
NIMS Stamping Level III Preparation Guide

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Overview

Introduction

This preparation guide (test advisor) is intended to help individuals study and prepare for the National Institute for Metalworking Skills (NIMS) written certification exam. The following sample exam will prepare individuals to take the actual certification exam. None of the questions are duplicated from the actual certification 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 certification is a means through which individuals involved in production stamping can prove their abilities to themselves, to their employers and to the customer. By passing the NIMS certification exam, you will earn a valuable and portable certificate. Because the exam is difficult, you will have the satisfaction of proving to yourself and others that you have reached a higher level of competency accepted nationally.

Who Wrote the Questions

A panel of technical experts from the stamping industry wrote the exam questions used on the certification exam. The panel of experts included company presidents, owners, engineers, quality personnel, tool and die makers and production stamping personnel. Exam questions are designed to evaluate the knowledge and skills needed for experienced production stamping employees. They are written to deal with practical problems, computations, and decisions production-stamping personnel perform in their day-to-day work.

The technical experts must first validate the certification exam questions. Stamping professionals on several levels then validate the credentialing exam questions nationally before they become part of the certification exam. Rejected questions are then rewritten or discarded altogether.

How to Prepare for the Certification Exam

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

Each question on the sample exam is linked to a particular task or set of tasks found in the **Task List**. Therefore, a review of the **Task 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 format. 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 certification exam are as follows:

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

- **Press Parameters, Controls and Setup**
- **Press and Process Troubleshooting**
- **Basic Press Safety, Maintenance and Housekeeping**

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

- **Die Set and Die Components:** Pressroom personnel must be familiar with components of both a die and a die set. They should be familiar with the components of a die assembly, function of each half of a die assembly and the basic processes performed in a die. Skilled pressroom personnel will also be able to identify and describe the function of a die stripper, die lifters, die parallels and die stop blocks. In addition, competent employees will know the basic components of a die set such as die set bushings, guideposts and the definition of a single station die.
- **Components of a Sheared Edge:** Basic knowledge of a sheared edge is important for pressroom personnel to understand and apply. They should have a fundamental comprehension of the components. The order of their occurrence will aid in the identification of potential problems. Personnel must accurately measure dimensions on the cut band for consistent measurement. They should also be able to identify the types of marks normally produced during a bending operation.
- **Hoists, Coiling Handling and Uncoiling:** Coil handling and coil loading and unloading are essential skills needed for competent setup and operation personnel. Applying basic balancing principles utilizing a hoist is important for safe loading and unloading. Knowing where to stand when un-banding a coil as well as proper coil loading to reduce coil set expedite setup and operation. Employees must also understand coil width adjustments for both stock reels and stock cradles as well as the purpose for cascade rollers. Basic coil safety knowledge is important in such respects, such as storing narrow coils with the “eye to the sky”.

- **Material Characteristics, Coil Defects and Coil Processing:** Understanding material characteristics, basic coil defects and coil processing is essential for effective pressroom setup and operation. Pressroom personnel should know about material lamination, hardness testing, types of surface strain and the definition of tensile strength. The identification and possible root cause of basic coil defects is essential for scrap prevention. Personnel should be able to identify rust, “tear drops” and several differences between steel and aluminum. Basic understanding of the features of galvanized coated steel is also essential. Material confirmation, raw material identification and understanding how tensile strength affects the drawing ability are additional areas of knowledge essential to pressroom setup and operation personnel.
- **Straighteners and Feeds:** Straightening and feeding are important aspects for progressive tooling operations. Competent setup personnel should know about the purpose of the slack loop, loop control device and straightening device. Additional knowledge skills would include an understanding of parameters that determine the amount of straightening allowable for a given stock straightener, location and purpose of pinch rolls and the function of threading tables. They should be knowledgeable about magazine feeding for single hit tooling. Setup personnel should exhibit knowledge identifying the basic components of an air grip feeder as well as the effect of a bad diaphragm.
- **Basic Safety, First Aid and PPE:** All pressroom personnel should have a basic knowledge of safety, PPE and first aid. Effective pressroom personnel will know where appropriate fire exits and fire extinguishers are located, evacuation plan and gathering location as well as the proper safety behavior to avoid accidents. First aid knowledge would include identifying the symbol for blood borne pathogens and the definition of a blood borne pathogen. Employees must be aware of a procedure that should be offered to a worker exposed to another person’s blood and the proper first step to aiding a bleeding co-worker. PPE knowledge would include knowing the sound level requiring hearing protection and safety equipment worn when handling raw material.

- **Measurement:** All metalworkers must be competent at measuring piece part features. Effective pressroom personnel should understand the meaning of tolerance and a basic understanding of attribute and variable characteristics. Knowledge of go/no go gaging for checking attribute characteristics is essential. Employees must be able read an inch and metric micrometer, dial indicator and depth micrometer. Basic blueprint skills include line identification, line purpose, defining a plan view and print tolerancing (title box). Pressroom personnel should be familiar with SPC charting through an understanding of process trends and documentation of variable variation.
- **Press Components:** To effectively operate and/or set up a mechanical power press, pressroom personnel must have knowledge of basic press components. These components include the purpose of a knock out bar, air cushion and the two types of clutches found on mechanical power presses. Other essential knowledge includes the input/output relationship when a clutch is fully engaged, components of a pneumatic system and their arrangement, methods for a flywheel to drive a crankshaft and the component turned by the flywheel when the clutch is engaged (crankshaft). Experienced personnel must know the procedures for properly inching a ram on the punch press.
- **Lockout/Tagout:** Lockout/Tagout is an important component of an organization's safety program. Pressroom employees should know the purpose and application of Lockout/Tagout procedures and the type of event (if any) when this procedure can be bypassed. Knowledge of Lockout/Tagout and preventative maintenance procedures affected by this safety procedure is essential for a safe and productive work environment. Pressroom personnel must understand their role as "affected" personnel and respect the rules associated with a Lockout/Tagout program.
- **Counterbalances:** The purpose of the counterbalance is to offset the weight of the tool attached to the ram. Competent setup and operation personnel must know when the counterbalance pressure should be changed as well as the location of information specifying the weight of the die components attached to the ram. Efficient application of this knowledge would include knowing when counterbalance pressure is checked and adjusted. Basic knowledge should also include an understanding of the symptoms of improper counterbalance pressure and the proper method for bleeding a pneumatic line.

- **MSDS and HMIS:** MSDS and HMIS information are the cornerstones of an effective safety program. Pressroom personnel must know the colors on an HMIS sticker and be able to reference numerical information. They should also have an understanding of the components of an HMIS sticker. Setup and operation personnel must know the meaning of the acronym “MSDS” and be able to name or identify the major components of MSDS information.
- **Mechanics:** To understand press working, pressroom personnel must have knowledge of mechanics concerning pulleys and gears. Essential conceptual knowledge includes gear rotation and gear speed relationships, determining the driver pulley and driven pulley rotation and pulley size/speed relationships between pulleys of different sizes.
- **Clamping:** Clamping is probably one of the most abused practices in die setting. Pressroom personnel must know the correct pattern for tightening die shoe clamps to even stresses and prevent movement. They must also know the minimum distance a bolt must enter a threaded hole to effectively hold a die shoe, T-bolt and fulcrum block. Improper clamping can lead to clamping failure, tooling failure and operator injury.
- **Sensor Technology:** Sensor technology is gaining popularity as a method to prevent die crashes and mishits. Stamping Level III practitioners should be able to describe the function of a tonnage monitor and what it is designed to prevent. Pressroom personnel should be able to describe the function of a proximity sensor and light curtains as well as the function of a mechanical proximity switch. Effective personnel should know what parameter to inspect if a proximity switch fails to provide an electrical signal.
- **Single Hit Tooling:** Single hit tooling does not apply progressive die principles. Part production can be either single piece or multiple pieces per stroke. Features of a part can be made in one die then transferred to another die in another press for subsequent operations. Pressroom personnel should understand the point of operation (as a safety precaution) and the number of palm buttons required for each person operating a single hit press (two buttons for each operator). They should also be able to name the cavity found in a die block for forming operations and the types of marks produced during a bending operation. Other essential knowledge includes defining an embossing

operation and understanding the importance of datums for correct part orientation in nesting situations.

