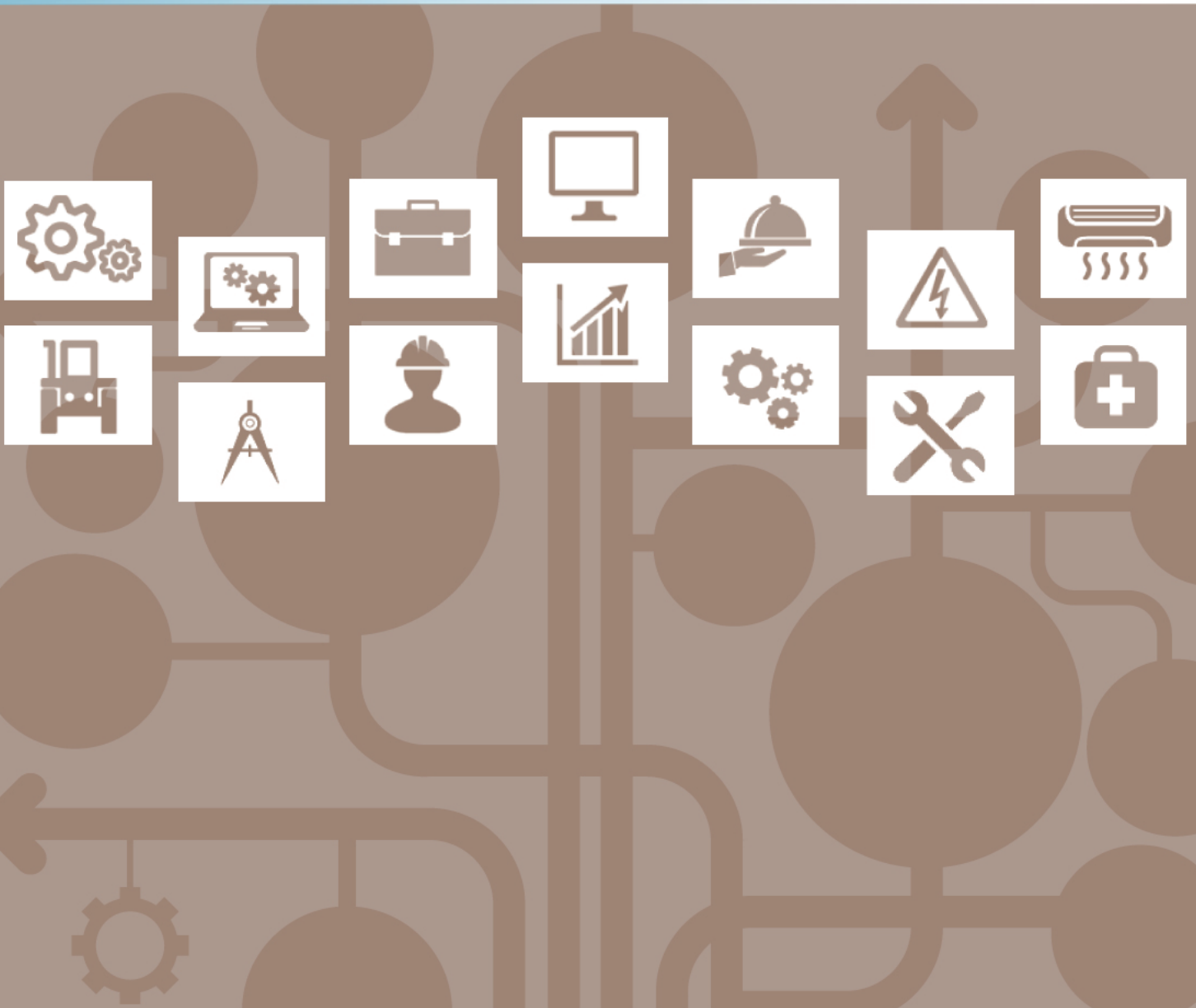


Entry Level Assessment Blueprint

CAD/CAM



Specific Competencies and Skills Tested in this Assessment:

Identifying Hardware and Operating Systems

- Identify hardware and software
- Identify operating system components
- Identify and apply computer terminology

Using Hardware and Operating Systems

- View file names of a storage device
- Store, copy, move, and retrieve information to/from various drives
- Rename and backup files

Interpreting and Reading Blueprints

- Interpret basic views and dimensions in a working drawing
- Interpret bilateral, unilateral, and limit dimensions
- Identify geometric tolerance symbols
- Interpret drawings, pictures, and symbols

Creating and Manipulating Mechanical Drawing Information

- Understand Cartesian Coordinate System
- Set and manipulate drawing elements
- Create and manipulate line types and layers/levels
- Create and edit basic geometry by inputting coordinates
- Insert and manipulate text and fonts
- Create single and multiple auxiliary views of surfaces and objects
- Create and insert cells/blocks
- Insert and manipulate dimensions
- Specify geometric tolerancing on a drawing
- Generate a 2-D multiview drawing
- Generate a pictorial drawing
- Scale and print hard copy on output device



Specific Competencies and Skills Continued:

Drawing and Designing Assemblies

- Create an assembly in 2-D geometry
- Create a bill of materials

Using 3-D Modeling

- Create and manipulate construction planes
- Generate and modify geometric components on construction planes
- Create a 2-D drawing from a 3-D model
- Create a 3-D model from a 2-D drawing
- Create a 3-D model



Machining Fundamentals

- Demonstrate machine tool safety
- Identify personal and environmental safety considerations
- Identify the properties of metals
- Identify the parts of machine tools
- Identify precision measurement techniques
- Measure an existing part to generate a drawing
- Select and set appropriate speeds and feeds
- Identify various cutting tools for machine operations
- Estimate time to manufacture a part

CNC Operation

- Perform safety check and pre-start up machine inspection
- Identify various machine and axes configurations
- Determine basic workholding system
- Secure and align workpiece to table
- Read and interpret diagrams, drawings, and set-up instructions
- Determine program reference zero
- Set up tool length and diameter offsets
- Set up and identify fixture offsets
- Verify and edit program prior to machining the first part
- Edit program to reduce cycle time
- Manufacture and inspect part

Specific Competencies and Skills Continued:

CNC Programming Preparation

- Develop a process plan
- Review drawing to determine stock and tooling required to produce part
- Determine machine process(es) needed
- Determine equipment needed

CNC Programming Using a CAM System

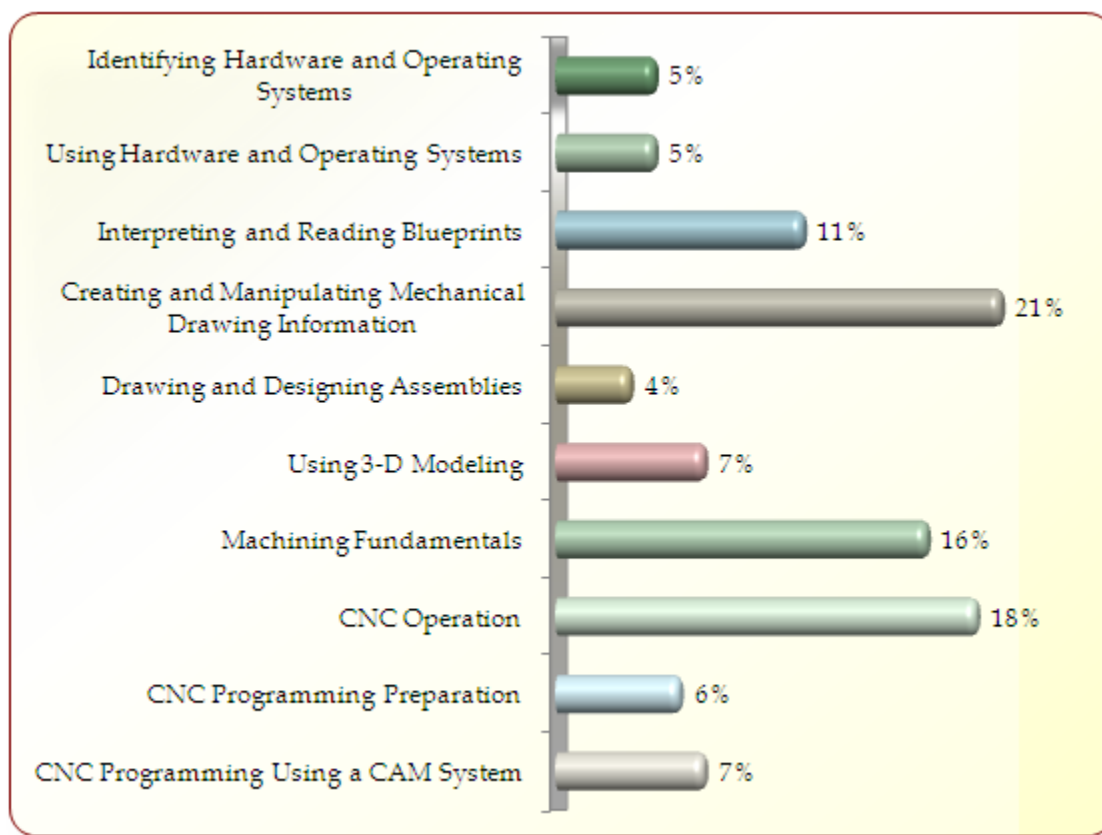
- Determine and manipulate geometry to be used for programming
- Identify methods and applications of file management
- Generate a program using the CAM system
- Verify the program graphically



