distribution.
8. Controlled and uncontrolled area.
9. Warning Light and Placard.
10. AERB Safety specifications for mobile Radiography systems.

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[LL 0817] AUGUST 2017 **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain in detail about the Deterministic effects of radiation.
2. Describe in detail the methods of control of radiation exposure.
3. Draw a fluoroscopy equipment layout and discuss the safety specifications in details as per AERB Recommendations.

II. Write notes on: **(8 x 5 = 40)**

1. Explain the radiolysis of water.
2. Elaborate the effects of radiation during pregnancy.
3. Explain about chromosomal aberration.
4. Discuss about the sources of exposure in Diagnostic/Interventional X-ray room.
5. Discuss the AERB guidelines for shielding of X-ray Installations.
6. Sources of background ionizing radiation.
7. Principle of Thermoluminescent Dosimeter and guidelines for using TLDS.
8. Discuss the radiation survey procedure in X-ray installations.

III. Short answers on: **(10 x 3 = 30)**

1. Radiation induced leukemia.
2. Lifespan Shortening.
3. What is chronic radiation dermatitis?
4. Law of Bergonie and Tribondeau.
5. Primary and secondary barriers.
6. Workload and occupancy factor.
7. AERB safety specifications for Dark Room.
8. Annual dose limits of radiation worker and pregnant radiation worker.
9. Dose limits for students/trainees.
10. Pocket dosimeters.

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[LM 0218] FEBRUARY 2018 **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the Direct and Indirect action of radiation on biological molecules.
2. Draw a CT layout and discuss the safety specifications in details as per AERB Recommendations.
3. Discuss the safe work practices in diagnostic radiology department to reduce patient exposure.

II. Write notes on: **(8 x 5 = 40)**

1. Explain briefly about medical exposure of patients with ionizing radiation.
2. Discuss the radiolysis of water.
3. Compare the risk of radiation with other industries.
4. Discuss the calculations for Primary and secondary barrier designs.
5. Discuss the radiation survey procedure in X – ray installations.
6. Write the does limits recommended by the ICRP 2007 Recommendations.
7. Principle of Thermoluminescent Dosimeter and Guidelines for using TLDs.
8. Write the specifications for protective devices used in diagnostic radiology department.

III. Short answers on: **(10 x 3 = 30)**

1. Radiation Hormesis.
2. Lifespan shortening.
3. Use factor and occupancy factor.
4. Area monitors.
5. What is chronic radiation dermatitis?
6. Law of Bergonie and tribondeau.
7. Define relative risk? List out the relative risks of radiation induced malignancies.
8. Relative biological effectiveness and radio sensitivity.
9. Radiation effects on eye and current dose limit.
10. What is meant by ALARA? Explain its significance.

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[LN 0818] AUGUST 2018 **Sub. Code: 1823**

B.Sc. RADIOLOGY IMAGING TECHNOLOGY

THIRD YEAR

PAPER III – RADIOBIOLOGY AND RADIATION SAFETY

Q.P. Code: 801823

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe in detail ELORA principles and Guidelines.
2. Explain various methods of quality assurance and control in CT.
3. Explain in detail planning of nuclear medicine department.

II. Write notes on: **(8 x 5 = 40)**

1. Deterministic effects.
2. RSO.
3. AERB.
4. Pocket dosimeter.
5. Roentgen.
6. Milli sieverts.
7. CT fluoroscopy.
8. MR Room Requirements.

III. Short answers on: **(10 x 3 = 30)**

1. Filtered back projection.
2. Radiation survey meter.
3. K space.
4. Leakage radiation.
5. Scattered Radiation.
6. Ten Day Rule.
7. Gamma ray.
8. Electromagnetic spectrum.
9. Radiation shielding.
10. Lead Apron thickness.

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