NIMS Metalforming Level I
Preparation Guide

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Overview

Introduction

This preparation guide or test advisor is intended to help individuals study and prepare for the National Institute for Metalworking Skills (NIMS) written credentialing exam. The following sample exam will adequately prepare individuals to take the actual credentialing exam. None of the questions are duplicates from the actual credentialing exam. However, this preparation guide is useful for reviewing the technical knowledge, identifying areas of strength and deficiency for adequate test preparation.

Achieving a NIMS credential is a means through which an individual involved or interested in metalforming can prove their abilities to themselves, to their instructors or employers and to the customer. By passing the NIMS credentialing exam you will earn a valuable and portable credential. Because the exam is tough, you will have the satisfaction of proving to yourself and others that you have reached a level of competency accept nationally.

Who Wrote the Questions

A panel of technical experts, from all areas of the metalforming industry, wrote the exam questions used on the credentialing exam. The panel of experts ranges from company presidents and owners, to engineers and quality personnel, tool and die makers and actual working metalforming personnel. Exam questions are designed to evaluate the knowledge skills need for entry-level metalforming employees. They are written to deal with practical problems, computations, and decisions metalforming personnel perform in their day-to-day work.

The technical experts must first validate the credentialing exam questions. The credentialing exam questions are then validated nationally by metalforming and industry personnel before the questions become part of the credentialing exam. Rejected questions are then rewritten or discarded altogether.

How to Prepare for the Credentialing Exam

Become familiar with the exam content and question format by utilizing the tools provided in this test preparation guide. The **Exam Specifications** portion contained in this guide contains a summary description of the content covered by the actual credentialing exam. The **Task List** describes competencies for each particular area associated with the credentialing area.

Each question on the sample exam is linked to a particular task or set of tasks found in the **Tasks List**. Therefore, a review of the **Tasks List**, with an eye to judging whether you know how to perform each task listed, will provide you with valuable information as you prepare for the exam.

The questions are multiple choice. Note instructions that may accompany some questions. Be sure to read each question carefully, (twice, if necessary) so that you know exactly what is being asked. Check your answer or work since an error in computation or understanding may make a wrong answer appear correct.

The following four steps are suggested for effective preparation:

Step 1: Study the content list for each exam you will attempt.

Step 2: Carefully read the **Task List** for each area.

Step 3: Go over the sample exam to become familiar with subject matter and question type. This is a very important step.

Step 4: Review steps 1 through 3 and identify the knowledge area(s) where you need additional study. Use the preparation guide as a self-diagnostic tool.

Areas of Knowledge Measured by the Exam

The knowledge and skills you will need to pass the credentialing exam are as follows:

Exam Sections: The credentialing exam is divided into three major areas. The three areas are:

- **Press Operation and Safety**
- **Basic Safety in the Workplace**
- **Math, Print reading and Measurement**

The following is a list of basic knowledge areas assessed by the exam.

- **Process Control:** Process control monitors metalforming operations to insure quality compliance. Process control insures quality of the product as well as responsible scrap control by separating scrap by material type. Metalforming personnel must know the type of features checked by a visual inspection and the difference between surface defects and material coatings. A basic understanding of SPC enhances competence in this area.

- **Metalforming Processes:** There are other metalforming processes besides punch press metal stamping. Individuals should understand basic metalforming processes such as CNC turret press, laser cutting and press brake. Many of the processes use machinery with CNC (computer numerical control) controllers to enhance production and accuracy.

- **Metalforming Theory:** The process of bending metal has characteristics all its own. An understanding of these characteristics enables individuals to understand the bending process, correct measurement techniques and enhances troubleshooting skills. Strength of a bend depends on the angle of the bend to the grain of the material. Steels are different from aluminum or brass due to the presence of a specific element that makes steel defined by a term called “ferrous”. Individuals should understand the variable that

determines when a metal will bend and not return to its original state. The location of the burr and other edge characteristics enables individuals to correctly measure a part and identify potential quality concerns.

- **Housekeeping:** A clean work area helps make employees safe and productive. Proper housekeeping involves understanding how to handle materials and liquids encountered in everyday work operations. Individuals should understand the purpose of a lubricant and the responsibility of an operator to maintain lubricant levels. Proper disposal and removal of metal slugs produced during a stamping operation prevents die breakage and unsafe working conditions.