Written Assessment:

Administration Time: 3 hours

Number of Questions: 190

Areas Covered:

Sample Questions:

The conventional views on a working drawing are set up by _____ projection.

- A. perspective
- B. orthographic
- C. first angle
- D. isometric

A symbol (or block) library is helpful to

- A. create dimensions
- B. recall lost information
- C. establish ground or families
- D. avoid repetitive drawing

The primary purpose of an assembly drawing is to

- A. describe the shape of parts
- B. show the parts as they fit together
- C. show the types of materials
- D. describe the parts in 3-D

The most commonly used workholding device on the vertical milling machine is the

- A. table vise
- B. magnetic chuck
- C. rotary table
- D. V-block

Being able to graphically verify the program, either on CAM software or on a CNC machine, is known as

- A. simulation
- B. graphic design
- C. plotting
- D. uploading

Performance Assessment:

Administration Time: 3 hours

Number of Jobs: 3 CAD jobs and 1 CAM job

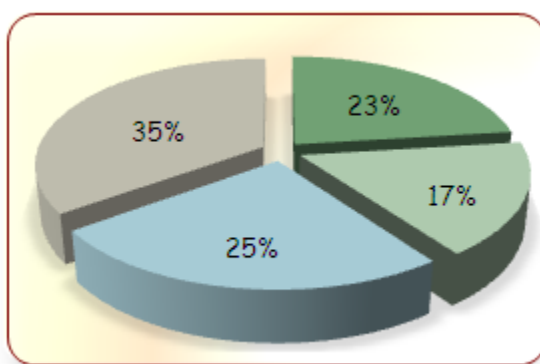
Areas Covered:

23% **Create a 2-D Orthographic Drawing on CAD with a Section View**
Printing and plotting to scale, title block, crosshatch, views, dimensions and their placement, file saved, and time to complete Job 1.

17% **Create a 3-D Solid Model**
Radius corners, holes, volume, file saved, and time to complete Job 2.

25% **Create Two Parts to be Mated and Mate the Parts**
Feature geometry part A and B, volume of part A and B, mating, file saved, and time to complete Job 3.

35% **Manufacture a Part from an Existing Drawing**
Safety, measurement of .125 inch pocket depth, length and width, measurement of .375 inch pocket depth, length and width, measurement of drilled holes depth and distance between drilled holes, overall finish and quality of work, and time to complete Job 4.



Sample Job: Create a 3-D Solid Model

Maximum Time: 30 minutes

Participant Activity: The participant will use the CAD system that is provided, creating a complete 3-D solid model and will save the job to a CD or disk, determine and print out the mass properties of the model.

