

Exam Tools

The Replacement for Standard Amateur Radio License Exams

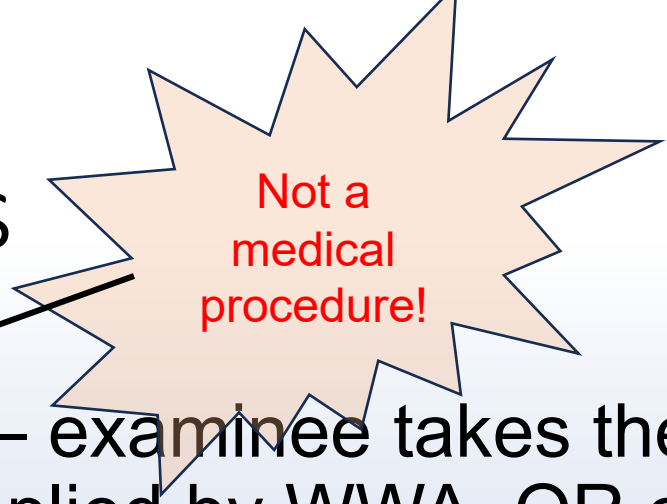
Overview – Why Are We Doing This?

- VECs (ARRL and others) stopped printing forms and paper exams
 - Effective with June 2026 Technician License – no ARRL printed exams
 - Other license classes will follow as exam booklets expire
- Migration to Exam Tools
 - In practice – more than 5 years ago
 - Youtube introduction was 8 years ago
- Exams are scheduled by the WWA VE Coordinator
 - WWA sets the number of examinees in advance
 - Examinee “reserves” a slot to take the exam in advance
- There is a learning curve to Exam Tools
 - Bugs and glitches addressed - mostly
 - Volunteer examiner (you) will see minimal impact – but there are changes

Changes from Current System

- Digital documentation – Form FCC 605 and others
- Faster processing – minutes instead of hours
- VE requirements – VEs must register and create accounts
 - Requires an official copy of your FCC amateur radio license
 - Generates your digital signature
- Several exam/grading options
 - Paper exams printed on-the-fly on site
 - Overlay template (similar to what we have)
 - GradeCam – answer sheet scanned by phone or computer camera
 - On site digital exam and grading – laptop or tablet
 - Remote on-line digital exam and grading – reasons for caution here

Definitions



Not a
medical
procedure!

- Digital exam – examinee takes the exam using a laptop or other computer supplied by WWA, OR examinee uses a privately owned laptop
 - In-person digital exam – digital exam taken at our club room
 - Remote digital exam – digital exam taken remotely using two cameras, three VEs and a session owner in a Zoom Pro meeting
- Paper exam – examinee takes the exam **in person** using a printed test with either a bubble style answer sheet or written A,B,C,D response

Process

- Session owner (WWA VE Team Coordinator) creates exam session
 - Selects session type – in person or remote and features
 - Builds manifest – VE's who have RSPVd
 - Assigns roles
 - Prepare hardware for in person digital exams (only for digital exams)
- Applicant Check-In
 - Applicant must register at hamstudy.org and receive a 4-digit PIN
 - VEs check identification and verify the FRN
 - Applicants and VEs join the session on line (only for digital exams)
 - Session owner prints the paper exam (only for paper exam)

Process (cont)

- Examination Phase
 - Device inspection (only for digital exam)
 - Monitoring – at least three VEs
 - Submission of answers
 - Digital on line grading (only for digital exam)
 - GradeCam or template for paper exams
- Post Exam Processing
 - Certification – three VEs digitally sign to certify FCC Form 605 and CSCE
 - Closing session – Team lead marks the session complete
 - Session owner uploads the generated PDFs and JSON files to the VEC

What's In It for Us?

