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SynerMED Technologies 

EMPLOYER AWARENESS

For Diagnostic Radiology Facilities

Synopsis

A humble effort to guide Employers of Diagnostic Radiology understand and prepare for the AERB's Awareness Assessment effectively.

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FOREWORD

The Atomic Energy Regulatory Board (AERB) is the regulatory authority responsible for ensuring safety and security in the use of ionizing radiation in India. The AERB mandates that employers and workers involved in radiation-related activities understand and comply with safety requirements, including the radiation protection principles and regulations.

This guide aims to assist Employers of Diagnostic Radiology in understanding and meeting regulatory requirements, to ensure they successfully qualify for the Assessment for Employer Awareness Program to be entitled to submit regulatory applications through eLORA (electronic Licensing and Online Regulatory Affairs) portal.

To keep the study material concise and facilitate easy learning, this guide has been prepared in a Question-and-Answer format. The content is aligned with the type of Multiple Choice Questions (MCQs) that an Employer of a Radiation Facility can expect in the examination.

Furthermore, this guide is divided into different topics from which the Employer may expect questions. This structure will also help the Employer quickly identify the relevant answers.

A step-by-step process is provided at the end to assist the Employer in logging into the eLORA portal to appear for the Assessment.

We welcome your feedback for enhancing this document and would greatly appreciate any insights on additional topics or questions the Employer encountered during the test.

Moreover, any other concerns the Employer may have had while taking the test will be very much welcomed.

With warm regards

ARINDAM SARKAR

For SynerMED Technologies LLP, Kolkata

1. What are X-rays?

Electromagnetic Radiation

Basic Regulatory Framework

2. Which Government Rule is applicable for radiation safety in the country?

Atomic Energy (Radiation Protection) Rules, 2004

3. What is the mission of AERB?

The Mission of the AERB is to ensure the use of ionizing radiation and nuclear energy in India does not cause undue risk to the health of people and the environment

4. Who is the Competent Authority for ensuring radiation safety in the country?

Chairman, AERB

5. What is eLORA?

Electronic Licensing of Radiation Application

6. As per the Atomic Energy (Radiation Protection) Rules, 2004, who is the Employer?

Any persons who employ workers or imparts training using sources or who is self-employed as a worker in a radiation installation.

7. Who is Custodian of X-ray equipment as per Atomic Energy (Radiation Protection) Rules, 2004?

Employer

8. Who is responsible for ensuring overall radiation safety in X-ray installations?

Employer

Authorization and Licensing

9. What is the validity of a license issued by AERB?

5 years from the date of issue

10. What action to be initiated if the validity of License for operation issued by AERB is expired?

Renewed before its expiry

11. What are the penalties, if the X-ray equipment is operated without obtaining the License for operation?

Penalties may include all of the following:

- Suspension of License
- Fine
- Imprisonment

Radiation Monitoring

12. What is PMS?

Personal Monitoring Services

13. Why Personal Monitoring is carried out in radiation facility?

Personal monitoring helps

- To keep records of monitoring over / along period of time for good practice
- To assess workplace conditions and individual exposure
- To ensure acceptably safe and satisfactory radiological conditions of workplace.

14. Which type of dosimeter generally used for radiation dose measurement in India.

Thermo Luminescence Dosimeter (TLD)

15. What is the chemical composition of TLD?

CaSO₄: Dy

16. Why TLD Badges are used?

Used to monitor the radiation doses received by occupational workers

17. What is the right position to wear the TLD badge during the work, if you have worn the lead apron?

Inside the lead apron at chest level.

18. Where TLD control card should be stored after the routine work?

Outside the X-ray room in radiation free area (such as Admin room, reception room, etc.)

