# Recruitment Examination – Technical Officer (Scale-I)
# (Job No. 50635622) in Fire and Safety Section

**Total Marks:** 50 | **Duration:** 1 Hour 30 Minutes

**Instructions:**

- Attempt **all questions**.
- **Part A** contains **15 multiple-choice questions** (1 mark each). Choose only one option for each questions.
- **Part B** contains **7 subjective questions** (5 marks each). Write your answers in maximum of 100 words.
- No negative marking.

**Part A: Multiple Choice Questions (15 × 1 = 15 Marks)**

**1.** Which of the following is the first step in the safety management process?
a) Risk control b) Incident investigation c) Hazard identification d) Audit

**2.** In a risk matrix, a hazard with low probability but catastrophic consequence should be:
a) Ignored b) Marked as medium risk c) Treated as high priority for control d) Documented without further action

**3.** The Institutional Biosafety Committee (IBSC) is responsible for:
a) Electrical compliance b) Reviewing bio-research protocols c) Disaster response d) Fire alarm testing

**4.** According to AERB guidelines, the acceptable annual dose limit for radiation workers is:
a) 10 mSv b) 50 mSv c) 5 mSv d) 100 mSv

**5.** Which of the following would make a Class D fire worse?
a) Water b) $CO_2$ c) Sand d) Foam

**6.** The colour of a $CO_2$ fire extinguisher is:
a) Red with cream band b) Red with blue band c) Red with black band d) Yellow

**7.** While using Class 4 lasers, interlocks and warning systems are mandatory to prevent:
a) Radiation leakage b) Noise pollution c) Optical overload d) Unauthorized access and exposure

**8.** The most effective electrical safety device to prevent shock in wet conditions is:
a) Circuit breaker b) RCCB (Residual Current Circuit Breaker) c) Fuse d) Insulated gloves

**9.** The minimum safe storage distance between oxygen and flammable gas cylinders must be:
a) 1 meter b) 3 meters c) 6 meters d) 10 meters

**10.** Fume hoods are tested for performance using:
a) UV meter b) Smoke visualization or face velocity meter c) Multi-meter d) Barometer

**11.** In a confined space, entry should be:

a) Immediate after opening  b) Without documentation  c) Based on permit and gas testing  d) Done only during lunch break

**12.** A properly labelled chemical container must have:
a) Only expiry date  b) Name, hazard symbol, and precautions  c) Weight and batch number  d) Lab user's ID

**13.** The four phases of the disaster management cycle are:
a) Planning, evacuation, recovery, safety  b) Alert, attack, absorb, assess
c) Mitigation, preparedness, response, recovery  d) Hazard, control, fire, shutdown

**14.** The Gas Cylinder Rules, 2016 are issued under the:
a) Petroleum Act, 1934  b) Factories Act, 1948  c) Electricity Act, 2003  d) Labour Code, 2020

**15.** Which emergency device is mandatory near chemical storage areas?
a) Fire blanket  b) $CO_2$ detector  c) Eyewash station  d) Vibration alarm

**Part B: Subjective Questions (7 × 5 = 35 Marks)**

**Q1.** What are the key components of an effective risk assessment process in a technical or operational workplace? Illustrate your answer with suitable examples.

**Q2.** You are tasked with conducting a fire drill in a multi-storey high-rise building. How would you plan, execute, and evaluate the effectiveness of the drill?

**Q3.** What precautions should be taken when handling radioactive isotopes in a controlled work environment?

**Q4.** List and briefly explain any five items you would inspect to ensure the safe use and storage of compressed gas cylinders in a workplace.

**Q5.** Describe the step-by-step response procedure in the event of a chemical spill involving a corrosive substance in a laboratory or technical workspace.

**Q6.** Write a brief incident report for a short-circuit fire that occurred in an electrical equipment room.

**Q7.** What key elements should be reviewed during a safety inspection or internal audit of a technical facility?

**Solution Key**

**Recruitment Examination – Technical Officer (Scale-I)**
**Total Marks: 50 | Duration: 1 Hour 30 Minutes**

**Part A: Multiple Choice Questions (15 × 1 = 15 Marks)**

| Q No. | Answer |
|---|---|
| 1 | c) Hazard identification |
| 2 | c) Treated as high priority for control |
| 3 | b) Reviewing bio-research protocols |
| 4 | b) 50 mSv |
| 5 | a) Water |
| 6 | c) Red with black band |
| 7 | d) Unauthorized access and exposure |
| 8 | b) RCCB (Residual Current Circuit Breaker) |
| 9 | c) 6 meters |
| 10 | b) Smoke visualization or face velocity meter |
| 11 | c) Based on permit and gas testing |
| 12 | b) Name, hazard symbol, and precautions |
| 13 | c) Mitigation, preparedness, response, recovery |
| 14 | a) Petroleum Act, 1934 |
| 15 | c) Eyewash station |

**Part B: Subjective Questions (7 × 5 = 35 Marks)**

**Q1. What are the key components of an effective risk assessment process in a technical or operational workplace? Illustrate your answer with suitable examples.**
(Answer should cover steps like hazard identification, risk evaluation, implementation of control measures, and periodic review.)