- **Compound Dies:** The orientation of the die block and punch for a compound die is opposite that of a conventional progressive die or single hit tool. Other essential knowledge includes defining the purpose of a light curtain (to detect part ejection), the effectiveness of a compound die for maintaining flatness and the reason why piercing punches are shorter than the blanking die block (to alleviate crowding). The knockout bar must be set properly to prevent shedder jamming and to obtain effective part ejection. Other areas of competence include setting the pass line in reference to the stripper and the function of oil pins on the shedder.
- **Progressive Dies:** The most common type of die is the progressive die. A coil strip passes through the die at a specific distance per stroke. Varieties of operations are performed on the strip at each station (or stroke) to make a completed part at the end of the die. Pressroom personnel must know the definition of the advance and some common names associated with the advance (such as the progression or pitch). Other essential skills include identifying the point at which the coil stock is released (pilot release), defining the function of the first stop pin and knowing which half of the die set is tighten first. Other knowledge includes an understanding of the consequences of a die that is not properly aligned to the feed line, the purpose of levelers on strippers and the consequences of reducing the shut height past the capability of the die.
- **Deep Draw Dies:** Draw work is a unique area of metalforming. Controlled material flow is very important in any draw operation. Pressroom personnel must understand the purpose and function of a developed blank, the effect of air cushion pins that are not all the same length, the importance of metal flow resistance and the function of air cushion pins in a deep draw operation. Competent setup personnel should be able to identify a possible root cause for a sudden dimensional change on a drawn part. Other knowledge areas include the items to check if the slide adjustment nuts are not turned equally and the effect on the draw operation when an air leak exists in the press air cushion.

Before the Certification Exam

Try to be well rested for the exam. Being well rested will make you alert and efficient when taking the certification 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. You may also bring a copy of the *Machinery's Handbook* if you have access to one. Become familiar with the procedure for taking a Scantron or an online test. If you wish to pace yourself, bring a watch, check the monitor (online testing) 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 allowed 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 certification 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 certification in several areas of Stamping Level III – Single Hit Tooling, Compound Dies, Progressive Dies and Deep Draw Dies. This section begins with **Exam Specifications**. The **Exam Specifications** will list the main categories covered on the certification exams for Stamping Level III. It will also list the name of the topic and the number of questions pertaining to that topic. These questions are common for each certification area found at Stamping Level III. Each certification area designated in bold type (single hit tooling, progressive dies, compound dies and/or draw dies) will have its own set of questions specific to that type of tooling and press operation.

The **Task List** describes competencies an individual must attain in order to receive a certification for each component of Stamping Level III – Single Hit Tooling, Compound Dies, Progressive Dies and Deep Draw Dies. The **Task List** has a two-fold purpose. The first purpose is to prepare production-stamping employees for certification. 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 certification exam are in the multiple-choice format. Some concepts evaluated on the certification exam are assessed in greater depth with the sample exam questions. The sample exam questions are developed to test conceptual knowledge of punch press operation and different types of tooling rather than specific physical competencies.

Answers to the sample questions are located at the end of the sample exam. The number of sample test questions for a given area may not be the same number of questions related to that topic on the certification 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 – Stamping Level III

Content Area	No. of Questions	% of Test
Press Parameters, Controls and Setup	18	9.1
Press and Process Troubleshooting	18	9.1
Basic Press Safety, Maintenance and Housekeeping	16	8.1
Die Sets and Die Components	14	7.1
Material Characteristics, Coil Defects and Coil Processing	14	7.1
Components of a Sheared Edge	12	6.1
Hoists, Coil Handling and Uncoiling	12	6.1
Straighteners and Feeds	11	5.6
Basic Safety, First Aid and PPE	10	5.5
Measurement	9	4.5
Press Components	8	4.0
Lockout/Tagout	6	3.0
Counterbalances	5	2.5
MSDS and HMIS	5	2.5
Mechanics	4	2.0
Clamping	4	2.0
Sensor Technology	4	2.0
Single Hit Tooling	7	3.4
Compound Dies	7	3.4
Progressive Dies	7	3.4
Deep Draw Dies	7	3.4
	Total of 198	100 %

Task List

Stamping Level III – Single Hit Tooling, Compound Dies, Progressive and Deep Draw Dies

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

Press Parameters, Controls and Setup

- Place to start the material before inching/jogging material through a die
- Location on the press where information on the stroke and adjustment limits of the press may be found
- Location of the ram adjustment control, mode of operation switch and on/off button for the main motor
- Purpose of the ram adjusting screw
- Instrument that checks the actual press stopping time
- The component that is activated by air pressure on an air operated clutch-brake mechanism
- Method to identify when the press is at BDC without a stroke indicator
- Definition of the acronym SDAU
- Rationale for a downward adjustment of the shut height after the material has been completely “walked through”
- First step when inching a ram on a punch press
- The part of the press cycle where the shut height of a punch press is obtained
- When the final setting (locking) of the ram is performed
- Definition of a blanking operation
- Definition of perforating
- Mode of operation when setting up and loading material
- Control that determines the rotational direction of the crankshaft
- The position of the slide adjustment control when other press controls are needed to operate

Sample questions:

- 1) What does the acronym SDAU represent?
 - a) Stroke down, adjustment up
 - b) Single draw auxiliary unit
 - c) Slide depress, adjustments utilized
 - d) Stop delivery, amplifier unplugged

- 2) What mode of operation should the press be in when setting up and loading material?
 - a) Continuous mode
 - b) Single stroke mode
 - c) Manual mode
 - d) Inch mode

- 3) What is the purpose of the ram adjusting screw?
 - a) Adjusts the height of the bolster plate
 - b) Adjusts the stroke of the press
 - c) Distributes even air pressure to the counterbalance
 - d) Adjusts the shut height by raising or lowering the ram

- 4) The first thing a set up person should do when inching a ram on a punch press is to:
 - a) Cycle the press without checking or setting the shut height
 - b) Bleed the counterbalance of all air pressure
 - c) Insert the key in the mode selector slot and turn on the main motor
 - d) Push both palm buttons to release all stored energy

- 5) Why must the material be located at the first stop when beginning a strip in a die?
 - a) To prevent partial cutting and deflection of die components
 - b) To balance the stripper
 - c) To save material
 - d) To balance the forces on the ram to prevent offloading

- 6) Where does a set up person find information on the stroke and adjustment limits of the ram on a mechanical punch press?
- a) On the HMIS sticker
 - b) On the side of the controller for the press or the press specification plate
 - c) On the MSDS form
 - d) On the punch holder of the die
- 7) What is the function of a brake monitor on a punch press?
- a) Checks the actual press stopping time and compares it to a pre-set limit
 - b) Prevents the uncoiling device from turning freely
 - c) Prevents creeping from a powered straightener
 - d) None of the above
 - e) Only a and c
- 8) How can set up personnel tell when the ram is at BDC if the press is not equipped with a stroke indicator?
- a) Check the location of the keyway on the flywheel
 - b) Take a measurement from the ram to the bolster/bed of the press
 - c) The point of the cycle at which the knockout bar is activated
 - d) The point at which the feed rollers activate pressure on the strip
- 9) The strip has been completely fed through the die. A downward adjustment of the press shut height must be made because:
- a) The flywheel is rotating too fast causing the ram to lift
 - b) The bearings in the press are becoming warm and expanding
 - c) The material is too thick for the die
 - d) The press has deflected due to clearances and allowances