- Efficiency and speed – licenses available in 48 to 72 hours
- Automatic grading – VEs can use GradeCam to verify answers
- Unique exams – each printed or digital exam is virtually unique
 - Thousands of different exam forms compared to 12 for Tech exam today
- Remote accessibility – handicapped or unable to travel (digital only)
- If we migrate to fully digital in person – big paper savings
- Paper exam security issues no longer exist – the printed exam can be written on by the student

Areas Requiring Close Attention


- Remote digital exams
 - Often require two cameras – room and examinee
 - In-person networking loss – we lose social contact with a new ham
 - Internet vulnerability – dropped connection can result in lost session
 - We must clearly define how WWA will conduct remote digital exams
- Administrative learning curve
 - Start with basic printed exam session with template or GradeCam grading
 - Use Exam Tools sandbox website sandbox.examtools.org
- We still collect fees and manage money
 - In person – cash ONLY (FUTURE – PayPal for all fees – no cash)

I'm a Certified VE. What Do I Need to DO?

- Register an account in Exam Tools (I can help with this)
 - Log on to [Examtools.org](https://examtools.org)
 - Use your callsign as your user name
 - Confirm your email address
 - Verify callsign
 - Upload the FCC official copy of your license
 - Wait for approval
- Participate in training sessions at sandbox.examtools.org
 - Digital signatures
 - Grading process

Next Steps

- Ensure VEs are registered and ready for first session – July 2026
- Do sandbox Exam Tools sessions
- Take steps now to improve our internet connection

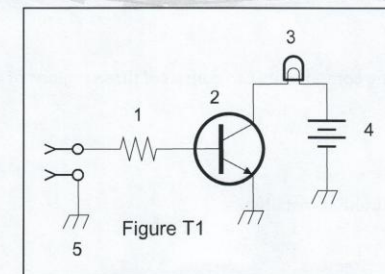


Nearing
Completion

Sample Paper Exam

- 1. What is FT8?**
 - A wideband FM voice mode
 - A digital mode capable of low signal-to-noise operation
 - An eight channel multiplex mode for FM repeaters
 - A digital slow-scan TV mode with forward error correction and automatic color compensation
- 2. What component changes 120 V AC power to a lower AC voltage for other uses?**
 - Variable capacitor
 - Transformer
 - Transistor
 - Diode
- 3. Which of the following controls could be used if the voice pitch of a single-sideband signal returning to your CQ call seems too high or low?**
 - The AGC or limiter
 - The bandwidth selection
 - The tone squelch
 - The RIT or Clarifier
- 4. What type of electrical component consists of conductive surfaces separated by an insulator?**
 - Resistor
 - Potentiometer
 - Oscillator
 - Capacitor
- 5. What hazard exists in a power supply immediately after turning it off?**
 - Circulating currents in the dc filter
 - Leakage flux in the power transformer
 - Voltage transients from kickback diodes
 - Charge stored in filter capacitors
- 6. What is a common repeater frequency offset in the 2 meter band?**
 - Plus or minus 5 MHz
 - Plus or minus 600 kHz
 - Plus or minus 500 kHz
 - Plus or minus 1 MHz
- 7. Which of the following components can consist of three regions of semiconductor material?**
 - Alternator
 - Transistor
 - Triode
 - Pentagrid converter
- 8. Where is an RF preamplifier installed?**
 - Between the antenna and receiver
 - At the output of the transmitter power amplifier
 - Between the transmitter and the antenna tuner
 - At the output of the receiver audio amplifier

- 9. What is the primary purpose of a dummy load?**
 - To prevent transmitting signals over the air when making tests
 - To prevent over-modulation of a transmitter
 - To improve the efficiency of an antenna
 - To improve the signal-to-noise ratio of a receiver
- 10. What describes the number of times per second that an alternating current makes a complete cycle?**
 - Pulse rate
 - Speed
 - Wavelength
 - Frequency
- 11. What is an advantage of a 5/8 wavelength whip antenna for VHF or UHF mobile service?**
 - It has more gain than a 1/4-wavelength antenna
 - It radiates at a very high angle
 - It eliminates distortion caused by reflected signals
 - It has 10 times the power gain of a 1/4 wavelength whip
- 12. What operating activity involves contacting as many stations as possible during a specified period?**
 - Simulated emergency exercises
 - Net operations
 - Public service events
 - Contesting
- 13. When may an amateur station transmit without identifying on the air?**
 - When the transmissions are of a brief nature to make station adjustments
 - When the transmissions are unmodulated
 - When the transmitted power level is below 1 watt
 - When transmitting signals to control model craft
- 14. What is component 2 in figure T-1?**
 - Resistor
 - Transistor
 - Indicator lamp
 - Connector



