

*With best  
compliments from*



# 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?**

*CaSO<sub>4</sub>: 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
<b>all of above</b>	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	<b>1.7 mm Lead Equivalence</b>
1 mm Lead Equivalence	none of above

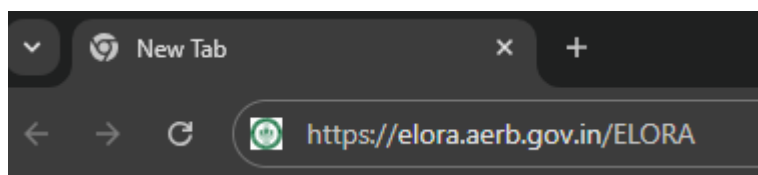
*Ans: 1.7 mm Lead Equivalence (in this example)*

*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.*

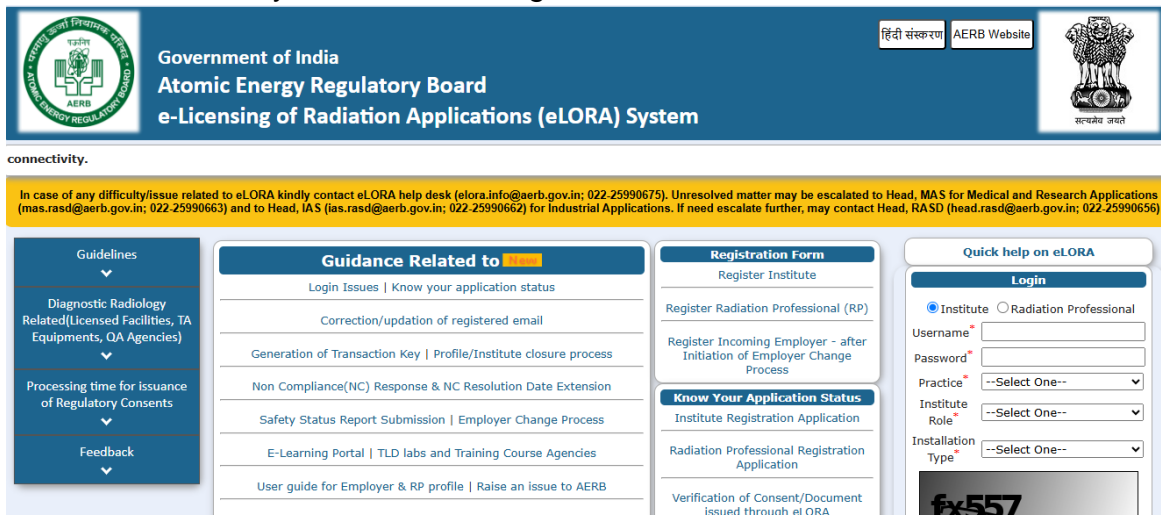
Please note that the training course must be accessed from a desktop or laptop only, and assessment attempted preferably with Camera option enabled in web browser.

## 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.

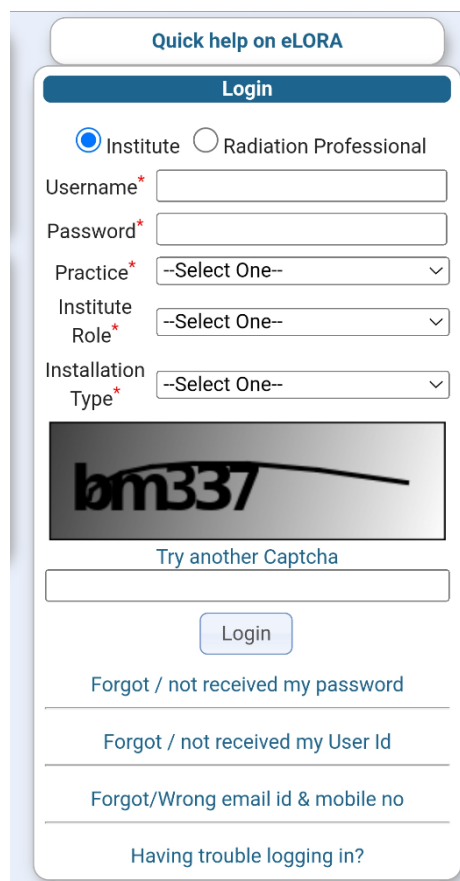
8. For “Practice” select “**Diagnostic Radiology**” from the dropdown list displayed by clicking down arrow in the selection box.

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.