- **Preventative Maintenance:** Basic preventative maintenance sustains quality by insuring lubricant levels are correct for both the material and the machine. Good preventative maintenance prevents costly downtime due to machine breakage or damage caused by excessive wear. Other aspects of preventative maintenance include reporting machine sounds not characteristic of the operation or notifying supervisors of drastic changes in the product.

Before the Credentialing Exam

Try to be well rested for the exam. Being well rested will make you alert and efficient when taking the credentialing exam. Review any course material from your instructor. Review the test advisor information and sample exam. Bring at least two sharpened (#2) soft leaded pencils and an eraser. In addition, bring a calculator and the *Machinery's Handbook.* Become familiar with the procedure for taking a Scantron test. If you wish to pace yourself, bring a watch, or be aware of the location of clocks at the test site. Make sure to bring some form of identification, any necessary paperwork from NIMS and arrive at the test site at least 10 to 15 minutes prior to the specified exam time.

At the Testing Site

When you arrive at the test center, wait in the assigned area until the proctor begins the test orientation and administration. The proctor will instruct you on how to fill out any information on the answer sheet. You will also be instructed on the amount of time allotment for the exam, calculator usage and reference materials.

Once the exam has begun, keep track of time. Do not spend too much time on any one question. Answer the questions you know the answers to and go back to questions you have difficulty with after you have gone through the whole credentialing exam. Repeat this process until you have answered all the questions or time has elapsed.

It is to your advantage to answer every question. Do not leave any answers blank. Your score will be based on the number of correct answers.

Exam Content and Sample Question Summary

Exam Content and Sample Question Overview

The following material is designed to help individuals prepare for and obtain a NIMS credential in the area of Metalforming Level I. This section begins with an **Exam Specification**. The **Exam Specification** will list the main categories covered on the exam for Metalforming Level I. It will also list the name of the topic, the number of questions pertaining to that topic and the percentage of the exam devoted to that topic.

The **Task List** describes competencies an individual must attain in order to receive a credential for Metalforming Level I. The **Task List** has a two-fold purpose. The first purpose is to prepare metalforming employees or interested individuals for credentialing. The second purpose is for instructors to apply the **Task List** as a check and balance on their curricula.

The number of questions in each content area may not be equal to the number of tasks listed. Some of the tasks are more complex and broader in scope. This type of information may be covered by several questions. Other tasks are simple and narrow in scope and one question may cover several tasks. The main objective in listing the tasks is to describe accurately what is done on the job, not to make each task correspond to a particular test question.

Sample questions follow the **Task List**. Although these same questions will not appear on the actual exam, they are in the same format as the actual exam questions. All questions on the credentialing exam are in the multiple-choice format. Some concepts evaluated on the credentialing exam are assessed in greater depth with the sample exam questions. The sample exam questions are developed to test conceptual knowledge of metalforming rather than specific competencies.

Answers to the sample questions are located at the end of the sample exam. Work with your instructor to identify weak areas and evaluate answers. Use the sample exam as a study guide and diagnostic tool.

Exam Specifications – Metalforming Level I

Content Area	No. of Questions	% of Test
Basic Safety, Lockout/Tag out, Fire Safety	13	14.8
Basic Math	11	12.5
Punch Press Controls, Operation and Safety	11	12.5
Print Reading and Tolerancing	10	11.4
MSDS and HMIS Material Identification Systems	8	9.1
Measurement	7	8.0
Types of Metalforming	5	5.8
Process Control	4	4.5
Process Planning	4	4.5
Housekeeping and Preventative Maintenance	4	4.5
Metalforming Theory	4	4.5
Punch Press Components	4	4.5
PPE	3	3.4
	Total of 88	**100 %**

Task List

Metalforming Level I

Reading this **Task List** will allow the individual to focus preparation on those subject areas that need attention. The instructor can use the **Task List** to fine-tune the curricula to meet the standards. If you feel comfortable with your knowledge about a particular task, you are probably ready to answer the questions on that subject. If, on the other hand, you have any doubts, you and your instructor can work on these areas to build up proficiencies. Many texts and other resources are available to provide information.