Printed Answer Sheet and Key

Name: _____ Score: _____ / 35

EXAM TOOLS DEVELOPMENT
Element 2 -- Technician

Valid Jul 1, 2022 to Jul 1, 2026
ANSWER SHEET
Test #22-26955

1. <u>B</u>	21. <u>B</u>
2. <u>D</u>	22. <u>B</u>
3. <u>D</u>	23. <u>C</u>
4. <u>D</u>	24. <u>D</u>
5. <u>D</u>	25. <u>B</u>
6. <u>B</u>	26. <u>D</u>
7. <u>B</u>	27. <u>B</u>
8. <u>A</u>	28. <u>D</u>
9. <u>A</u>	29. <u>D</u>
10. <u>D</u>	30. <u>A</u>
11. <u>A</u>	31. <u>C</u>
12. <u>C</u>	32. <u>C</u>
13. <u>D</u>	33. <u>B</u>
14. <u>B</u>	34. <u>D</u>
15. <u>D</u>	35. <u>C</u>
16. <u>C</u>	
17. <u>D</u>	
18. <u>B</u>	
19. <u>D</u>	
20. <u>B</u>	

Graded by: _____

EXAM TOOLS DEVELOPMENT
Element 2 -- Technician

Valid Jul 1, 2022 to Jul 1, 2026
ANSWER KEY
Test #22-26955

1. <u>B</u> T8D13	21. <u>B</u> T5C11
2. <u>B</u> T6D06	22. <u>C</u> T9B07
3. <u>D</u> T4B06	23. <u>C</u> T2C07
4. <u>D</u> T6A05	24. <u>D</u> T4A01
5. <u>D</u> T0A11	25. <u>B</u> T1F07
6. <u>B</u> T2A01	26. <u>D</u> T1C06
7. <u>B</u> T6B04	27. <u>B</u> T7D01
8. <u>A</u> T7A11	28. <u>D</u> T1E09
9. <u>A</u> T7C01	29. <u>D</u> T1B04
10. <u>D</u> T5A12	30. <u>A</u> T8A02
11. <u>A</u> T9A12	31. <u>C</u> T3C02
12. <u>D</u> T8C03	32. <u>C</u> T5D09
13. <u>D</u> T1D11	33. <u>B</u> T5B09
14. <u>B</u> T6C03	34. <u>D</u> T0B08
15. <u>D</u> T0C06	35. <u>C</u> T1A07
16. <u>C</u> T3B10	
17. <u>D</u> T2B02	
18. <u>B</u> T3A02	
19. <u>D</u> T7B07	
20. <u>B</u> T8B02	

Bubble Answer Sheet - GradeCam

Technician or General Class Exam
Please bubble T or G to indicate which exam you are taking

Applicant PIN

Test ID

Exam Version:

1. 16.

2. 17.

3. 18.

4. 19.

5. 20.

6. 21.

7. 22.

8. 23.

9. 24.

10. 25.

11. 26.

12. 27.

13. 28.

14. 29.

15. 30.

31.

32.

33.

34.