Radiation Worker & Dose Limits

19. What is the minimum age criteria to work in Radiation field?

18 years and above

20. Who should hold the patient whenever it is required during radiological procedures?

Patient relative with lead Apron

21. What is the radiation dose monitoring period for radiation workers in Diagnostic Radiology?

3 (Three) months

22. What is the radiation dose limits for radiation workers recommended by AERB?

20 mSv / year averaged over 5 consecutive years and it shall not exceed 30 mSv in any single year

23. What is the dose limit for female workers?

Dose limits given for occupational worker is applicable for female workers also. However, once pregnancy is declared the equivalent dose limit to embryo / foetus shall be 1 mSv for the remainder of the pregnancy.

24. What is the AERB dose limit for members of public?

AERB dose limit for members of public is 1 mSv in a year.

25. At what dose, Chromosomal aberration (CA) test can be conducted to estimate the biological dose of the exposed individual?

In case, radiation dose received a worker exceeds

- 10 mSv per quarter (Three months) or
- 30 mSv per annum or
- 100 mSv for a block of 5 (Five) Years

26. What are the parameters to be reviewed for investigation of EE (Excessive Exposure) case?

- Type of x-ray installation (whether complying layout requirements?)
- Workload during reported period
- Complying design safety requirements (whether x-ray equipment model is type approved?)

Radiation Shielding & Protective Device

27. What is the objective of radiation shielding in diagnostic x-ray facilities?

- To protect x-ray workers of the radiation facilities
- To protect the other staff working adjacent to or near the x-ray facility
- To protect members of the public

28. What are the commonly used shielding material in medical x-ray installations?

Common shielding material used in x-ray installations are

- Brick
- Lead
- Concrete

29. Which shielding material generally used in protective barrier & entrance door of x-ray installations?

Lead

30. What are the different types of radiation protection accessories to be used during the diagnosis of patients?

Lead apron, protection barrier, lead eye glass, gonad shield, hand gloves, thyroid shield, etc.

31. What are the different parameters which decides the barrier thickness in X-ray installation?

- Type of radiation
- Type of equipment
- Maximum energy of x-ray unit and workload

32. What are the basic factors for radiation protection in Diagnostic radiology?

Time, Distance & shielding

33. What are the recommendatory lead equivalence for radiation protective barrier, viewing glass window, lead apron and door of the x-ray installation room?

Protective barrier - 1.5 mm Lead Equivalence

Viewing glass window - 1.5 mm Lead Equivalence

Lead apron - 0.25 mm Lead Equivalence

Patient Entrance Door - 1.7 mm Lead Equivalence

Ceiling suspended/couch hanging screen/flaps – 0.5 mm Lead Equivalence

Quality Assurance (QA) Test

34. How often should QA tests be conducted on X-ray machines?

At least once every 12 months (annually) or after any major repair, relocation, or upgrade of the equipment.

35. Why QA tests of the X-ray equipment should be carried out periodically?

- Useful to maintain quality of equipment:
- Improves imaging standard
- Increase the Life of the X-ray tube/ equipment
- Useful in reduction of unnecessary patient's Dose & hence dose to the staff

36. Who is authorized to carry out the QA for X-Ray equipment?

Authorized agencies by AERB

Notes

1. Here you may expect tricky questions requesting to select incorrect option/s, like for Question 28:

Which material is normally not used as structural shielding material of X-ray installation?

Which material is normally not used as structural shielding material of X-ray installation?

Concrete

Wood

Brick

Lead

Ans: Wood (in this example)

2. Some questions might come across questions with all correct answers, like for Question 35:

What is the objective of carrying out QA tests of X-ray equipment?

What is the objective of carrying out QA tests of X-ray equipment

Useful to maintain quality of equipment

Improves imaging standard

all of above

Increase the Life of the X-ray tube/ equipment

Ans: all of above (in this example)

3. Some questions might require selection of specific correct answers, like for Question 33:

What is the recommended lead equivalence for patient Entrance Door?