Home **eLearning Portal** View Profile View All Messages Help How To (Beta) Logout

Government of India  
**Atomic Energy Regulatory Board**  
e-Licensing of Radiation Applications (eLORA) System

Login: GOKARAJ KARKI  
Institute: RAJESH K. KARKI MEDICAL  
Role: Employer, Licensee  
Profile: Diagnostic Radiology-Medical diagnostic x-ray facility

**Important Announcement** : You might be experiencing difficulty in logging in. [Click here and open "eSPI Value Details" tab for details.](#) [How is it calculated?](#)

electronic Safety Performance Indicator (eSPI) Values  
My Inbox

Change Password  
Change User ID  
Instrument Management  
My Applications  
My Casefiles  
My Institute Details  
My Equipment Details

In case of any difficulty/issue related to eLORA kindly contact eLORA Help Desk (elora.info@aerb.gov.in ; 022-25990675). Unresolved matter may be escalated to Head, MAS for Medical and Research Applications (mas.rasd@aerb.gov.in ; 022-25990663) and to Head, IAS (ias.rasd@aerb.gov.in ; 022-25990662) for industrial Applications. If need to escalate further, may contact Head, RASD (head.rasd@aerb.gov.in ; 022-25990656)

14. Click on “Diagnostic Radiology”

AERB eLORA Training Module

Calibration Consumer Products and Scanning Facility **Diagnostic Radiology**

Common Gamma Irradiation Chamber Gamma Radiation Processing Facility

15. Click on “Awareness”

AERB eLORA Training Module

Diagnostic Radiology

Awareness

16. Click on “Course Id: 203 – Employer\_Awareness Program”

**AERB eLORA Training Module**

Course Id: 201	Course Id: 202	Course Id: 203
RSO Awareness	X-ray Technologist	Employer_Awareness Program
20 QUESTIONS	10 QUESTIONS	10 QUESTIONS
30 TIME	15 TIME	15 TIME
99 ATTEMPTS	99 ATTEMPTS	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



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

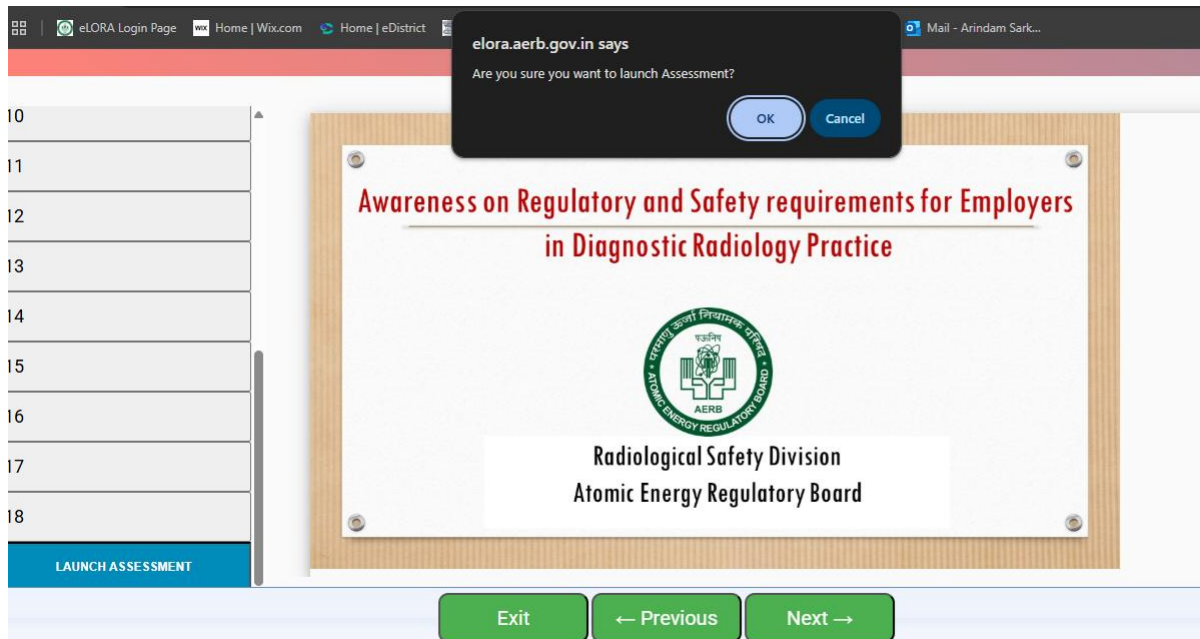
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LAUNCH ASSESSMENT

