

THE INTERNATIONAL ASSOCIATION OF RADIO, TELECOMMUNICATIONS &
ELECTROMAGNETICS, INC.

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Study Reference Guide and Sample Questions for ESD Engineers and Technicians Certification Exams



The Certification Exam

All applicants for certification, both engineers and technicians, must pass an eight-hour examination. The examination covers a broad range of ESD control fundamentals including program design and management, ESD theory, standards and specifications, and specific ESD control procedures.

Preparing for the Certification Exam

Regional Tutorials: Local ESD Chapters sponsor regional tutorials throughout the year with sessions covering a number of ESD topics.

National Tutorials: In conjunction with the ESD Symposium, the ESD Association holds a number of educational tutorials, many with content specific to the certification exam.

EOS/ESD Symposium: The annual EOS/ESD Symposium covers a number of technical issues that can serve as education background.

ESD Selected Reference Materials

ESD Handbook, ESD Association, 1994

EOS/ESD Symposium Proceedings, 1979-1997

ESD Association Standards, Glossary and Advisories

Electrostatic Discharge Control, Owen McAteer, 1990, 450 pp.

ESD Program Management: A Realistic Approach to Continuous, Measurable Improvement in Static Control, G. Theodore Dangelmayr, 1990, 320 pp.

Electrostatic Damage in Electronics: Devices and Systems, William Greason, 1987, 252 pp.

ESD in Silicon Intergrated Circuits, Ajith Amerasekera & Charvaka Duvvury, 1995, 209 pp.

Electrostatic Discharge and Electric Equipment: A practical Guide for Designing to Prevent ESD Problems, Warren Boxleitner, 1988, 128 pp.

Most of these materials can be obtained from the **ESD Association**, 7900 Turin Road, Building 3, Suite 2, Rome, NY 13440 Phone (315)339-6937 Fax (315)339.6793 email info@esda.org

ESDC fundamentals covered in the examination include, but are not limited to the following subjects:

ESD Program Design & Management
ESD Loss Analysis
ESD Theory
Math/Physics
Safety
Standards/Specifications
Terminology
System Test & Measurements
Workstations
Flooring
ESD Shielding Analysis
*Equipment Design
*Intersystem & Intrasystem Design
*ESD Prediction (Devices & Systems)
*ESD Analysis (Devices & Systems)
Manufacturing/Repair Facility Evaluation, Survey & Auditing
Plant Equipment ESD
Control & Evaluation
Clean Room Equipment & Material Control
Body Charge Evaluation & Control Garment Control & Evaluation
Manufacturing Plant Handling Procedures
ESD Control Material In-Field Testing
Production Aids & Tool Evaluation
Materials Test & Measurement
In Field ESD Controls
*Device Sensitivity Test & Measurement
Ionization Devices & Systems
Grounding Technology Laboratory Test & Analysis of ESDC Packing Materials

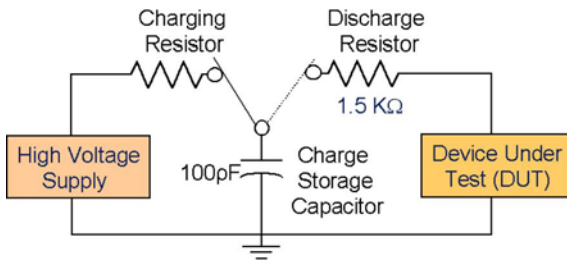
**applies to Engineering exam only*

ESD PRACTICE QUESTIONS (Answers inside front cover)

1. To which of the following should you ground work surface mats?

- A) A water pipe
- B) A steel girder
- C) Common-point ground
- D) The adjacent worksurface mat

2. The following equivalent circuit diagram is typical of which type of ESD event?



- A) Human Body Model (HBM)
- B) Machine Model (MM)
- C) Charged Device Model (CDM)
- D) Field Induced Model (FIM)

3. The ratio of DC voltage to the current flowing between two electrodes of specified configuration that contact the same side of a material is known as:

- A) Conductivity
- B) Resistivity
- C) Surface resistivity
- D) Surface resistance

4. Which of the following types of materials will triboelectrically charge?

- A) Insulative materials
- B) Conductive materials
- C) Dissipative materials
- D) All of the above

5. The ESD Association standard for worksurface resistance testing is designed for materials with resistance:

- A) $< 1\text{M}$
- B) $> 1\text{M}$
- C) Conductive materials
- D) None of the above

6. When materials with different work functions come into contact (<4 angstroms):

- A) Electrons from the material with the lower work function will move to the material with the higher work function.
- B) Electrons from the material with the higher work function will move to the material with the higher work function.
- C) The material with the higher work function will become positively charged.
- D) The material with the lower work function will become negatively charged.

PRACTICE QUESTIONS ANSWER KEY

Question Number	Answer	Test Type
1	C	Engineer and Technician
2	A	Engineer
3	D	Engineer and Technician
4	D	Engineer and Technician
5	B	Engineer and Technician
6	A	Engineer