What is the recommended lead equivalence for patient Entrance Door

3 mm Lead Equivalence

1.7 mm Lead Equivalence

1 mm Lead Equivalence

none of above

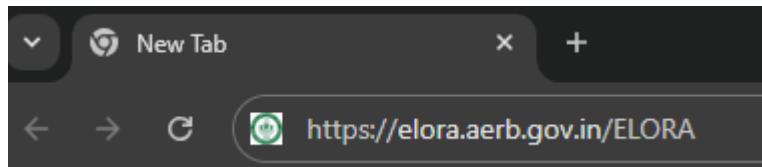
Ans: 1.7 mm Lead Equivalence (in this example)

In the next Section (Pages 5 – 9) we take you through the step-by-step guide for logging in to the eLearning portal for the course material & assessment.

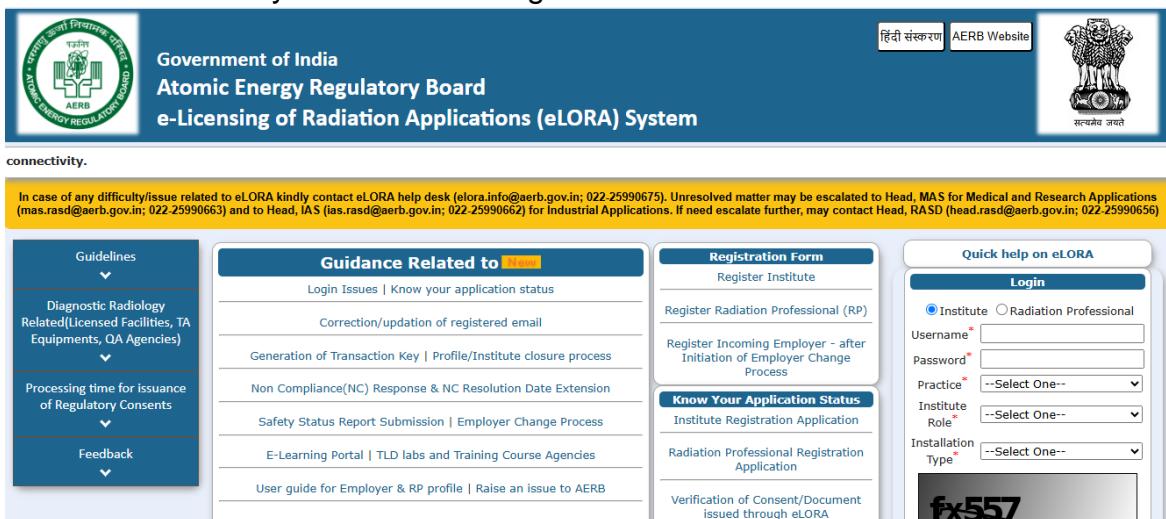
Please note that the training course must be accessed from a desktop or laptop only, and assessment attempted preferably with Camera option enabled in web browser.

Step-by-step Guide for Login, eLearning & Assessment

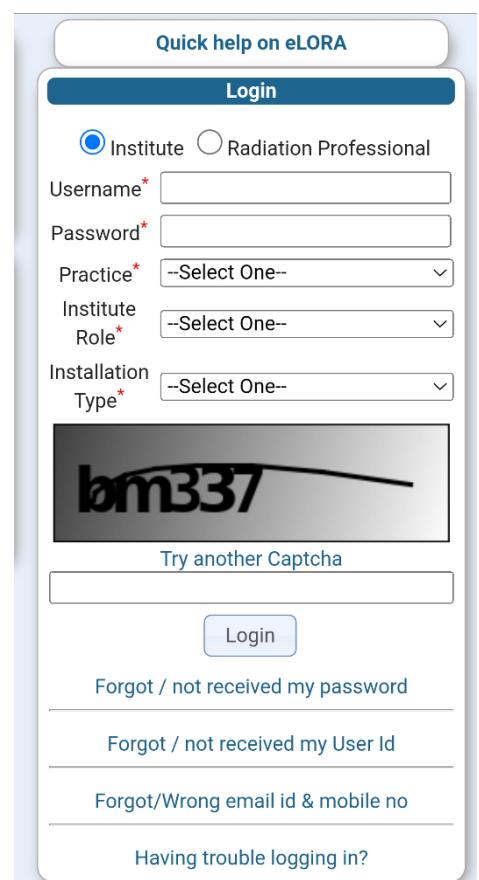
1. Open a new tab on your web browser.
2. Type in **https://elora.aerb.gov.in/ELORA** on the address bar of your browser: and press ↵ Enter to visit the eLORA website.