- Hazard Identification: Identify potential sources of harm. E.g., exposed wires near a workstation.
- Risk Evaluation (Likelihood × Severity): Assess how likely the hazard is to cause harm and how severe the impact could be. E.g., frequent foot traffic increases risk of electric shock.
- Implementation of Control Measures: Apply controls in order of hierarchy – engineering, administrative, PPE. E.g., install cable covers, add warning signs, and issue insulated gloves.
- Documentation: Record hazards, controls, responsible persons, and timelines. E.g., maintain a risk register for all identified hazards.
- Periodic Review: Update assessments after incidents, audits, or process changes. E.g., re-evaluate risks after lab equipment upgrade or a near-miss.

**Q2. You are tasked with conducting a fire drill in a multi-storey high-rise building. How would you plan, execute, and evaluate the effectiveness of the drill?**
(Answer should include pre-drill coordination, evacuation procedures, role assignment, timing, and feedback collection.)

- Planning: Schedule the drill, inform departments, assign roles.
  E.g., floor wardens, fire marshals.

- Execution: Activate alarm, simulate evacuation, monitor flow.
  E.g., clear corridors, check headcounts.
- Evaluation: Note evacuation time, obstacles, and compliance.
  E.g., 5 minutes for full evacuation.
- Feedback: Conduct debrief and collect feedback for improvement.
  E.g., revise assembly point layout.
- Reporting: Prepare and share a drill report with the building management for records and improvement.

**Q3. What precautions should be taken when handling radioactive isotopes in a controlled work environment?**
(Answer should include shielding, PPE, access control, contamination monitoring, and compliance with radiation safety guidelines.)
- Shielding: Use appropriate shielding materials. E.g., lead bricks or glass barriers.
- PPE: Wear gloves, lab coats, and dosimeters. E.g., TLD badges for monitoring exposure.
- Access Control: Restrict area to trained personnel only. E.g., sign-in log and signage.
- Contamination Monitoring: Use survey meters and wipe tests. E.g., post experiment.
- Compliance: Follow AERB guidelines strictly. E.g., maintain disposal records.

**Q4. List and briefly explain any five items you would inspect to ensure the safe use and storage of compressed gas cylinders in a workplace**.
(Answer should be focused on cylinder condition, securing methods, valve operation, labelling, and leak prevention.)
- Cylinder Condition: Check for rust, dents, corrosion, or other physical damage that may weaken the cylinder or cause leaks. E.g., reject cylinders with deep dents or bulging ends.
- Cylinder Labelling: Check for correct gas name and hazard info. E.g., flammable, toxic labels.
- Valve Condition: Ensure no leakage or damage. E.g., check with soapy water.
- Securing: Cylinder must be chained or clamped. E.g., anchored to a wall.
- Storage Area: Keep cylinders away from heat or open flame. E.g., well-ventilated corner.
- Separation of Gases: Store oxygen and fuel gases separately. E.g., minimum 6 meters apart.

**Q5. Describe the step-by-step response procedure in the event of a chemical spill involving a corrosive substance in a laboratory or technical workspace.**
(Answer should cover alert, PPE, containment, neutralization, clean-up, and reporting.)
- Alert and Evacuate: Inform others and clear the area. E.g., pull alarm if needed.
- PPE: Wear gloves, goggles, apron. E.g., chemical-resistant gear.
- Containment: Use spill kit barriers. E.g., absorbent pads or neutralizers.
- Clean-Up: Carefully collect waste, avoid spreading. E.g., use scoops, neutralize acid.
- Reporting: Notify supervisor and document the incident. E.g., fill spill report form.

**Q6. Write a brief incident report for a short-circuit fire that occurred in an electrical equipment room.**
Date: 05 July 2025
Location: Electrical Equipment Room, Main Admin Block
Incident: A minor fire broke out due to a short circuit in a distribution panel. Staff noticed smoke, isolated power supply, and used a $CO_2$ extinguisher to suppress the fire.

Cause: Overloaded socket with damaged insulation.
Corrective Actions: Electrical audit conducted, faulty cables replaced, and fire load reviewed.
Preventive Measures: Periodic inspection and proper load balancing implemented.

**Q7. What key elements should be reviewed during a safety inspection or internal audit of a technical facility?**

(Answer should cover, what to check under documentation, physical conditions, compliance with procedures, and follow-up actions.)

- Documentation: SOPs, training records, inspection logs. E.g., missing MSDS sheets.
- Physical Safety: Emergency exits, signage, lighting. E.g., blocked pathways.
- Equipment Compliance: Safety features, calibration. E.g., loose guard on grinder.
- Chemical and Gas Storage: Labelling, segregation, leak checks. E.g., acids stored with flammables.
- Follow-up Actions: Status of past corrective actions. E.g., unaddressed audit findings.