Basic Safety, Lockout/Tag out and Fire Safety

- Individual(s) responsible for accident prevention
- Proper procedure for reporting an accident
- Steps for effective lockout/tag out
- Name the government agency that regulates safety and health requirements and issues
- Types of fire extinguishers and the application of each type
- When to report a fire hazard and to whom
- Basic safety when using compressed air
- Parts of the fire triangle and its importance if extinguishing fires
- Proper use of hand tools used in metalforming (hammers, pliers, wrenches, pry bars, etc.)
- The purpose of having a third wire on an electrical plug designed for 110 volt applications
- Proper lifting technique
- Single biggest cause of operator injury in the metalforming industry

Sample questions:

1) Working safely and accident prevention is the responsibility of:

   a) Management

   b) Workers

   c) Safety Engineers

   d) All of the above

   e) Only a and b

2) When an accident or injury occurs, it is best to:

   a) Wait to see of the injury gets better or gets infected

   b) Hide the accident or injury from management

   c) Seek legal advice before applying first aid treatment

   d) Notify your supervisor and apply first aid if necessary

3) Before making any adjustments to power operated equipment or beginning a lockout/tag out procedure, the operator must:

   a) Make adjustments while the machine is running

   b) Disconnect the power and put a note on the power switch

   c) Notify all affected employees before starting the lock-out/tag-out procedure

   d) Shut off the power and begin making the adjustment after locking

4) What government agency regulates safety requirements and issues in the metalworking industry?

   a) National Institute for Metalworking Skills

   b) Department of the Interior

   c) Occupational Safety and Health Administration

   d) Department of Urban Development

   e) Department of Justice

5) A fire has started in a pile of solvent and oil soaked rags. What class of fire extinguisher should be used to extinguish the fire?

   a) Class A

   b) Class B

   c) Class C

   d) Class D

   e) Class SO

6) Using compressed air to clean clothing and machines is not recommended because:

a) Flying particles can cause injury to the operator and other workers

b) Particles can become embedded into moving components of the machine causing wear

c) Particles may fly into another machine and disrupt that operation

d) All of the above

e) Only a and c

7) Which of the following is not a component of the fire triangle?

a) Fuel

b) Heat

c) Nitrogen

d) Oxygen

8) What happens if one component of the fire triangle is missing?

a) The fire will burn to a lesser degree

b) The fire will be extinguished

c) The fire will find a substitute for that component

d) The fire will burn on at the same rate

9) What is the purpose of the third wire or third prong on a 110-volt plug?

a) This converts 110 volts to 220 volts

b) If one of the prongs is broken, the third prong acts as a backup

c) The third prong guides the plug for an easier connection

d) The third prong or wire acts as a ground in the case of a short circuit

10) What does the term AC represent?

a) Alternating current

b) Direct current

c) Adaptive controller

d) Constant amperage

11) The proper way to lift material or light to medium loads is to use:

a) Only the arms

b) Flex the legs, back straight and arms extended

c) Flex the legs, round the back and use the shoulders

d) Legs straight, back rounded and arms totally flexed

12) Deactivating power and stored energy of powered equipment is a characteristic of:

a) Basic electrical activation

b) Lock-out/Tag-out

c) TPM (Total Preventative Maintenance)

d) HMIS (Hazardous Mechanical Inspection Sequencing)

13) The first thing to do if a foreign particle gets lodged in the eye is to:

a) Pull the top lid over the bottom lid

b) Rub the eye with your finger

c) Use a magnet to draw out the material regardless if it is magnetic

d) Use a few drops of water and wipe with tissue paper

Basic Math

- Division and multiplication of fractions to a whole number
- Addition – fractions
- Relationship between a radius and a diameter and solving problems involving a radius and/or diameter
- Converting fractions to decimal equivalents
- Calculating the hourly rate of production for a machine
- Calculating the strokes per minute given a production rate per hour
- Determining the largest fraction from a group of fractions with different denominators
- Addition and subtraction of fractions and the lowest common denominator
- Converting decimals to fractions
- Numbers of sides for some common regular polygons

14) The top half of a die weighs 2,380 pounds. The hoist in the tool room is rated at 1 ton. Which of the following statements is correct?