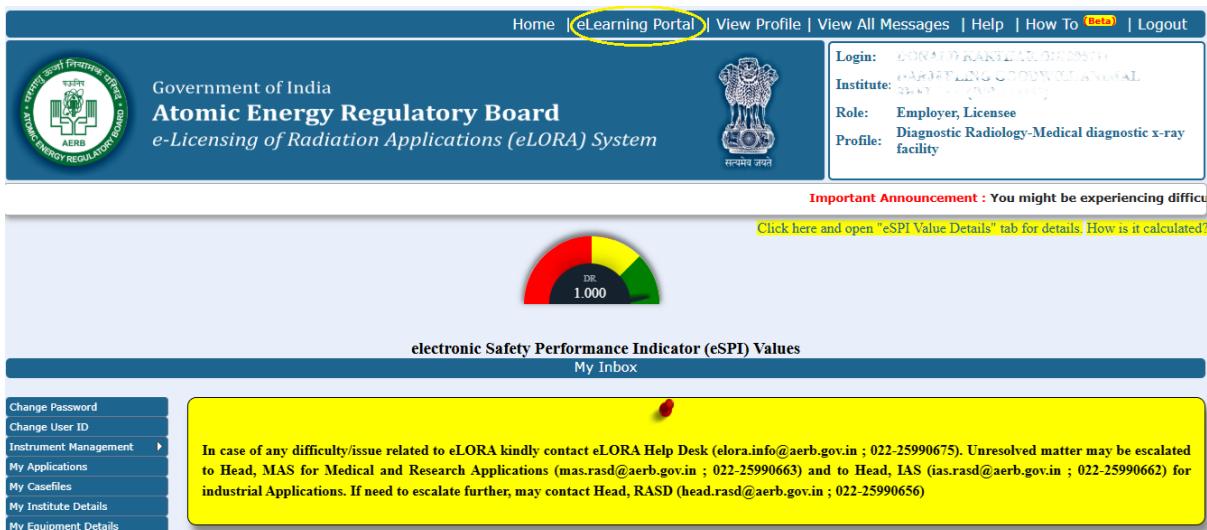
3. This will take you to the following home screen of eLORA website



4. On the right hand side you will find the “Login” form.
5. Leave the Radio Button on its default selection i.e. “Institute”
6. Type in the “Username” received on your registered email id from eLORA – AERB after successful Institute registration.
7. For “Password” type in the new password you created after first login.
8. For “Practice” select “Diagnostic Radiology” from the dropdown list displayed by clicking down arrow in the selection box.
9. For “Institute Role” select “Radiation Facility” in the similar manner.
10. For “Installation Type” select “X-Ray facility” in the similar manner.
11. Type in Captcha displayed in the box displayed above the “Login” button.
12. Click “Login” to enter to take you to the eLORA page of your Registered Institute.



