Section 1, Unit 1

1. Define the term machining.
   Machining is using machine tools to cut materials to desired shapes and sizes.

2. What is a machine tool?
   A machine operated tool or piece of equipment used to perform machining.

3. What is manufacturing?
   Production or creation of a durable or consumable good.

4. List four industries that depend on machining.
   Answers can vary and include aerospace, automotive, motorsports, power equipment, medical, food, clothing, electronics plastics.

5. What does the term CNC stand for?
   Computer Numerical Control

6. What is the purpose of the drill press?
   To perform holemaking operations.

7. What machine tool produces cylindrical parts?
   Lathe

8. Briefly describe the primary purpose of sawing machines.
   To cut material to rough sizes or remove large portions of material in preparation for other machining operations.

9. What machine tool uses a rotating cutting tool primarily to produce flat surfaces?
   Milling machine

10. Abrasive machining makes use of grinding wheels to remove material.

11. What does the term EDM stand for?
    Electrical Discharge Machining

12. What are the two types of EDM machines?
    Ram (or sinker) EDM and Wire EDM

13. Water jet machining uses a high pressure stream of water containing abrasive particles to cut material.

14. Briefly describe the principle of laser machining.
    Material is cut using a highly concentrated light beam to cut metals.

Section 1, Unit 2

1. What is an engineering drawing and what its purpose?
   A drawing that shows part shapes, sizes, and specifications to guide the machining process.

2. What is the primary duty of a machine tool operator?
   To place parts in machine tools for machining, start a machine, and then remove parts after machining.

3. What occupation involves preparing tools and machines for machining operations?
   Set-up technician

4. Briefly describe a CNC programmer's responsibilities.
   Creating programs of machine code for use in CNC machine tools.

5. What is CAM software?
   Computer Aided Manufacturing software is used to create programs for CNC machine tools.

6. What is CAD software?
   Computer Aided Design software is used to design parts that can then be programmed using CAM software.

7. What career advancement opportunities exist for employees in the machine tool industry?
   Supervisory positions, designers and engineers, salespeople.

8. What career area related to machining deals with designing, establishing, and improving products and/or manufacturing processes?
   Engineering

9. What occupation requires knowledge of several different types of systems in order to troubleshoot and repair machine tools?
   Machine tool service technician

10. What is metrology?
    The science and practice of measurement

Section 1, Unit 3

1. Briefly compare and contrast technical and personal skills.

   Personal skills are largely part of a person's personality, but can be improved with practice. Technical skills are largely learned, but different people have tendencies to have different technical strengths.

2. List four personal skills beneficial to achieving success in a machining career.

   Answers vary but can include mechanical aptitude, manual dexterity, eye-hand coordination, problem solving skills, troubleshooting skills, decision making skills, ability to focus on details, persistence, patience, responsibility, ability to use reference materials, interpersonal skills, memory use.

3. Explain why two of the skills from question 2 are important in the machining field.

   Evaluate individually: answers will vary.

4. List four technical skills beneficial to achieving success in a machining career.

   Answer will vary but can include interpretation of engineering drawings, knowledge of measurement systems, math skills, tool use, understanding of materials, computer skills.

5. Explain why two of the skills from question 4 are important in the machining field.

   Evaluate individually: answers will vary.

6. What is the purpose of CTE or Vocational Education?

   To provide training in technical fields at the secondary (high school) level in public schools.

7. What are the similarities and differences between certificate and associate degree programs?

   Both provide practical, hands on training, but certificate program academics are usually applied while degree academics are more theoretical.

8. What is an apprenticeship?

   A form of on the job training (OJT) that requires completion of a certain number of training hours to achieve a particular level of skill. It may also require attending classes outside of work hours to receive instruction

9. What are two different ways that apprenticeships are structured?

   Sponsored by an individual company or by state or federal Departments of Labor.

10. What is a journeyperson?

    Someone who has completed an apprenticeship program and is expected to have a certain skill level.

11. What does NIMS stand for?

    National Institute for Metalworking Skills

12. Discuss how NIMS certification is different from traditional methods of school or employer based training for the machining industry.

    NIMS certification requires achievement of a standard level of competency instead of merely completing a certain number of training hours.

13. Briefly describe a portfolio and give an example of what it might contain.

    It is a collection of documents and/or photos, certificates, and awards that showcases a person's skills and accomplishments.

Section 1 Unit 1 - Introduction to Machining

1. Bow Drill
2. $70,000, $58,000
3. Water Jet
4. Lasers
5. Surface grinders, Cylindrical grinders
6. "to process by machine" and "to reduce or finish"
7. (answer will vary among student)
8. The CNC was created eliminating punched code
9. Performance, interchangeable parts, proper form/shape, extended part life
10. Manufacturing plays a major role in supporting the American workforce, U.S. manufactures more of the world's end products GNP, economic strength and standard of living, money
11. F
12. T
13. T
14. T
15. F
16. F
17. T
18. T
19. a. 2, b. 5, c. 4, d. 3, e. 1
20. a. 3, b. 5, c. 1, d. 2, e. 4
21. a. 7, b. 8, c. 3, d. 5, e. 4, f. 2, g. 6, h. 1
22. b
23. c
24. d
25. d

Section 1 Unit 2 Careers in Machining

1. 2008–2009 Occupational Outlook Handbook
2. salesperson
3. manufacturing
4. operators
5. F
6. T
7. F
8. T
9. T
10. Employees skills, shop environment, machine tool technology, manufacturing process and materials
11. CNC and conventional machinist have the same skill sets; blueprint reading, precision measurement, understanding of metal removal. The difference is the machine, manual vs computer.
12. They are expert machinist, both conventional and CNC. They have the ability to repair, troubleshoot complex process issues. Each are specialist in their field, ie. Punch press, mold, jig and fixture, but all require the same machining skills to produce the end item.
13. (answer varies among students)
14. revolutionized machining, reduced design time, ensured part form, eliminate hand generated coding, very few design limitations,
15. a. 4, b. 9, c. 6, d. 8, e. 10, f. 3, g. 5, h. 2, i. 7, j. 1
16. c
17. b
18. d

Section 1 Unit 3 Workplace Skills

1. troubleshooting
2. apprenticeship
3. university
4. OJT or on the job training
5. (will vary among students)
6. (will vary among students)
7. Greeting, body and closing
8. (will vary among students)
9. (will vary among students)
10. A journeyman has years of experience in the trade field, where as an apprentice is just learning the trade usually in a controlled environment.
11. National Institute for Metalworking Skills (NIMS) is an organization that plays a vital role in training for the machining industry.
12. T
13. T
14. F
15. T
16. a
17. b
18. c
19. c