a) The capacity of the hoist exceeds the weight of the top half of the die

b) The weight of the top half of the die exceeds the capacity of the hoist

c) A 1/2 ton hoist will suffice

d) A 3/4 ton hoist will suffice

e) A one ton hoist will suffice

15) The diameter of a circle is 3 1/2 inches. The radius of the circle is:

a) 3 1/2 inches

b) 7 inches

c) 1 3/4 inches

d) 5/8 inches

e) 1 5/8 inches

16) The length of each part produced in a progressive die is 1.375 inches. There is a 1/4-inch slug between each part. How long of a strip is needed to make 20 parts?

a) 32 1/4 inches

b) 32.5 inches

c) 22.5 inches

d) 22 3/4 inches

17) What is the decimal equivalent of 45/64?

a) 0.703

b) 0.456

c) 1.422

d) 0.719

e) 0.966

18) A press brake operator can produce 20 parts in 15 minutes. How many parts can the operator produce in 2 hours?

a) 80 parts

b) 40 parts

c) 160 parts

d) 320 parts

e) 120 parts

19) The punch press produces four parts on each stroke. The work order states a rate of 16,400 parts per hour. The press must run at _____ strokes per minute to meet the rate per hour.

a) 164 SPM

b) 68 SPM

c) 132 SPM

d) 273 SPM

20) Which of the following represents the smallest portion?

a) 0.093

b) 11/64

c) 1/16

d) 1/8

e) 0.078

21) To add 3/8 and 9/32, a machinist must find the _____ and calculate _____ fractions.

a) Literal factor, reciprocal

b) Lowest common denominator, literal

c) Highest common denominator, equivalent

d) Lowest common denominator, equivalent

e) Reciprocals, lowest common numerator

22) 9/16 is the fractional equivalent of:

a) 0.750

b) 1.777

c) 0.5625

d) 0.144

23) How many 3" X 6" blanks can be sheared from a strip 2' X 24"?

a) 32 blanks

b) 18 blanks

c) 64 blanks

d) 48 blanks

24) Which of the following geometric figures has six sides?

a) Trapezoid

b) Octagon

c) Hexagon

d) Rhombus

Punch Press Controls, Operation and Safety

- Function of a light curtain on a press
- Color of the emergency stop button
- Operator reaction when the sound of the machine suddenly changes
- Purpose of a straightener and the position of the straightener in a feed line
- Press mode for hand feeding strip stock
- Definition of a punch press stroke and revolution
- Definition and acronym for top dead center and bottom dead center for a stamping press
- Operator reaction when the press suddenly stops
- Definition of a double hit for a stamping operation
- Component of a punch press that stores energy and may present a safety hazard when the press is turned off

- Proper technique and tools for removing scrap and slugs from a machine

25) A light curtain will stop the press when:
    a) All the light beams are broken
    b) Any of the light beams are broken
    c) An operator is near the point of operation when the machine is running
    d) Oil mist enters the light curtain area
    e) The press is at BDC (Bottom Dead Center)
    f) Only b and c

26) What is the color of the button on the punch press that is used in emergencies and commonly called the E-stop?
    a) Green
    b) Red
    c) Yellow
    d) Orange

27) If the sound of the machine changes during a production run, the operator should:
    a) Check the parts, if the parts meet requirements continue to run
    b) Keep the press running and find the maintenance technician
    c) Increase the lubrication for the machine and material being processed
    d) Stop the press and notify the supervisor

28) Which of the following is the proper sequence of equipment for a coil fed press line?
    a) Uncoiler, feed, press, straightener
    b) Uncoiler, straightener, feed, press
    c) Press, uncoiler, feed, straightener
    d) Straightener, uncoiler, press, feed

29) What press mode is a punch press set at for single hit tooling using hand feeding after initial setup?