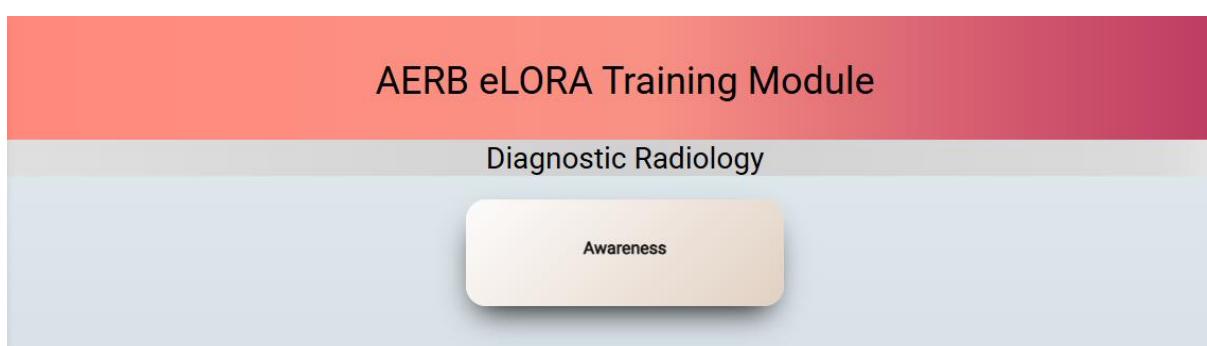
13. In the displayed screen after Login click on “eLearning Portal” in the header menu.



14. Click on “Diagnostic Radiology”



15. Click on “Awareness”



16. Click on “Course Id: 203 – Employer_Awareness Program”

AERB eLORA Training Module

Course Id: 201

RSO Awareness

20 QUESTIONS 30 TIME 99 ATTEMPTS

Course Id: 202

X-ray Technologist

10 QUESTIONS 15 TIME 99 ATTEMPTS

Course Id: 203

Employer_Awareness Program

10 QUESTIONS 15 TIME 99 ATTEMPTS

17. This will take you to a slides presenting the Awareness Program. You may surf through these slides by clicking “Next” button on bottom right to take you through all 18 slides.

Employer_Awareness Program

1

2

3

4

5

6

7

8

9

Awareness on Regulatory and Safety requirements for Employers

in Diagnostic Radiology Practice



Radiological Safety Division
Atomic Energy Regulatory Board

Exit **← Previous** **Next →**

18. Optionally, if you are confident to take up the assessment test directly, you may scroll down the slide bar next to the number tabs on the left.