- 10) Final locking of the ram (or setting of the ram) is performed when:
- a) The part has been accepted by quality assurance personnel
 - b) The press is at BDC and the motor has been turned off
 - c) The die has been clamped to the ram
 - d) The coil is loaded onto the uncoiling device
- 11) What does the air activate on an air operated clutch-brake mechanism?
- a) Main motor
 - b) Straightener
 - c) Clutch
 - d) Overload monitor
- 12) What control determines the direction of the crankshaft?
- a) Mode of operation switch
 - b) Forward-reverse motor selector switch
 - c) Ram adjustment lever
 - d) Pitman arms
- 13) Locate where the operator or set up person finds the on/off button for the main motor, mode of operation switch and the ram adjustment control on the punch press:
- a) On the flywheel
 - b) Cradle
 - c) Next to the pressure regulator and counterbalance
 - d) On the control panel of the controller
- 14) For other press controls to operate, the slide adjust control must be set in the _____ position.
- a) Continuous
 - b) Delay
 - c) Idle
 - d) Reference

- 15) The maximum shut height of a punch press is determined when the:
- Stroke is up (TDC) with the adjustment down
 - Stroke is up (TDC) with the adjustment up
 - Stroke is down (BDC) with the adjustment down
 - Stroke is down (BDC) with the adjustment up
- 16) Define the press operation that creates a part by shearing it from a coil of material:
- Embossing
 - Blanking
 - Piercing
 - Drawing
- 17) Several holes are pierced during the stroke of the press. This operation is called:
- Gang drilling
 - Perforating
 - Embossing
 - Shear forming

Press and Process Troubleshooting

- Cause of a misfeed - progressive die
- Cause of double hits
- Cause of an “out of specification” condition
- Possible cause of a sticking stripper
- Possible cause of a press overload
- Reason why a bolster plate does not sit flat on the press bed
- Possible problem evident by a large burr
- Instrument used to measure voltage
- Use of a continuity tester
- Cause of a main motor running hot

- Possible cause for excessive burrs on a pierced hole
- Factors in galling
- Possible cause for part ejection failure
- Possible cause for loss of part features
- Effect of dull tooling on press performance
- Possible cause of a “no loop” condition for a feed line
- Possible cause of an “excessive loop” condition for a feed line
- Possible cause of skeletal scrap impressions on a piece part

Sample questions:

- 18) Which one of the following devices is the best device to apply when determining voltage?
- a) Air pressure regulator
 - b) Multimeter
 - c) Electronic dial indicator
 - d) Telescoping gage
- 19) A pierced hole has excessive burrs. What is a probable root cause of this condition?
- a) Excessive tonnage exerted by the press
 - b) The shut height is too deep
 - c) The punch and die clearance is incorrect
 - d) The straightener is over straightening the material
- 20) Dull tooling can cause:
- a) The tonnage requirement to increase
 - b) The tonnage requirement to decrease
 - c) Missing features
 - d) Burrs to disappear

- 21) Skeletal scrap impressions are found on several piece parts. This would indicate:
- a) Excessive lubrication
 - b) Rust on the material preventing proper feeding
 - c) A previous short feed or slug pulling
 - d) Improper pressure to the press clutch
 - e) Voltage failure
- 22) Pressroom personnel will often use a continuity tester to check:
- a) Air pressure to the press
 - b) Oil levels
 - c) Weight of the coil
 - d) Fuses
- 23) Which of the following is **not** a cause of a “*no loop*” condition?
- a) Stock misalignment
 - b) Incorrect speed adjustment on the uncoiling device
 - c) Loop sensor fault
 - d) Improper shut height
- 24) What is a possible cause of *double hits*?
- a) Piece parts sticking to the punch
 - b) Material that is slightly undersize but within specifications
 - c) Use of a light vanishing oil
 - d) The press is running too slow
- 25) Which one of the following conditions would not be characteristic of an “*out of spec*” condition?
- a) Large change in material thickness
 - b) Excessive lubrication and slug pulling
 - c) Extremely worn or chipped die components
 - d) Short feeds or overloading conditions
 - e) All of the above

- 26) What may cause a mechanical punch press to overload?
- a) Inadequate tonnage to stamp the part
 - b) Thinner material used in the tooling
 - c) Improper adjustment of the counterbalance
 - d) Excessive roller pressure on a servo feed
- 27) Which one of the following statements may be a reason why a bolster plate does not sit flat on the bed of a mechanical press?
- a) The tie rod overload system is set improperly
 - b) The gibs for the ram are not adjusted properly
 - c) Dirt and slugs are underneath the bolster plate
 - d) The die has been improperly clamped to the bolster plate
- 28) What may be a possible cause for a large burr on a piece part?
- a) An extremely sharp punch
 - b) A sharp punch with a TiCN coating
 - c) A polished punch that has been sharpened and the wire edge removed
 - d) Dull or chipped punch and/or die
- 29) The main motor on a mechanical punch press is running hot. What may be a root cause?
- a) The shut height is set too high
 - b) Drive belts are slipping
 - c) The strokes per minute is set too low
 - d) The counterbalance had a slight increase in pressure
- 30) The piece part does not eject from the die. This condition could be caused by:
- a) The counterbalance is set improperly
 - b) Improper knockout adjustment
 - c) The feed angle is too small
 - d) The material has been over straightened

- 31) Which one of the following conditions will most likely cause an “*excessive loop*” condition?
- a) A loop control arm out of adjustment
 - b) An improper knockout adjustment
 - c) Over lubrication
 - d) Press deflection
- 32) A progressive die has a misfeed during a production run in the continuous mode. Identify a possible cause of the misfeed:
- a) Excessive stopping time
 - b) Mirror imaging
 - c) Tie rods have worked loose
 - d) Uncontrolled coil set and camber in the strip
- 33) Loss of features on a piece part may be caused by:
- a) Tie rods that are very tight
 - b) Scrap in the die
 - c) Press gibs needing adjustment
 - d) Sprocket replacement
- 34) Which of the following statements is a root cause for a stripper that sticks?
- a) The pinch roll on the feeder has backed off
 - b) Lack of lubrication
 - c) Dull tooling
 - d) All of the above
 - e) Only b and c
- 35) Which of the following parameters are factors in galling?
- a) Lack of lubrication
 - b) Insufficient clearance between the punch and die
 - c) Material defects
 - d) All of the above
 - e) Only a and c

Basic Press Safety, Maintenance and Housekeeping

- Person responsible for verifying that pinch points on a stamping line are safeguarded
- Application for a safety block
- Proper time to clean a slide and bolster
- Safety precaution when lubricating machinery
- The main purpose for oiling and lubricating equipment
- Basic components of a material removal system
- Device that warns an operator of potential electrical shock
- Conditions that cause shock from electrical devices
- Basic types of safeguarding devices
- Effect of disconnecting a safety block interlocked to the press controller
- Definition of an interlocked barrier guard
- Effects of temperature on the viscosity of oil
- Purpose of “*point of operation safeguarding*” devices
- Basic maintenance on a chain drive
- Position of operator controls when setting a die

Sample questions:

- 36) The pinch points on a stamping line must be safeguarded and verified to protect employees from accidental injury. Who is responsible for this action?
- a) Tool and die maker
 - b) Manufacturing engineer
 - c) Setup personnel
 - d) Quality assurance inspector
- 37) When is a safety block installed in the die area?
- a) Every time the ram speed is adjusted
 - b) During the pilot release portion of the press cycle
 - c) When changing or repairing a die
 - d) Every time the feed is adjusted while the press is operating

- 38) Which one of the following is **not** considered a safety device for the point of operation?
- a) Top stop button (yellow)
 - b) E-stop button (red)
 - c) Barrier cage
 - d) Safety mat
 - e) Light curtain
- 39) A safety block is interlocked with the press controller. What will happen if the safety block is disconnected from the press controller?
- a) The press will run normally in the continuous mode
 - b) The press will not operate
 - c) The press will cycle to bottom dead center (BDC) and lock out
 - d) The temperature of the motor will increase substantially
- 40) The bolster should be cleaned:
- a) Before a setup
 - b) Each week
 - c) Every two weeks
 - d) Only during shutdown periods
- 41) The main reason for oiling and lubricating equipment is to:
- a) Adjust the ram speed
 - b) Allow rolling parts to gall and skive
 - c) Reduce the noise level of reverse tonnage by absorbing sound
 - d) Reduce friction and wear
- 42) For the safety of die setting personnel, the position of the operator controls should be based on:
- a) Die maker position when changing or repairing a die
 - b) Distance from the nearest pinch point or *point of operation*
 - c) The length of time for a quick die change
 - d) The height of the shortest operator

- 43) Which one of the following statements is an essential step when properly lubricating machinery?
- a) Bleed all the air from the counterbalance
 - b) Shut the machinery off and practice Lockout/Tagout
 - c) Adjust the ram to bottom dead center to expose the ways and gibs
 - d) Install a shield to prevent drips and spraying from moving components
- 44) As the temperature of oil gradually increases, the viscosity of the oil will:
- a) Remain the same
 - b) Increase
 - c) Decrease
 - d) Reach the flash point immediately
- 45) Identify the piece of equipment that would **not** be part of a material removal system:
- a) Scrap chutes
 - b) Shaker units
 - c) Conveyors
 - d) Light curtain
- 46) Which of the following devices will warn an operator or setup person of potential electrical shock?
- a) Tonnage monitor
 - b) Counterbalance air pressure meter
 - c) Ground fault indicator
 - d) Part out light curtain
- 47) Which one of the following is most likely to cause an electrical shock?
- a) Improper grounding
 - b) Improper lubrication levels
 - c) Improper air pressure
 - d) Insufficient voltage

- 48) What does the term “interlocked,” mean when used in the context of an “interlocked barrier guard”?
- a) The guard is screwed and doweled to the bolster plate
 - b) The guard is interlocked to the bull gear of the press
 - c) The guard is directly wired into the press controls
 - d) The guard is equalized through pneumatic and hydraulic pressure
- 49) What is the purpose of “*point of operation*” safeguarding devices?
- a) Remove scrap from the die area
 - b) Prevent operator entry into the point of operation
 - c) Prevent electrical shock from improper wiring or grounding
 - d) Used to activate proximity sensors for light sensitivity
- 50) For the majority of press applications, most chain drives require a _____ procedure performed on a scheduled basis.
- a) Stretching
 - b) Master link replacement
 - c) Lubrication
 - d) Sprocket replacement

Die Sets and Die Components

- Basic processes performed in a die
- Basic die components for a forming operation
- The purpose of a stripper in a die
- Purpose of a die lifter
- Two functions of a punch
- Definition of a single station operation
- Function of a die parallel
- Purpose of die stop blocks
- Purpose for the top half of a die assembly for a progressive die
- Purpose of leader pins on a die set
- Purpose of guide bushings on a die set

- Purpose for the bottom half of a die assembly for a progressive die
- Definition of a die assembly

Sample questions:

- 51) What is the main purpose of a die lifter?
- a) Grip the material for feeding purposes
 - b) Eject piece parts from the die
 - c) Trim the material to the proper width
 - d) Lift the strip off the die components
- 52) Identify two common functions of a punch:
- a) Shear form and draw
 - b) Cut and form
 - c) Cut and draw
 - d) Draw and emboss
- 53) What is a function of a die parallel?
- a) Creates an area underneath the die for scrap removal
 - b) Straightens the camber in a strip of material
 - c) Releases the feed roller pressure for pilot alignment of the material
 - d) Monitors the tonnage monitor for short feeds and ejected parts
- 54) What is the function of die stop blocks on any type of die?
- a) Keeps the material from kinking in the straightener
 - b) Locates the die correctly on the bolster plate
 - c) Provides the proper leverage for strap clamps
 - d) Provides a reference for setting the shut height
- 55) What is the function of leader pins on a die set?
- a) Hold the slugs in the die openings
 - b) Provide positive alignment for the top and bottom die set shoes
 - c) Guide the ram of the punch press
 - d) Reduce the width of the strip to fit within the guide rails

- 56) What is the function of guide bushings on a die set?
- a) Provide clearance for the punch and die
 - b) Provide a close tolerance fit to the leader pin to promote alignment
 - c) Prevent the top half of the die from entering the lower portion
 - d) Act as a reservoir for oil or grease
- 57) The function of the “bottom half” of a progressive die assembly is to:
- a) Hold the punches
 - b) Guide the piece part on the conveyor and chute
 - c) Achieve zero energy on the press at TDC
 - d) Hold the die assembly to the bolster plate
- 58) What is the purpose of a stripper on a die?
- a) Feeds the material to the next progression
 - b) Reduces the material thickness by 1/3
 - c) Removes material from the punch
 - d) Pierces holes and openings in the material
- 59) The punch components and die components together are called:
- a) Die assembly
 - b) Punch assembly
 - c) Tool engineering component assembly
 - d) Process assembly
- 60) Name the type of die assembly that holds one blank for one stroke of the press, with the blank being removed from the die assembly after the press has cycled:
- a) Single station (single hit) die assembly
 - b) Two-up progressive die assembly
 - c) Double station (multiple hit) die assembly
 - d) Transfer die assembly

- 61) Which one of the following processes is **not** performed in a die?
- a) Piercing
 - b) Drawing
 - c) Polishing
 - d) Embossing
 - e) Bending
- 62) What is the purpose for the “top half” of a conventional progressive die assembly?
- a) Holds the blanks in the die openings
 - b) Holds the punches and punch holder
 - c) Holds the scrap chutes and conveyors
 - d) Holds the die bushings inserted into the die blocks
- 63) Which of the following die components are used to support a forming operation?
- a) Nitrogen cylinders to supply forming pad resistance
 - b) Springs
 - c) Transfer pins
 - d) Air pins to a die cushion
 - e) All of the above

Material Characteristics, Coil Defects and Coil Processing

- Type of a surface strain
- Identification and definition of a “tear drops” coil defect
- Possible cause of rust on material
- Type of hardness test
- Part of the process that determines variations in material thickness of a coil
- Definition of the acronym M.I.
- Method to confirm material recognition
- Parts of a raw material verification process
- Definition of material lamination

- Cause of material lamination
- Feature of galvanized coated steel
- Definition of tensile strength
- Tensile strength and drawing ability
- Differences between aluminum and steel

