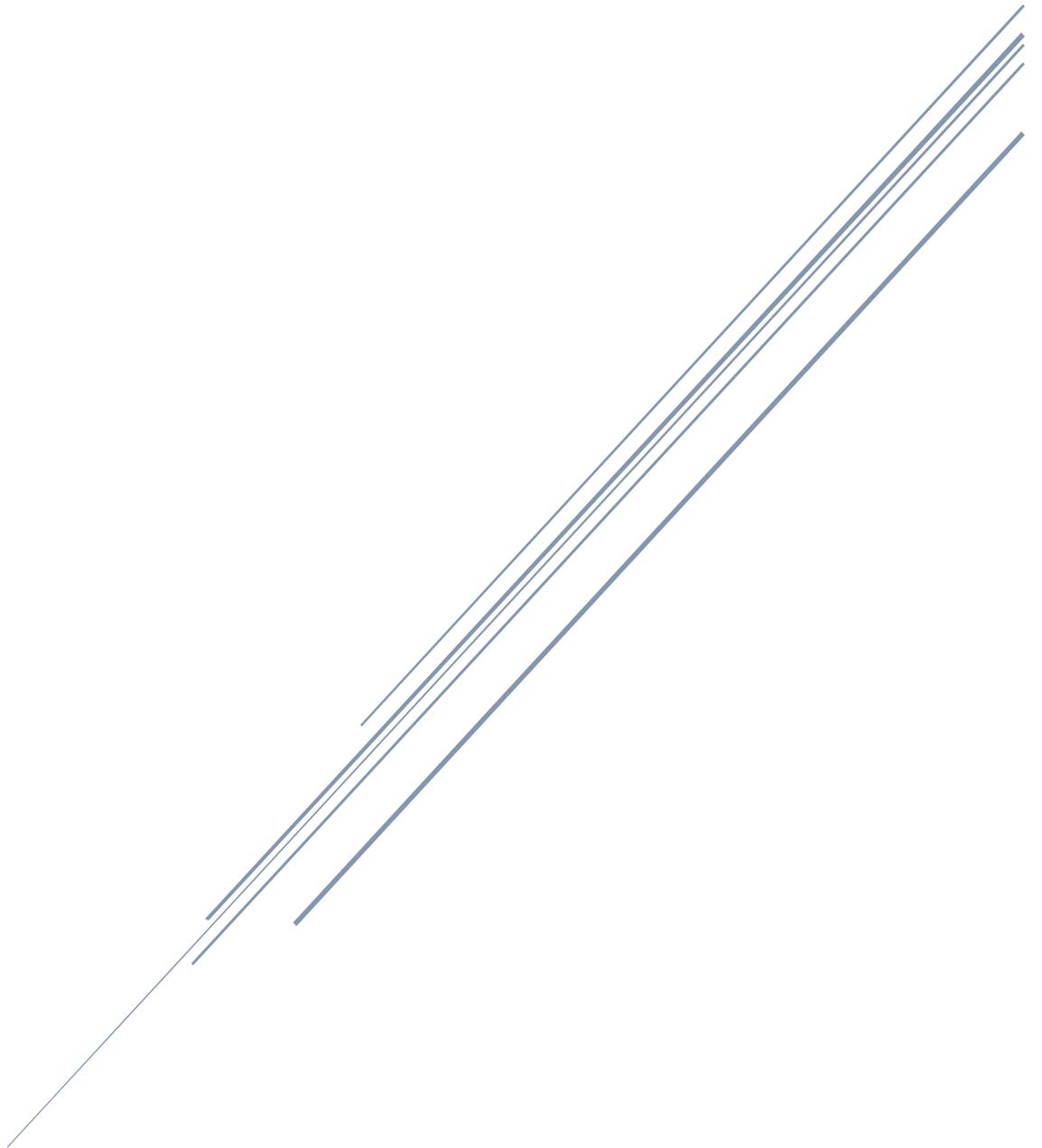


EMPLOYER AWARENESS FOR DIAGNOSTIC RADIOLOGY

Notes for AERB-eLORA Assessment Test



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Introduction

The **Atomic Energy Regulatory Board (AERB)** is the statutory authority responsible for ensuring radiation safety in the use of ionizing radiation in India. To safeguard patients, radiation workers, and the public, AERB mandates that employers and professionals involved in diagnostic radiology understand and comply with radiation protection principles and regulatory requirements.

To submit any regulatory application through the **eLORA (Electronic Licensing of Radiation Applications)** portal of AERB, employers of diagnostic radiology facilities are required to **qualify an online Employer Awareness Assessment Test**. This assessment evaluates the employer's understanding of radiation safety, regulatory obligations, and best practices in diagnostic radiology.

These notes are intended for **owners, employers, and authorized signatories of diagnostic radiology facilities**, particularly those preparing for the **MCQ-based Employer Awareness Assessment**. To facilitate quick learning and revision, the notes are presented in concise bullet points, organized by topic areas commonly covered in the assessment.