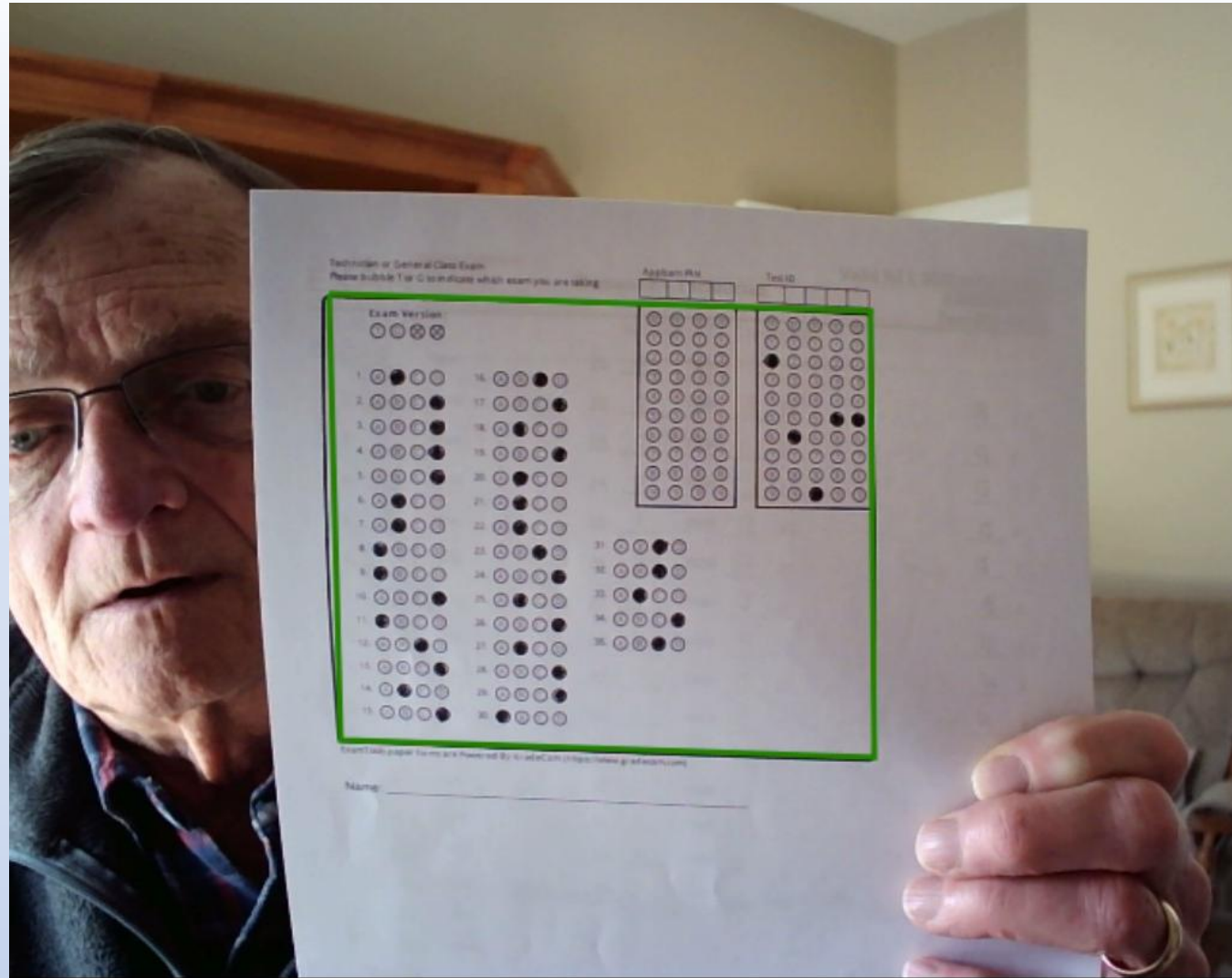
35.