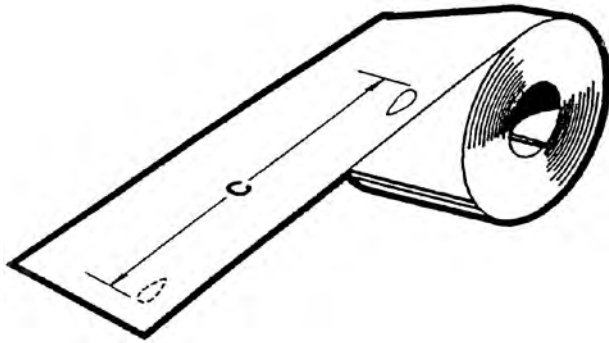
Sample questions:

- 64) Which one of the following conditions is **not** likely to cause rust on material?
- a) Lack of mill oil on a steel coil
 - b) Moisture on wood pallets
 - c) Lubricating the coil with an oil-based lubricant
 - d) Letting moisture condense on the coils in an uncontrolled environment
 - e) All of the above
 - f) None of the above
- 65) Define the acronym “*M.I.*”:
- a) Manual interpretation
 - b) Material inspection
 - c) Material identification
 - d) Manufacturer information
- 66) How can material recognition be verified?
- a) Material is entering the guides on the feeder
 - b) The material can be straightened
 - c) The part looks like the print
 - d) Compare the material tag to the control plan, router or inspection sheet

- 67) Which one of the following verifications is **not** part of raw material verification?
- a) Verifying the material width
 - b) Verifying the material thickness
 - c) Verifying the progression of the die
 - d) Verifying the type of material
- 68) The separation of material due to impurities found in the steel's chemistry is called:
- a) Lamination
 - b) Pickling
 - c) Phosphating
 - d) Austempering
- 69) Identify a characteristic unique to galvanized steel:
- a) Resistance to springback
 - b) Rust prevention
 - c) Excellent drawing ability
 - d) Resistance to welding
- 70) How is tensile strength of a material related to the drawing ability?
- a) The higher the tensile strength the easier the material is to draw
 - b) The higher the tensile strength the harder the material is to draw
 - c) Tensile strength has no effect on the drawing ability
 - d) The drawing ability of a material is only dependent on material pitting
- 71) Which of the following is the name of a test to determine hardness of a material?
- a) Ground fault test
 - b) Charpy V-notch test
 - c) Rockwell test
 - d) Push test

72) What material defect is illustrated below?

- a) Crowning
- b) Tear drops
- c) Pitting
- d) Staining
- e) Coil set



73) Which one of the following is a common surface strain found in a material?

- a) Coil set
- b) Crowning
- c) Pickling
- d) Lapping

74) What determines material thickness variation?

- a) Uncoiling device
- b) Straightener
- c) Feeding unit
- d) Guide rails
- e) The milling process

75) What is a major difference between aluminum and steel?

- a) Aluminum has more carbon than steel
- b) Aluminum is more difficult to form
- c) Steel has less material thickness variations

- d) Aluminum has a higher compressive strength
- 76) Name one cause of material lamination:
- a) Excessive argon in the chemistry of the material
 - b) Exposure to ionized water
 - c) Impurities in the metal
 - d) Excessive voltage in the steel processing operation
- 77) Define tensile strength of a material:
- a) The ability of a material to resist forces applied to pull the material apart
 - b) The ability of a material to resist forces applied to push the material together
 - c) The ability of a material to resist forces applied to twist the material laterally
 - d) The ability of a material to resist forces applied to shear the material in opposing directions

Components of a Sheared Edge

- First stage of a shearing operation
- Part of the sheared edge produced during the penetration stage
- Part of the sheared edge produced during the fracture stage
- Identification of the components of a sheared edge
- Shearing operation that cuts a shape out of raw stock
- Component of a sheared edge that is adjacent to the burr
- Types of marks normally produced during bending operations

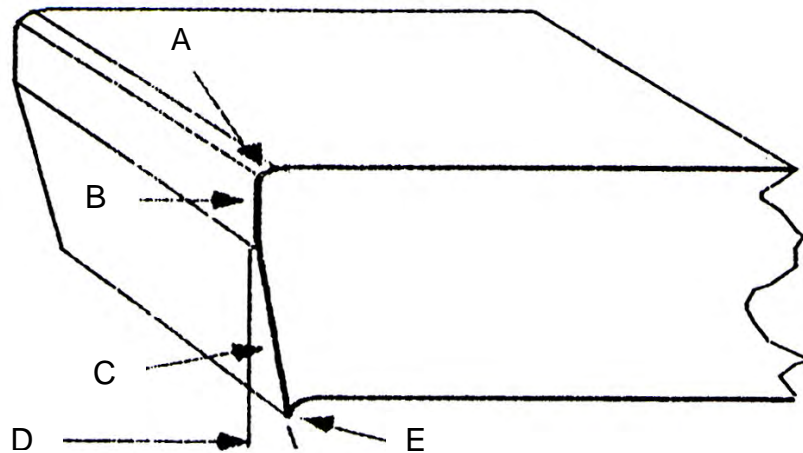
Sample questions:

- 78) Which shearing stage occurs first during the shearing process?
- a) Plastic deformation (end radius)
 - b) Cut band
 - c) Break

- d) Burr
- 79) What component of a sheared edge is adjacent to the burr?
- a) Cut band
 - b) End radius
 - c) Break
 - d) Shear zone
- 80) What part of a sheared edge is produced during the fracture stage?
- a) End radius
 - b) Break
 - c) Cut band
 - d) Burr
 - e) Burnished radius
- 81) What shearing operation cuts a shape out of raw stock or a coil strip?
- a) Piercing
 - b) Drawing
 - c) Blanking
 - d) Extruding
 - e) Shear forming
- 82) What part of a sheared edge is produced during the penetration stage?
- a) Break
 - b) End radius
 - c) Burr
 - d) Cut band
 - e) Burnished burr
- 83) Name the type of marks that are considered normal in a forming operation:
- a) Scratch marks
 - b) Gouge marks

- c) Construction marks
- d) Pit marks

Use the following illustration to answer questions 84 to 87:



- 84) What portion of the sheared edge is identified by the letter B?
 - a) Taper angle
 - b) Burr
 - c) Cut band
 - d) Edge radius

- 85) What portion of the sheared edge is identified by the letter E?
 - a) Burr
 - b) Cut band
 - c) Edge radius
 - d) Taper angle

- 86) What portion of the sheared edge is identified by the letter A?
 - a) Burr
 - b) Edge radius
 - c) Cut band

- d) Break
- 87) What portion of the sheared edge is identified by the letter C?
- a) Break
 - b) Edge radius
 - c) Burr
 - d) Taper angle

Hoists, Coil Handling and Uncoiling

- Balancing differential weights
- Purpose of the stock cradle rest rolls
- Rationale for storing narrow coils with the “*eye to the sky*”
- Place to stand when un-banding a coil
- Component of a dereeler that supports the inside diameter (I.D.) of the coil
- Type of uncoiling device that supports the coil on its outer wraps
- Adjusting coil width when loading a coil on a stock reel
- Adjusting coil width when loading a coil on a stock cradle
- Purpose of cascade rolls
- Action to take when the camber is too severe to adjust
- Parameter that determines the coil loading direction
- Reason for wrapping coils with specially treated paper

Sample questions:

- 88) Narrow coils are usually stored with the “*eye to the sky*”. What is the rationale for this practice?
- a) Variations in the material thickness
 - b) Prevents the coils from falling over when stored vertically
 - c) Keeps the uncoiling device from running hot
 - d) Prevents galling on straightener and feed rollers