a) Inch

b) Continuous

c) Reverse

d) Single stroke

e) Top stop

30) A revolution of the crankshaft of a punch press contains:

a) 90 degrees of rotation

b) 180 degrees of rotation

c) 360 degrees of rotation

d) 720 degrees of rotation

31) The stroke of the press is:

a) The "throw" or distance the ram moves in one direction for each cycle

b) The "throw" or distance the ram moves in both the up and down direction

c) The width of the bolster plate

d) Number of degrees of rotation needed to eject a part

32) On a punch press, TDC is defined as:

a) Top dead center

b) Top diameter constant

c) Total diametric compression

d) Timed die controller

33) On a punch press, BDC is defined as:

a) Basis die cavity

b) Bottom dead center

c) Bottom die controller

d) Basic duty compressor

34) If a machine suddenly stops:

a) Examine the part and restart the machine

b) Disregard the stop as a nuisance stop and restart

c) Notify the supervisor and do not start the machine

d) Ask the setup personnel to install the tools in another machine

35) Which of the following statements best describes the term "double hit"?

a) The press is a double action press

b) Two parts are made on each stroke

c) The part is hit and then hit again in a separate tool

d) Hitting two or more parts at the same time when only one part should be hit

36) Which of the following statements best describes the term "two up die"?

a) The press is a double action press

b) Two parts are made on each stroke

c) The part is hit and then hit again in a separate tool

d) Hitting two or more parts at the same time when only one part should be hit

37) What component of a punch press or machine stores energy and may present a danger when the motor is shut off?

a) Flywheel

b) Ram

c) Slide

d) Gibbing

e) Crankshaft

Print Reading and Tolerancing

- Definition of tolerance and why a tolerance is used in metalforming
- Reading a basic dimension and tolerance and determining if a part dimension is in tolerance
- Determining the amount of dimensional variance from a basic dimension when a tolerance is given
- Line convention of a center line and its application
- Line convention of a hidden line and its application
- Understanding and identifying the three basic views of orthographic projection and visualizing missing lines and views
- Determining the number of thread per inch from a thread callout
- Line convention of a dimension line and its application
- Identify the diameter symbol

38) A feature of a part has a dimension of 0.750 ± 0.012 inches. The operator measures the feature and records a dimension of 0.765 inches. This feature is:

a) Undersize

b) Right on the mean dimension

c) Oversize

d) Within tolerance specifications

39) A center line that represents the center of a hole provides:

a) Size of the radius

b) Location through a center point dimension

c) Size of the diameter

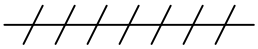
d) Volume of the hole

e) Diameter of the hole

40) Which of the following represents a hidden line?

a) ----------

b) 

c) 

d)

41) An object or visible line shows:

a) The shape of the object as it appears in that view

b) Detail not seen in that view

c) The center of a hole or shaft

d) The length of a dimension

42) How many threads per inch does a 1/4-20 UNC socket head cap screw have?

a) 4

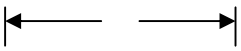
b) 1

c) 10

d) 20

e) 5

43) What are the two types of line convention represented below?



a) Dimension lines and center lines

b) Center lines and object lines

c) Dimension lines and extension lines

d) Section lines and hidden lines

44) What is the tolerance range from the basic dimension for the following dimension listed below:

5.208 ± 0.018

a) 0.036

b) 0.018

c) 0.009

d) 0.0045

45) Tolerance can be defined as:

a) A dimensional relationship between mating parts ensuring a particular fit

b) Extra stock left for subsequent machining operations

c) Permissible variation from a basic dimension

d) The difference between the highest and lowest readings when performing SPC

46) What does the following symbol represent? ∅

a) Diameter

b) Radius

c) Radians

d) Do not perform

47) What does the following symbol represent? ∠

a) Diameter

b) Angle

c) Parallel

d) Perpendicular

48) How does a centerline differ from a hidden line?

a) Centerlines are continuous lines

b) Centerlines consist of a solid line broken by a short dash line

c) Centerlines are short jagged lines similar to a line graph

d) Centerlines are a series of parallel lines set at a 45 degree angle

MSDS and HMIS Material Identification Systems

- Application of both the MSDS and HMIS systems
- The definition and acronym for LEL on the MSDS format
- Document that provides flash point information and the definition of a flash point
- Define the acronym MSDS
- Colors found on an HMIS label
- Document that provides the limit threshold value and the definition of a limit threshold value
- Define the acronym HMIS

49) Which of the following is the best reference for questions concerning the handling, applying, disposing and cleaning of various chemicals, coolants and lubricants used in the metalworking industry?