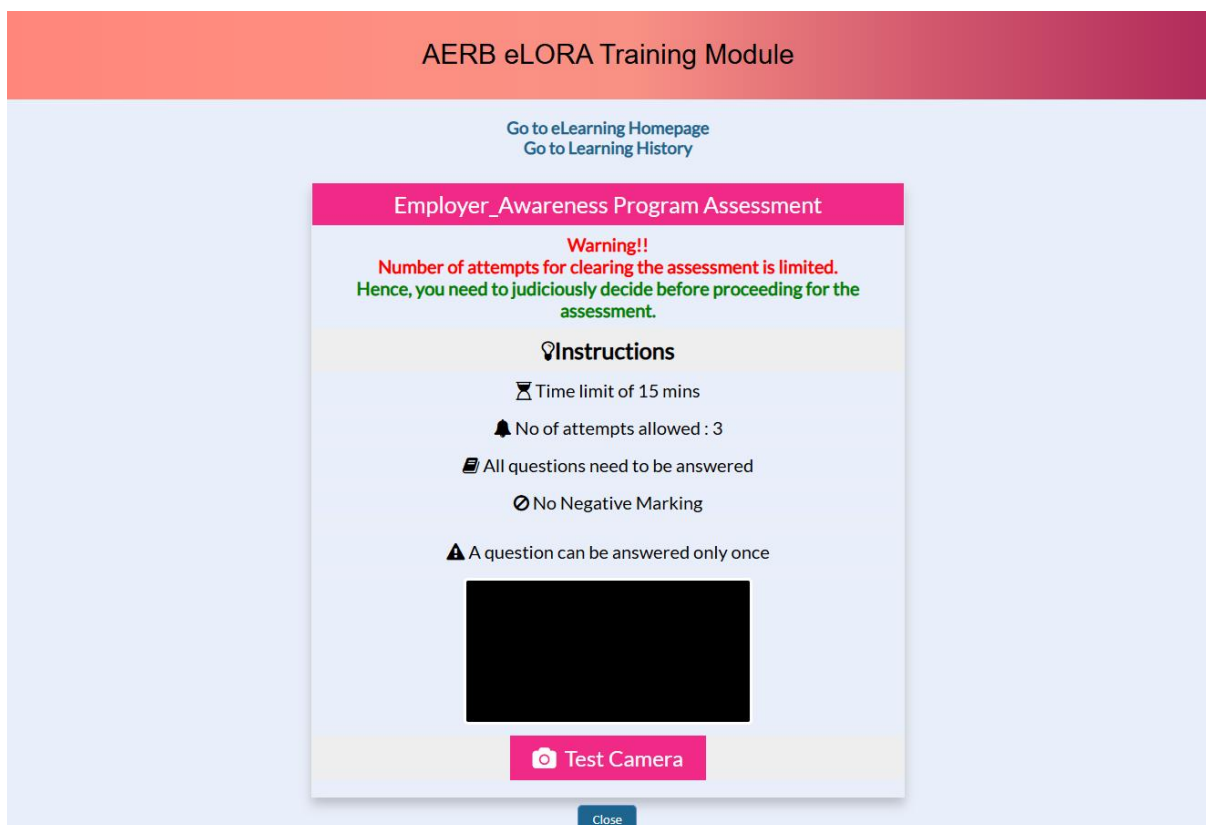


Exit
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19. Click the “Launch Assessment” button. A pop up window will appear for confirmation. Click “Okay” to launch the assessment.

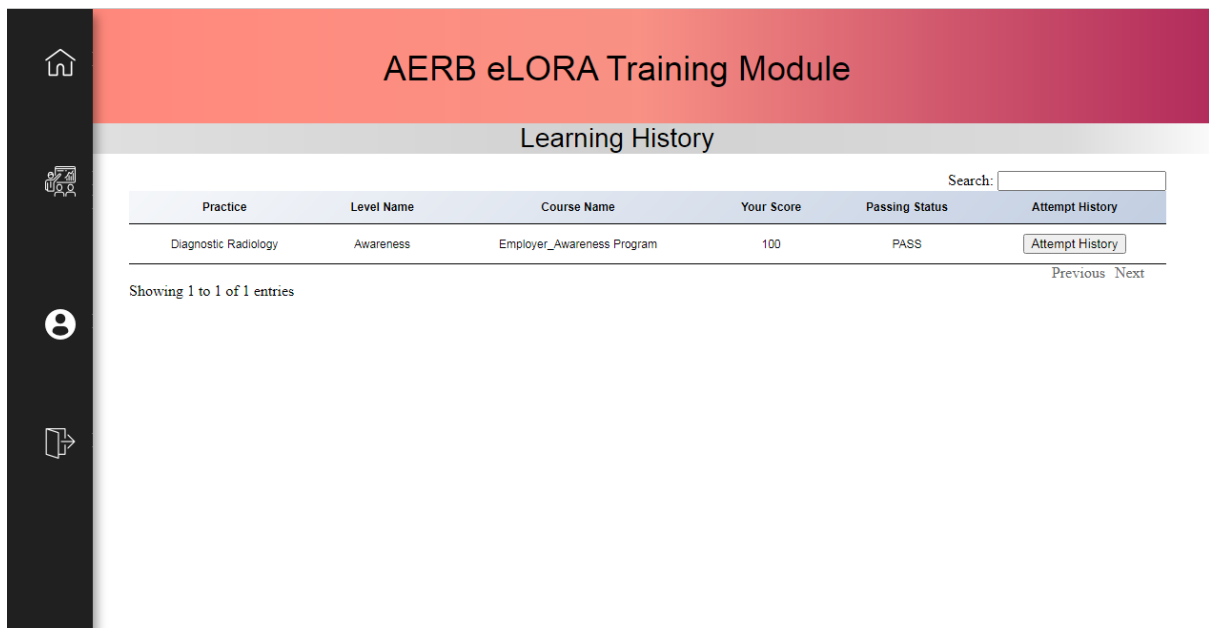


20. You need to click “Test Camera” and allow Camera access for this website.



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:



**AERB eLORA Training Module**

**Learning History**

Search:

Practice	Level Name	Course Name	Your Score	Passing Status	Attempt History
Diagnostic Radiology	Awareness	Employer_Awareness Program	100	PASS	<a href="#">Attempt History</a>

Showing 1 to 1 of 1 entries

[Previous](#) [Next](#)

*Wish you  
All the  
Best*

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