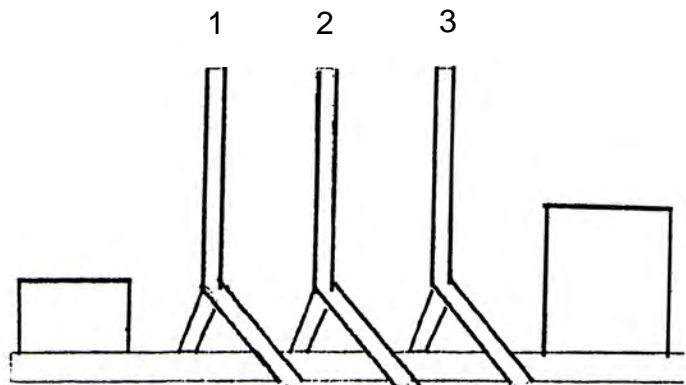
- 89) To prevent an injury from the whipping action of the coil while cutting the retaining bands, the operator should stand:
- a) Above of the coil
 - b) Underneath the coil
 - c) To the side of the coil
 - d) In front of the coil
- 90) A _____ supports a coil on its outer wraps.
- a) Pallet decoiler
 - b) Vertical decoiler
 - c) Magazine
 - d) Cradle
- 91) What is the purpose of cascade rolls?
- a) Aid the operator in safely cutting the retaining bands on a coil
 - b) Keeps the material from kinking
 - c) Locates and positions the die correctly in the press
 - d) Aligns the feed unit for a consistent pass line
- 92) What is the main reason for wrapping coils of material with specially treated paper?
- a) The paper adds lubrication so the material can slip through the feeding unit
 - b) Protects the operators from being injured by sharp burrs on the edge of the material
 - c) Protects the material from oxidation during shipment and storage
 - d) Prevents misfeeds due to additional lubrication
- 93) What is the purpose of cradle rest rolls?
- a) Supports the coil's outside diameter
 - b) Supports the coil's inside diameter
 - c) Supports the coil in the horizontal position
 - d) Supports the straightener pinch rollers

- 94) A new coil of material is loaded onto a stock reel. The new coil has a width that differs from the previous coil. What adjustment must be made?
- a) Adjust the arbor
 - b) Adjust the keepers
 - c) Adjust the confining rollers
 - d) Adjust the pinch rollers
- 95) What coil characteristic determines the direction a coil should be loaded on the uncoiling device?
- a) Coil set
 - b) Material thickness
 - c) Material type
 - d) Material width
- 96) Which of the following is the best course of action to take if coil camber is too severe to adjust?
- a) Introduce additional pressure in the straightener by adjusting the rollers downward
 - b) Notify supervision to reject the material
 - c) Shorten the slack loop to deform the material
 - d) Increase the pressure on the pilot release
- 97) A new coil of material is loaded onto a stock cradle. The new coil has a width that differs from the previous coil. What adjustment must be performed?
- a) Adjust the mandrels
 - b) Adjust the keepers
 - c) Adjust the confining plate
 - d) Adjust the pinch rollers

- 98) What component of a stock reel supports the inside diameter (I.D.) of the coil?
- a) Confining plate
 - b) Mandrels
 - c) Cascade rolls
 - d) Keepers

- 99) To properly balance out two loads of unequal weight, where should the belt be attached to the platform shown below without tilting it?

- a) Location 1
- b) Location 2
- c) Location 3
- d) Location 1 or 2



Straighteners and Feeds

- Position of the feed rolls when the press is at TDC
- Purpose of a straightener
- Location of pinch rolls on a feed line
- Effect of a bad diaphragm on an air grip feeder
- Purpose of a magazine on a single hit press operation
- Function of threading tables
- Parameter that determines the amount of straightening for a coil fed stock straightener
- Purpose of the “slack loop”
- Purpose of pinch rolls
- Purpose of the loop control device
- Basic components of an air grip feeder

Sample questions:

- 100) What is the function of threading tables?
- a) Adjusts the uncoiling device for different widths of material
 - b) Aligns the material to the die
 - c) Keeps the material from kinking along the press line
 - d) Minimizes coil loop
- 101) Define the purpose of a “slack loop” on a coil fed press line:
- a) Provides a location to inspect incoming material
 - b) Provides a place for material to accumulate while the uncoiler is stopping
 - c) Allows the feed to always have material so it can respond quickly
 - d) All of the above
 - e) Only b and c
- 102) What is the purpose of pinch rolls?
- a) Guide the material into the feeding unit
 - b) Provide power to thread the material
 - c) Position parts in the die
 - d) Lift the coil onto the reel
- 103) What determines the amount of straightening that takes place on a coil fed stock straightener?
- a) The cascade rolls
 - b) Keepers
 - c) The distance between and diameter of the straightening rolls
 - d) The pinch rollers

- 104) A diaphragm on an air grip feeder has an air leak. What may happen during the production run?
- a) The cascade rolls will kink the material
 - b) The tools may become prematurely worn
 - c) The pinch rolls on the straightener will collapse
 - d) A misfeed may occur
- 105) What is the function of a magazine on a single hit press operation?
- a) Eliminate misfeeds by the feeding unit
 - b) Hold blanks for each stroke of the press
 - c) Locate the coil strip both vertically and laterally
 - d) Reduce tonnage requirements of the press by offloading
- 106) Which one of the following components is **not** a part of an air grip feeder?
- a) Feed gripper
 - b) Retaining gripper
 - c) Diaphragm
 - d) Mandrel
- 107) What is the purpose of the loop control device?
- a) Straightens the material after feeding
 - b) Activates the straightener and/or uncoiling device when more material is needed
 - c) Provides power to thread the material
 - d) Prevents kinking and binding of stock as it enters the straightener
- 108) What is the main purpose of a straightener on a coil fed press line?
- a) Remove coil set
 - b) Level the material
 - c) Measure the pressure for piercing and forming
 - d) Guide the material into the feeding device

- 109) Pinch rolls are located on the:
- a) Uncoiling device
 - b) Feeding unit
 - c) Straightener
 - d) Ram adjustment mechanism

Basic Safety, First Aid and PPE

- Safety equipment worn when handling raw material
- First step when aiding a bleeding co-worker
- Basic first aid for burns
- Appropriate fire exits
- Sound level in DBA at which hearing protection is required
- Definition of blood borne pathogens
- Procedure that should be offered when a worker has been exposed to another person's blood
- Responsibility of accident prevention
- Symbol for blood borne pathogens
- Safety behavior to minimize accidents

Sample questions:

- 110) Define *blood borne pathogens*?
- a) Diseases transmitted through bodily fluids
 - b) Basic safety rules for treating burns
 - c) The American Red Cross system for blood types
 - d) Diseases transmitted through food, water and air
- 111) What should an employer offer an employee who has been exposed to another person's blood in the factory?
- a) A raise in wages
 - b) Mental counseling
 - c) A physical
 - d) A tetanus shot from the foreman

- 112) What PPE should be worn when pressroom personnel handle raw material?
- a) Lab coat
 - b) Hearing protection
 - c) Knee braces
 - d) Gloves
- 113) Which of the following is **not** an appropriate action to take when providing first aid for a burn?
- a) Immerse or flush the burned area in cool water
 - b) Cover the burn with a light, dry and sterile dressing (no cotton balls)
 - c) Apply light vegetable oil to the wound
 - d) Do not puncture any blisters from the burn
- 114) Which of the following actions is **not** appropriate during a fire?
- a) Exit through an approved stairway
 - b) Meet at an assigned area dictated in the evacuation plan
 - c) Use a motorized overhead door or an elevator to escape the fire
 - d) Follow an approved emergency lit exit
- 115) According to OSHA, what sound level in decibels (DBA) requires hearing protection?
- a) 25 DBA
 - b) 85 DBA
 - c) 130 DBA
 - d) 180 DBA
- 116) Accident prevention is the responsibility of:
- a) All company personnel
 - b) State and national government
 - c) The tool room supervisor
 - d) The quality assurance director

117) What does the following symbol represent?