a) Hazardous Material Resource Sheets

b) Internet Safety Data System

c) Material Safety Data Sheets

d) Dictionary of Safety Materials

50) The acronym LEL is found on all MSDS information. LEL represents:

a) Limited Explosive Level

b) Lower Explosive Limit

c) Lethal Environmental Level

d) Limited Exponential Level

51) Which of the following statements best describes the term "flash point"?

a) Airborne concentration of material that personnel can be exposed to day after day without adverse effects on their health

b) A measure of how quickly a substance forms a vapor at ordinary temperatures

c) The minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite

d) A chemical that causes reversible inflammatory effects on living tissue

52) The acronym MSDS represents:

a) Modern Safety Disposition Service

b) Material Safety Data Sheet

c) Material Safety Departmental Service

d) Metal Safety Data System

53) Which one of the following sets of colors is represented on an HMIS sticker?

a) Red, blue, white, green

b) Yellow, orange, purple, red

c) White, yellow, green, gray

d) Red, white, yellow, blue

54) The initials HMIS represent:

a) Hazardous Material Information System

b) Health and Manufacturing Institute for Safety

c) Hazardous Machine Inspection and Safety

d) Hazardous Material Inspection System

55) Which one of the following is **NOT** found on an MSDS?

a) Molecular weight

b) Melting point

c) Size of storage containers

d) Emergency phone number

56) A press setup person wants to know the maximum exposure a person can have to airborne solvents day after day. What does the setup person reference on the MSDS?

a) Boiling point

b) Threshold Limit Value

c) Vapor Density

d) NFPA rating

e) Flash point

Measurement

- Angle measurement with a protractor
- Angularity of a steel square
- Metric measurement – millimeters in an inch
- Inch measurement – inches in a millimeter
- Micrometer measurement – graduations on the thimble
- Micrometer measurement – total movement for one revolution of the thimble
- Micrometer measurement – parts of a micrometer and where a part is actually measured
- Micrometer measurement – reading a micrometer

57) Which one of the following measuring tools is most appropriate for measuring angles?

a) Machinist square

b) Dial Caliper

c) Protractor

d) Center head and rule

58) Which of the following measuring instruments determiness if an angle is 90 degrees?

a) Machinist steel square

b) Caliper

c) Internal hole gage

d) Dial indicator

e) Angle set

59) How many millimeters are in two inches?

a) 2.54

b) 25.4

c) 50.8

d) 5.08

60) One complete revolution of the thimble on an outside micrometer will change the opening gap:

a) 0.001 inches

b) 0.025 inches

c) 0.050 inches

d) 0.100 inches

e) 0.040 inches

61) Each division on a thimble of an outside micrometer equals:

a) 0.001 inches

b) 0.025 inches

c) 0.040 inches

d) 0.100 inches

62) To measure a feature using an outside micrometer, the operator would place the feature between the _____ and _____.

a) Spindle and sleeve

b) Anvil and spindle

c) Spindle and thimble

d) Anvil and frame

Types of Metalforming

- Type of operation performed by a CNC turret press
- Definition of the acronym CNC
- Type of operation performed by a laser machine
- Type of operation performed by a press brake
- Location of work in a press brake and the consequences of offloading

63) A CNC turret press is not capable of:

a) Cutting blanks

b) Forming small forms

c) Cutting square holes

d) Cutting round holes

e) Forming deep drawn shells

64) CNC is an acronym for:

a) Computer Numerical Control

b) Capability Numerical Charting

c) Constant Numerical Computer

d) Control Numerical Components

65) Laser machines use a _____ to cut blanks.

a) Sonic wave

b) High intensity light beam

c) Thin straight wire

d) High speed machining end mills

66) What will happen if the tooling and forming operations are performed on one end of the press brake?

a) The production rate will increase due to operator proximity to the operation

b) Another job can be setup at the other end of the press brake

c) A condition called offloading exists and the part might appear twisted due to uneven pressure

d) Nothing, these machines are built to be offloaded

67) The main function of a press brake is to:

a) Perform transfer operations

b) Store energy for the ram

c) Stop the clutch from engaging the flywheel

d) Bend material

Process Control

- Basic characteristic determining how scrap metal is separated
- Basic types of surface defects
- Types of characteristics checked in a visual inspection
- Definition of the acronym SPC