Employer_Awareness Program

10

11

12

13

14

15

16

17

18

Awareness on Regulatory and Safety requirements for Employers

in Diagnostic Radiology Practice

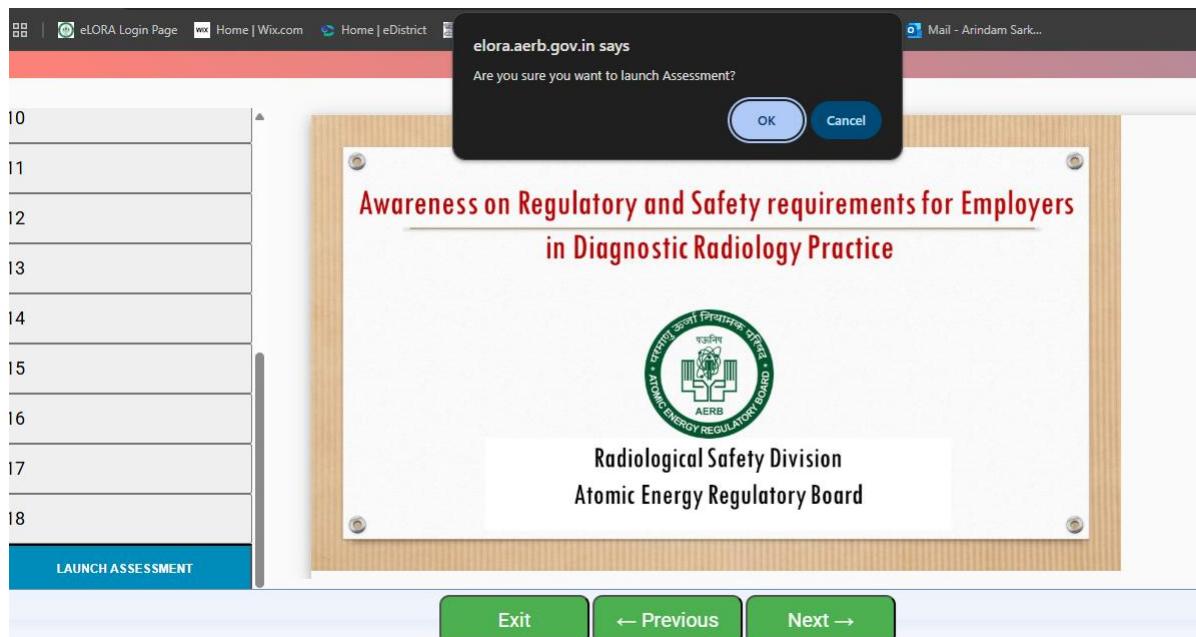


Radiological Safety Division
Atomic Energy Regulatory Board

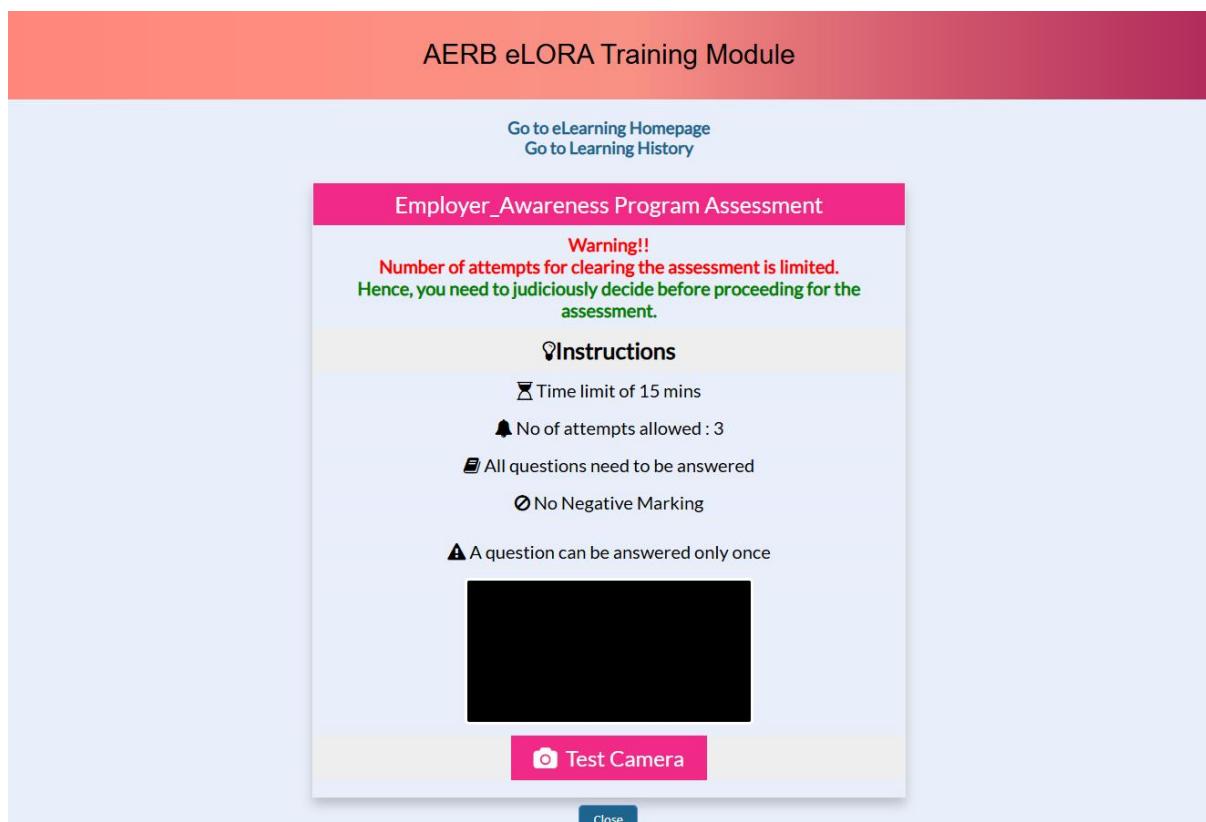
LAUNCH ASSESSMENT

Exit **← Previous** **Next →**

19. Click the “Launch Assessment” button. A pop up window will appear for confirmation. Click “Okay” to launch the assessment.