- a) HMIS symbol
- b) MSDS symbol
- c) Fire triangle symbol
- d) Blood borne pathogen symbol



118) Name the first step to aid a bleeding co-worker:

- a) Apply cotton to the wound
- b) Wash out and disinfect the wound with acetone
- c) Determine their blood type
- d) Wear protective clothing and follow biohazard procedures

119) Which statement represents a safety behavior fundamental to minimizing accidents?

- a) Blame the management for all accidents
- b) Follow standard operating procedures (SOPs) and safety procedures
- c) Rely on OSHA safety inspections to enhance safety
- d) Set individual safety standards and procedures

Measurement

- Reading a metric micrometer
- Type of chart used to record piece part variables
- What a go/no go gage measures
- Reading a dial indicator
- Definition of tolerance
- Definition of a plan view
- Definition and meaning of a hidden line
- Definition and implication of trending on an SPC chart
- Reading a depth micrometer
- Possible root cause for a no go gage to enter a hole

Sample questions:

120) Determine the reading on the depth micrometer illustrated below:

- a) .893 inches
- b) .718 inches
- c) .743 inches
- d) .817 inches

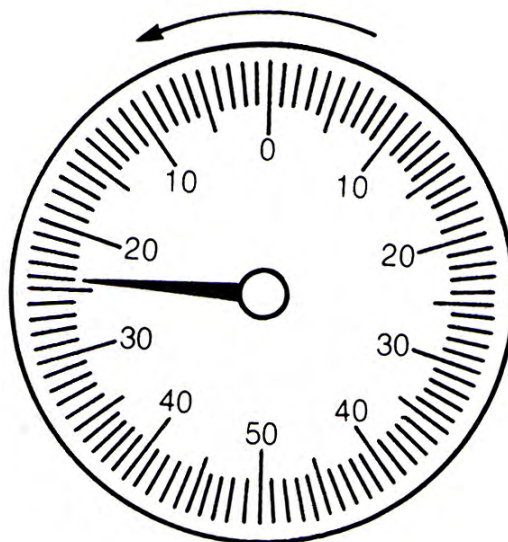
121) What type of data will a *go/no go gage* provide?

- a) Attribute data
- b) Type of material data
- c) Variable data
- d) SPC data

122) Piece part variable data is recorded on:

- a) Fishbone charts
- b) Process flow charts
- c) SPC charts
- d) Pareto charts

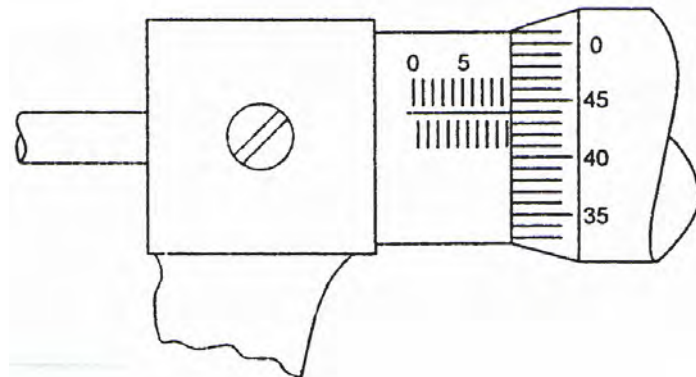
- 123) A dotted line on a print means:
- a) The line is a center line
 - b) The line is an object line
 - c) The line is a hidden line
 - d) The line is a section line
- 124) Define tolerance:
- a) The acceptable amount of variation allowed from a specific dimension
 - b) The actual measured dimension of a part feature
 - c) The capability of a process as dictated by the Cpk
 - d) Percentage of scrapped parts to good parts
- 125) What orthographic view is represented by the term "*plan view*"?
- a) Left side view
 - b) Right side view
 - c) Bottom view
 - d) Top view
 - e) Front view
- 126) What is the reading shown on the illustration of a dial indicator?
- a) .209 inches
 - b) .029 inches
 - c) .024 inches
 - d) .036 inches



- 127) What information is conveyed when several consecutive readings on an SPC chart are above the mean?
- The mean is wrong and should be adjusted
 - The process is trending and potentially can be out of control
 - The process is in control and no action should be taken until the part is out of tolerance
 - Extend the control limits past the limits allowed by the tolerance specified on the print
- 128) The no go portion of a pin gage enters the hole. What may be the cause?
- The hole is oversized caused by dull or galled tooling
 - The material thickness is too large
 - The width of the material is too small
 - The gage is incorrect and should be recalibrated

129) What is the reading on the following illustration of a metric outside micrometer?

- 9.44 mm
- 5.45 mm
- 5.95 mm
- 9.21 mm



Press Components

- The input/output relationship when a clutch is fully engaged
- Components of a pneumatic system and their arrangement
- Methods for a flywheel to drive a crankshaft
- The two types of clutches found on a mechanical power press
- Purpose of a knockout bar
- Purpose of an air cushion
- First thing to do when inching a ram on a punch press
- Component turned by the flywheel when the clutch is engaged

Sample questions:

- 130) The purpose of an air cushion is to:
- a) Lengthen or shorten the stroke
 - b) Provide pressure with the use of transfer pins
 - c) Prevent slugs from entering the punch holder and ram
 - d) Decrease burr height caused by worn punch and die components
- 131) Define the purpose of a knockout bar:
- a) Supports external sensor devices
 - b) Sheds a piece part from the top half of the die at TDC
 - c) Serves as a backup block to prevent die block shifting
 - d) Transfers pressure from the air cushion to the die shoe
- 132) Name the two types of clutches found on mechanical punch presses?
- a) Tonnage and velocity
 - b) Power and torque
 - c) Full and part revolution
 - d) Electrical and pneumatic
- 133) How does a flywheel drive the crankshaft?
- a) Gear drive
 - b) Direct drive
 - c) Air drive
 - d) Both a and b
 - e) Fluid drive
- 134) When the clutch is fully engaged,
- a) The input turns twice as fast as the output
 - b) The input and output turn at the same speed
 - c) The output turns three times as fast as the input
 - d) The output turns and the input never turns

- 135) Identify the correct component order starting at the input line for a pneumatic system:
- a) Regulator, Luber, Filter
 - b) Luber, Filter, Regulator
 - c) Filter, Regulator, Luber
 - d) Regulator, Filter, Luber
- 136) Name the first thing a setup person should perform when inching a ram on a punch press:
- a) Start the main motor
 - b) Insert the key in the mode selector slot
 - c) Move the mode selector to the inch mode
 - d) Activate the light curtain
- 137) When the clutch is fully engaged, the flywheel will supply rotary motion to the:
- a) Crankshaft
 - b) Ram
 - c) Die cushion
 - d) Bolster plate

Lockout/Tagout

- When to apply a Lockout/Tagout
- Lubrication practices and Lockout/Tagout
- Function of gears and their relationship to “stored energy”
- Type of event for bypassing a Lockout/Tagout procedure
- Function of a Lockout/Tagout device
- Purpose of a Lockout/Tagout procedure

Sample questions:

- 138) When is permissible to bypass the Lockout/Tagout procedure established by OSHA?
- a) Never
 - b) When it is inconvenient to the affected personnel
 - c) When the job at hand takes less than two minutes
 - d) On weekends or between shifts
- 139) Lockout/Tagout devices are used to:
- a) Establish the size of containers to hold parts
 - b) Keep affected personnel from being injured by machinery that may be activated by mistake
 - c) Supply air pressure to an air feeder
 - d) Prevent theft of valuable computer controllers
- 140) Which of the following are considered “*sources of energy*”?
- a) Electrical
 - b) Pneumatic
 - c) Mechanical
 - d) All of the above
 - e) Only b and c
- 141) Who is responsible for removing a lock associated with a Lockout/Tagout procedure?
- a) The person who installed the lock
 - b) The maintenance supervisor
 - c) The plant manager
 - d) The tool room foreman

Counterbalances

- The time when counterbalance pressure is usually checked or adjusted
- The time when counterbalance pressure should be changed
- Location of information specifying the weight of the top die shoe (punch holder)
- The effect of improper counterbalance pressure
- Definition of “bleeding” a line or valve

Sample question:

142) When is the counterbalance pressure usually checked or adjusted?