68) For proper scrap disposal:

a) All types of metals are mixed

b) All types are separated by type of material regardless of thickness

c) All types are separated by material thickness with metals of the same thickness being mixed

d) Ferrous materials of any kind are mixed as are non-ferrous materials

69) Which of the following is an example of a metal coating?

a) Scratches on the metal

b) Pitted metal

c) Rusted metal

d) Galvanized metal

e) Discoloration

70) Visual attribute inspections differ from variable inspections because:

a) Visual inspections collect numeric data

b) Visual inspections determine if an attribute is present or not present

c) Variable inspections determine probable cause of a problem

d) Lengths, widths and hole diameters are attribute characteristics

71) SPC represents:

a) Safety Program Committee

b) Statistical Plant Council

c) Statistical Process Control

d) Safety Process Course

72) Which of the following is true concerning SPC?

a) SPC is a regulatory agency of the government

b) SPC is capable only of assessing process capability

c) SPC is a process of in-die assembly

d) SPC is a system of quality assurance using X bar and R charts

Process Planning

- Purpose and function of a work order, job card or router
- Information contained in a work order, job card or router
- Defining operator responsibility such as housekeeping and inspecting parts
- Concept of raw material traceability

73) A work order (router or job card) contains information about the:

a) Production rate

b) Material type and thickness

c) Heat treating process (if applicable)

d) All of the above

e) Only a and b

74) What is the press operator's responsibility?

a) Housekeeping

b) Using gages and checking fixtures properly

c) Measuring parts and recording readings

d) Filling the lubricant reservoirs

e) All of the above

75) Finished and delivered parts can be tracked back to the original stock material by applying methodology known as:

a) SPC charting

b) Traceability

c) Control plans

d) Inventory tags

e) FMEA analysis

76) What type of information does a work order, process sheet or job card provide?

a) The names of the inspection team for each sub-supplier

b) The cost of material and profit margin on each operation

c) All the necessary information to make the part to specifications

d) A spreadsheet on material resource planning and production scheduling

Housekeeping and Preventative Maintenance

- Operator responsibility when using automatic lubrication devices on metalforming machinery
- Proper procedure for containing and cleaning oil spills
- Main functions of lubricants in the metalforming industry
- Proper time period for checking lubrication fluid levels

77) Lubricants help to prevent galling and reduce _____.

a) Part washing procedures

b) Cutting edge life

c) Wear

d) Slug pulling

e) Shear form height

78) Oil, lubricant or cleaning solution spills should be:

a) Left for the maintenance department to clean

b) Cleaned up immediately

c) Cleaned up at the end of the shift

d) Covered with rags

e) Gathered for recycling into the machines

79) Lubrication levels should be checked:

a) Daily

b) When the fluid levels are below a specific line

c) Annually

d) Only when a problem with galling occurs

Metalforming Theory

- Grain direction for maximum strength of the bend and to prevent cracking
- Element that makes a metal termed “ferrous”
- Definition of the elastic limit
- Definition of a yield point
- Burr side location for a blanked metal part

80) The weakest way to form metal and promote cracking is to form:

a) Against the grain

b) On the burr

c) With the grain

d) 45 degrees to the grain

81) The strongest way to form metal is to form:

a) Against the grain

b) On the burr

c) With the grain

d) 45 degrees to the grain

82) A non-ferrous material does not have:

a) Chromium

b) Carbon

c) Vanadium

d) Silicon

e) Iron

83) In order to form metal, the press must exceed the _____ in order to alter the grain and crystal structure.

a) Shear strength

b) Elastic limit

c) Fatigue limit

d) Tensile strength

e) Draw ratio

84) The burr side of a blank is:

a) The rounded portion on the edge just above the cut band

b) The cut band distance

c) A sharp edge on the edge of the part below the cut band and break

d) A surface defect on the face of the part

Personal Protective Equipment (PPE)

- PPE for working with an overhead crane or material stored above shoulder level
- Definition of the acronym PPE
- PPE for handling strip or coil stock, or metal with rough, sharp edges

85) What type of PPE is best suited for handling coil stock, sharp or rough metal strips?