What to Expect in the Employer Awareness Assessment Test

- The assessment is conducted online through the **eLORA portal** of AERB
- The test consists of a set of 10 Nos. Multiple Choice Questions (**MCQs**)
 - Time limit of 15 minutes
 - No of attempts allowed : 3
 - All questions need to be answered
 - No Negative Marking
 - A question can be answered only once
- Questions are based on:
 - Basic radiation physics
 - Regulatory framework
 - Licensing and authorization
 - Personal monitoring
 - Radiation dose limits
 - Shielding and protective devices
 - Quality assurance (QA)
- Qualifying the assessment is mandatory for submitting applications such as:
 - Procurement permission
 - License for operation
 - Amendment or renewal requests

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Notes for Employer Awareness Assessment Test

Basic Physics

- X-rays are a form of **electromagnetic radiation**
 - X-rays are capable of ionizing matter and therefore require regulatory control
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Basic Regulatory Framework

- **Atomic Energy (Radiation Protection) Rules, 2004** are the primary government rules applicable for radiation safety in India
 - The mission of AERB is to ensure that the use of ionizing radiation and nuclear energy does not cause undue risk to:
 - Human health
 - The environment
 - The **Chairman, AERB** is the competent authority for ensuring radiation safety in the country
 - **eLORA** stands for *Electronic Licensing of Radiation Applications*
 - As per Atomic Energy (Radiation Protection) Rules, 2004:
 - An **Employer** is any person who employs workers, imparts training using radiation sources, or is self-employed in a radiation installation
 - The employer is the **custodian of X-ray equipment**
 - The employer is responsible for ensuring **overall radiation safety** in the X-ray installation
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Authorization and Licensing

- The validity of a **License for Operation** issued by AERB is **5 years** from the date of issue
 - Renewal of the license must be **initiated before the expiry date**
 - Operating X-ray equipment without a valid license may attract penalties including:
 - Suspension of license
 - Monetary fine
 - Imprisonment under applicable law
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Personal Monitoring

- **PMS** stands for *Personal Monitoring Services*
- **Thermo Luminescence Dosimeter (TLD) badges** is commonly used in India for radiation dose measurement and *to monitor radiation doses received by occupational workers*
- The chemical composition of TLD used in India is **CaSO₄:Dy**

- Objectives of personal monitoring include:
 - Maintaining long-term dose records
 - Assessing workplace radiation conditions
 - Ensuring safe and satisfactory radiological conditions
- Correct position for wearing a TLD badge:
 - **Inside the lead apron at chest level**
- The TLD control badge should be stored:
 - Outside the X-ray room
 - In a radiation-free area such as the admin or reception room after routine work

Radiation Workers and Dose Limits

- Minimum age to work in a radiation field is **18 years**
- Patient relatives wearing lead aprons may assist in holding patients **only when required**
- Radiation dose monitoring period for diagnostic radiology workers is **3 months**
- AERB recommended dose limits for radiation workers:
 - **20 mSv per year**, averaged over 5 consecutive years
 - Not exceeding **30 mSv in any single year**
- Dose limits apply to female workers as well; however:
 - Once pregnancy is declared, the dose limit to the embryo/foetus is **1 mSv** for the remainder of the pregnancy
- AERB dose limit for members of the public is **1 mSv per year**
- **Chromosomal Aberration (CA) test** is used to estimate biological radiation dose
- CA test may be required if radiation exposure exceeds:
 - 10 mSv in a quarter
 - 30 mSv in a year
 - 100 mSv over a block of 5 years
- Parameters reviewed during investigation of an **Excessive Exposure (EE)** case include:
 - Type of X-ray installation and layout compliance
 - Workload during the reported period
 - Equipment design safety and type approval status

Radiation Shielding and Protective Devices

- Objectives of radiation shielding:
 - Protect radiation workers
 - Protect adjacent staff
 - Protect members of the public
- Common shielding materials used in diagnostic X-ray installations:
 - Brick
 - Lead
 - Concrete
- Lead is commonly used for:

- Protective barriers
- Entrance doors
- Radiation protection accessories include:
 - Lead apron
 - Protective barrier
 - Lead goggles
 - Gonad shield
 - Lead gloves
 - Thyroid shield
- Factors determining barrier thickness:
 - Type of radiation
 - Type of equipment
 - Maximum energy and workload
- Fundamental principles of radiation protection:
 - **Time**
 - **Distance**
 - **Shielding**
- Recommended lead equivalence:
 - Protective barrier: **1.5 mm Pb**
 - Viewing window: **1.5 mm Pb**
 - Lead apron: **0.25 mm Pb**
 - Patient entrance door: **1.7 mm Pb**
 - Ceiling-suspended or couch-mounted shields: **0.5 mm Pb**

Quality Assurance (QA) Tests

- QA tests are conducted to:
 - Maintain equipment quality
 - Improve image quality
 - Increase equipment life
 - Reduce unnecessary patient and staff dose
- QA tests must be performed:
 - At least **once every 12 months**
 - After major repair, relocation, or equipment upgrade
- QA tests must be carried out **only by AERB-authorized agencies**

Conclusion

This concise notes support employers of diagnostic radiology in preparing effectively to qualify the assessment test in a *single attempt*. For further guidance on AERB regulatory requirements and AERB compliant equipment selection in West Bengal, healthcare facilities may consult us on [9073481182](tel:9073481182) or mail us at synermedtechnologies@gmail.com