



Additive Manufacturing Fundamentals Examination

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Test Type: The Additive Manufacturing Fundamentals certification is an assessment for individuals working in or seeking to work in additive manufacturing roles in automotive, aerospace, and medical equipment. This program is ideal for high schools as a capstone or standalone certification to increase workforce readiness in additive manufacturing. This assessment offers a written component and can be used at the secondary level. This assessment is delivered entirely through QuadNet™, NOCTI's online testing system.

Revision Team: The certification assessment content is based on input from secondary, post-secondary, and business/industry representatives who review the assessment on an annual basis.



15.0613 Manufacturing Engineering
Technology/Technician



13- Manufacturing



17-3029.06 - Manufacturing Engineering
Technologists



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

Written Assessment

This written assessment consists of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 110

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Specific Competencies and Skills Tested in this Assessment

- Definition of Additive Manufacturing
- Key Elements of Additive Manufacturing
- Uses of Additive Manufacturing Parts
- Industries Using Additive Manufacturing
- Computer Aided Design (CAD) Tools
- Additive Manufacturing Processes – ASTM Standard
- Current Technologies That Support Each Method/Process
- Key Additive Manufacturing Terminology – ASTM Standard
- Secondary Processes
- Additive Manufacturing Advantages Over Traditional Manufacturing
- Machine Quality Factors
- Input Sources and Characteristics
- File Manipulation
- Investment Casting
- Vat Photopolymerization
- Material Extrusion
- Material Jetting
- Sheet Lamination
- Directed Energy Deposition
- Additive Manufacturing Business & Economics
- Processes for Final Products/Use
- Hazards Associated with Additive Manufacturing Processing
- Personal Protective Equipment
- Hazard Communication and Labeling
- Use of Safety Data Sheets

Sample Questions

Which of the following is a likely area for growth in the use of additive manufacturing?

- a. Customized, batch products
- b. Rapidly produced, large batches of parts.
- c. Customized, individual products.
- d. The mass production of simple parts.

How can users avoid fire hazards when using solvents in AM processes?

- a. Use only non-flammable spray solvents for AM parts.
- b. Coat the part when it is contained in the curing oven.
- c. Limit spraying or dipping to 30 seconds per part.
- d. Make sure to cool the part before using the solvent.

Which of the following is an advantage of lowering the resolution for a particular build on an AM machine? Lower resolutions:

- a. Allow for stronger parts.
- b. Require less time to build.
- c. Are easier to convert to CAD.

Why do CAD files need to be converted to STL files?

- a. STL files use more complex shapes than CAD designs.
- b. AM machines use only two-dimensional part designs.
- c. Extra information in CAD files is unneeded for AM machines.

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Sample Questions (Continued)

Which of the following should take place before starting an additive manufacturing machine and building a product?

- a. Removal of support materials from the part.
- b. Adjusting the resolution and materials used by the machine.
- c. Use of an abrasive to polish the surface of the product.
- d. Performing required post-processing steps.

Which of the following is an advantage for additive manufacturing due to the development of Ethernet?

- a. Easier PC/machine connections
- b. Quicker build speeds
- c. Decreased machine cost
- d. Higher quality models

When compared to CNC, which of the following is a key benefit of additive manufacturing?

- a. The speed with which a design can be turned into a product.
- b. The ability to use stronger, more durable materials.
- c. The rapid production of simple parts.

Which AM method pushes liquefied material through a nozzle and onto a support?

- a. Binder jetting
- b. Powder bed fusion
- c. Sheet lamination
- d. Material extrusion