ExamTools paper forms are Powered By GradeCam (<https://www.gradecam.com>)

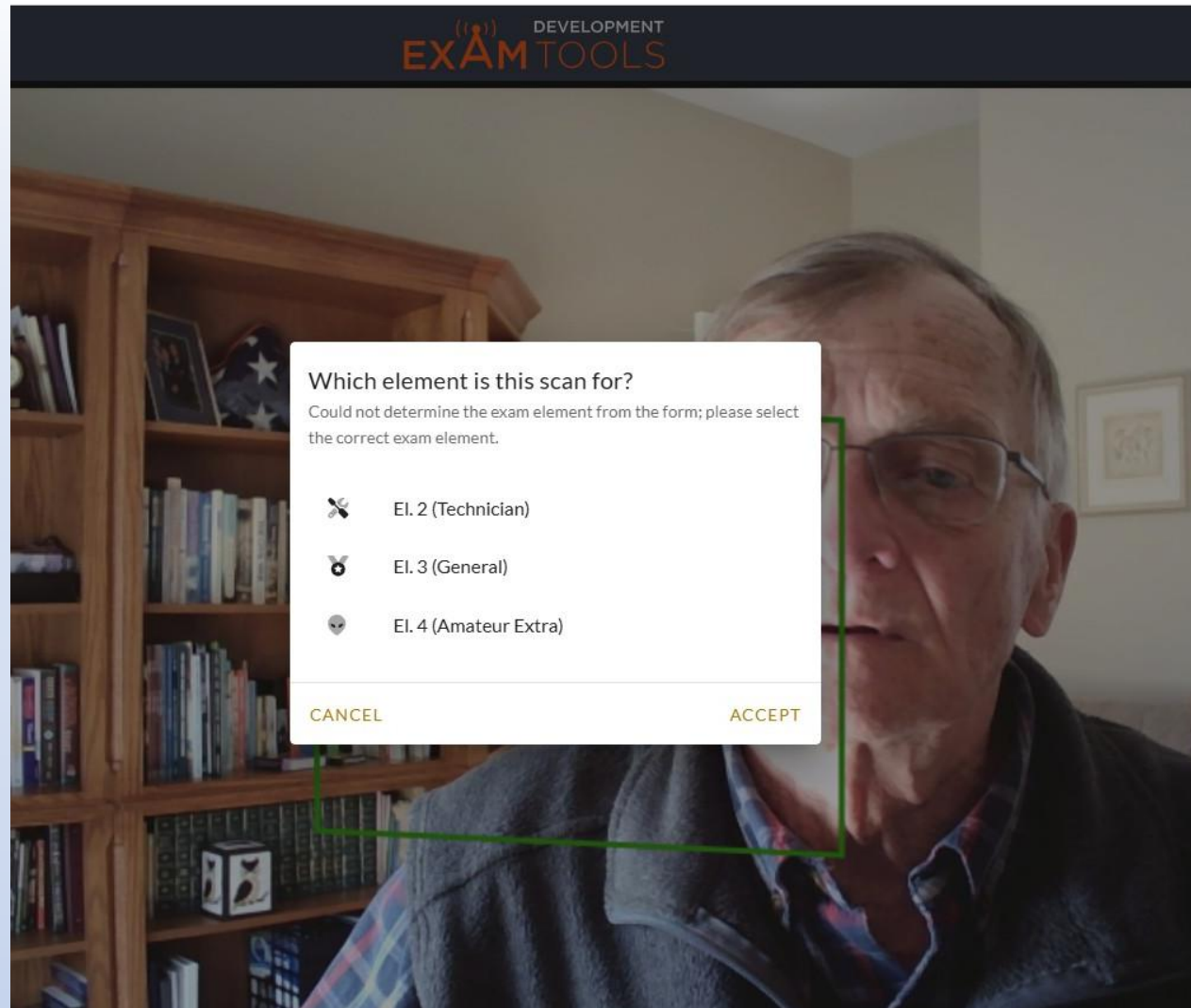
Name: _____

50 question answer sheet
for Extra Class exam is
available

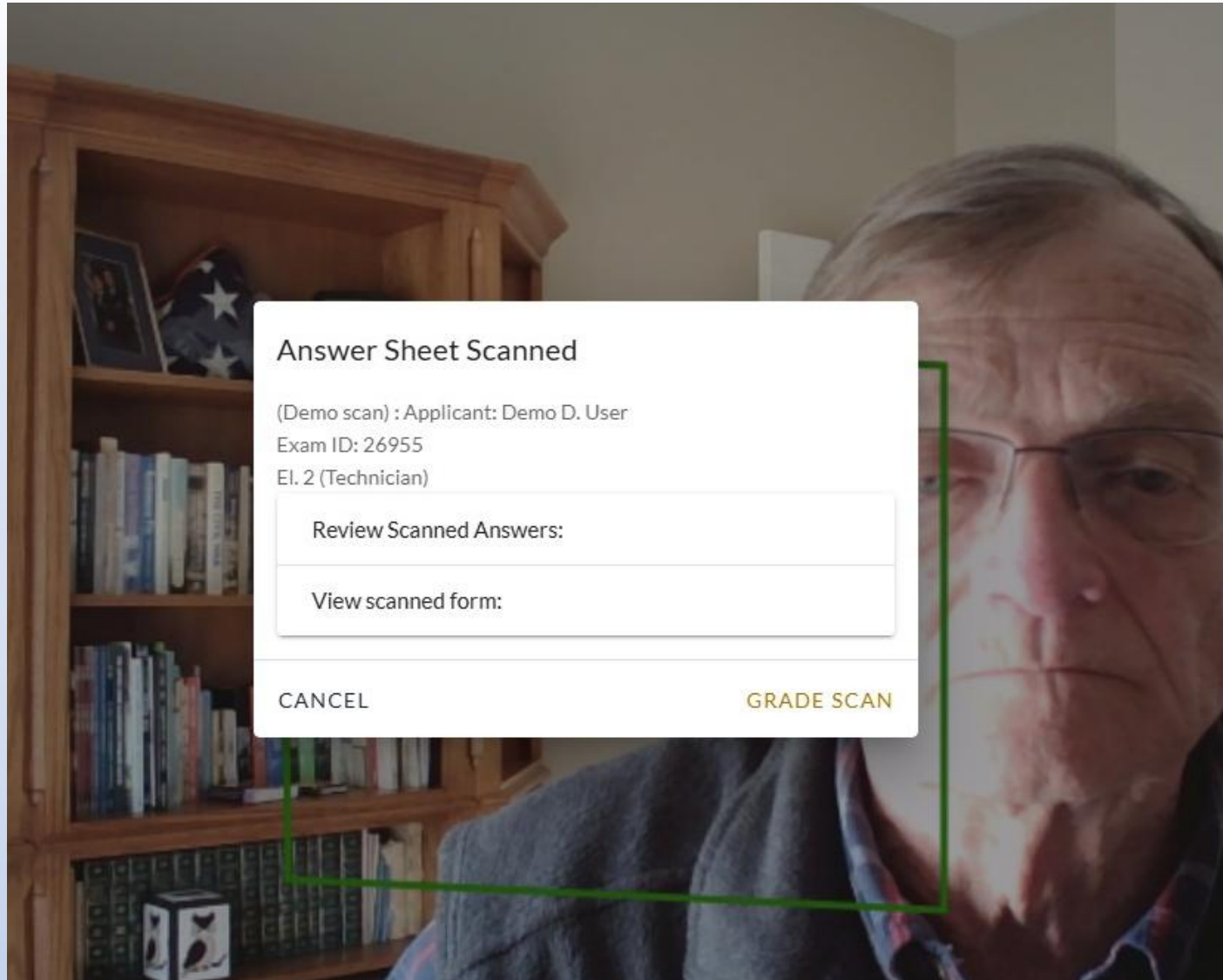
GradeCam – Scanning the Answer Sheet



GradeCam – Verifying the Correct Element



GradeCam – Review/Grade Scanned Answers



Questions

Presentation can be downloaded from wattsburgwireless.org
under the meetings tab