a) Long sleeve work shirt

b) Tarsal guards

c) Work gloves and safety glasses

d) Lab coat, safety glasses and tarsal guards

86) The acronym PPE means:

a) Press Protective Equipment

b) Personal Protective Equipment

c) Punch Press Emergency

d) Pinch Point Emergency

87) Which of the following best describes typical PPE used by pressroom personnel?

a) Hard hat, tarsal guards, elbow pads, safety glasses

b) Back support, safety glasses, apron, knee pads

c) Safety glasses, ear protection, safety shoes, gloves

d) Shoulder harness, safety glasses, back support, elbow pads

88) What PPE should an employee wear when using overhead cranes or moving material and tooling stored on overhead racks?

a) Hard hat

b) Safety glasses

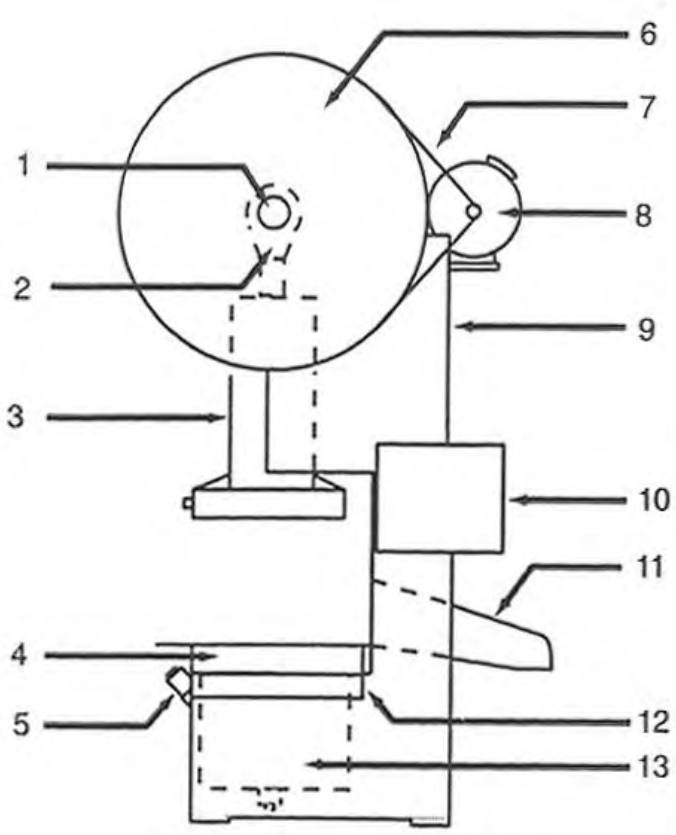
c) Clean room body suit

d) Ear protection

Punch Press Components

- Identify common components of a punch press such as:
    - Ram
    - Bed
    - Bolster
    - Flywheel
    - Motor
    - Air cushion
    - Crankshaft
    - Frame
    - Control box
    - Palm button control switches
    - Pitman
    - Part chute

Identify the following components:



1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

11)

12)

13)

Metalforming Level I
Sample Test Answers

1) D

2) D

3) C

4) C

5) B

6) D

7) C

8) B

9) D

10) A

11) B

12) B

13) A

14) B

15) C

16) B

17) A

18) C

19) B

20) C

21) D

22) C

23) A

24) C

25) F

26) B

27) D

28) B

29) D

30) C

31) A

32) A

33) B

34) C

35) D

36) B

37) A

38) C

39) B

40) A

41) A

42) D

43) C

44) B

45) C

46) A

47) B

48) B

49) C

50) B

51) C

52) B

53) D

54) A

55) C

56) B

57) C

58) A

59) C

60) B

61) A

62) B

63) E

64) A

65) B

66) C

67) D

68) B

69) D

70) B

71) C

72) D

73) D

74) E

75) B

76) C

77) C

78) B

79) A

80) C

81) A

82) E

83) B

84) C

85) C

86) B

87) C

88) A

Press Components

1) crankshaft

2) pitman

3) ram

4) bolster

5) palm buttons (switches)

6) flywheel

7) belt

8) motor

9) frame

10) control box

11) chute

12) bed

13) cushion