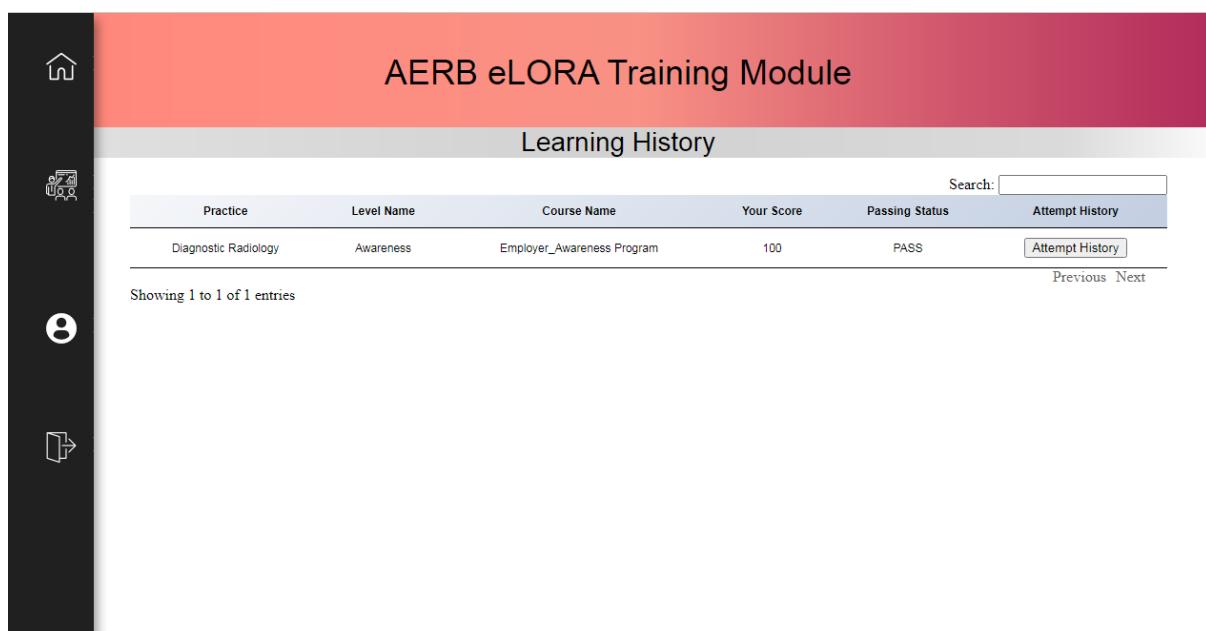


20. You need to click “Test Camera” and allow Camera access for this website.



21. Once the camera is enabled “Test Camera” button changes to “Begin Test”. Click on this button. You get another popup window warning that the test is monitored through camera. Click “OK” to confirm & begin the test.

22. Read every question carefully before selecting the answer.
23. Follow the instruction appearing on screen to complete the assessment.
24. All questions must be answered, however *there is no negative marking for wrong answers.*
25. The summary of your progress is shown on the left-hand side panel of the screen.
26. Once you have answered all questions click “Finish Quiz” on the left-hand side panel.
27. Please click “Submit” on the upcoming Feedback screen.
28. Once feedback is submitted, your score will appear in the following format:



Practice	Level Name	Course Name	Your Score	Passing Status	Attempt History
Diagnostic Radiology	Awareness	Employer_Awareness Program	100	PASS	Attempt History

Showing 1 to 1 of 1 entries



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