- a) After each coil
- b) After a new die has been installed
- c) At the end of each shift regardless of the production run
- d) Once set at press installation, it will never be changed

143) The counterbalance is used to offset the:

- a) Weight of the die shoe on the bolster plate
- b) Weight of the bolster plate
- c) Weight of the upper die assembly
- d) Weight of the coil of material

144) The weight of the top die shoe is usually found:

- a) On the bottom of a parallel
- b) Counter balance reserve tank
- c) Upper die shoe
- d) Control plan and/or inspection sheet

- 145) Improper counter balance pressure (insufficient pressure) may result in:
- a) Excessive snap through
 - b) Increased reverse tonnage loads
 - c) Excessive stopping time
 - d) All of the above
 - e) Only a and b
- 146) Bleeding an air line or an air valve means the operator is:
- a) Applying additional air pressure
 - b) Releasing air pressure
 - c) Maintaining consistent air pressure with a spare tank that “bleeds”
 - d) All of the above
 - e) Only a and c

MSDS & HMIS

- Components of HMIS
- Definition of the acronym MSDS
- Basic components of an MSDS
- Colors found on an HMIS label

Sample questions:

- 147) Which one of the following is not found on an MSDS document?
- a) Size of storage containers
 - b) Recommended PPE
 - c) Address of chemical supplier
 - d) Fire safety
- 148) What does the acronym MSDS represent?
- a) Material Storage Deposition Status
 - b) Material Safety Data Sheet
 - c) Manual for Safety and Dimensional Standards
 - d) Medical Standards and Dentistry Standards

149) Which one of the following is **not** a component of the *Hazardous Material Identification System*?

- a) Material flammability
- b) Health
- c) Material reactivity
- d) Sewage disposal

150) Which color is **not** part of the HMIS label?

- a) Blue
- b) Red
- c) Yellow
- d) Green

Mechanics

- Tow motor modifications must have written permission from a specific party
- Pulley size and speed relationships between pulleys of different sizes
- Driver and driven pulley rotation (clockwise/counterclockwise rotation)
- Gear rotation and gear speed relationships

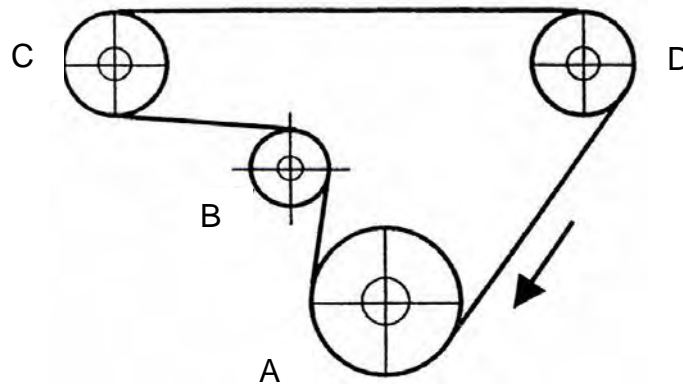
Sample questions:

151) Gears are mechanical components that:

- a) Work with timing belts
- b) Transmit power to motion
- c) Always rotate in the same direction
- d) Are fixed fasteners with no teeth and smooth surfaces

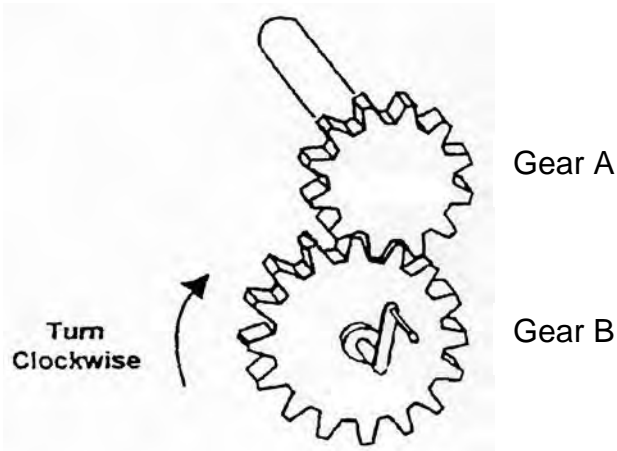
152) Which of the following pulleys turn in the same direction as pulley A (pulley A is the driver)?

- a) B and C
- b) B and D
- c) C and D
- d) A and B



153) Which of the following statements is true concerning the illustration of the gear assembly?

- a) Gear A (without the handle) rotates in the same direction as Gear B (with the handle)
- b) Gear A has 12 teeth and Gear B has 16 teeth. Gear B will rotate faster than Gear B.
- c) Gear A (without the handle) rotates in the opposite direction as Gear B (with the handle)
- d) Gear A has 12 teeth and Gear B has 16 teeth. Both gears rotate at the same RPM regardless of the number of teeth



- 154) What type of energy is associated with pneumatics?
- a) Water
 - b) Mechanical
 - c) Oil
 - d) Air
- 155) Towmotor and powered lift truck safety standards are dictated by:
- a) American Automobile Association
 - b) TS-16949
 - c) OSHA
 - d) Dept. of Defense

Clamping

- Pattern for tightening die shoe clamps
- Minimum distance that a bolt must enter a hole
- Fulcrum block/die shoe height relationship
- T-bolt/fulcrum block relationship

Sample questions:

- 156) For clamping a die set to either the ram or the bolster plate, the clamps should be tightened:
- a) By tightening all the front clamps then all the back clamps
 - b) By alternate corner to corner (similar to tightening lug nuts on a tire)
 - c) Clockwise starting at the 9 o'clock position
 - d) Without any set pattern, it does not matter
- 157) What is the minimum distance that a bolt must enter a threaded hole in a bolster plate?
- a) The distance is the same as the diameter of the bolt
 - b) 1.5 times the diameter of the bolt
 - c) One thread
 - d) At least 10 threads

- 158) When clamping a die shoe to a bolster plate, the T-bolts must be positioned:
- a) Closer to the fulcrum block than the die set
 - b) Exactly on center between the die set and the fulcrum block
 - c) Behind the fulcrum block support by a secondary block
 - d) Closer to the die set than the fulcrum block
- 159) What is the relationship between the height of the fulcrum block and the height of the die shoe?
- a) The fulcrum block must be below the die shoe
 - b) The fulcrum block is always 3/8" higher than the die shoe
 - c) The fulcrum block and the die shoe are at the same height
 - d) The die shoe height is capable of more adjustment, so it doesn't matter

Sensor Technology

- Function of a tonnage monitor
- Defining a proximity switch
- Purpose of a tonnage monitor
- Parameters to check if a proximity switch fails to provide an electrical signal

Sample questions:

- 160) What is a proximity switch?
- a) A device that senses the presence of a metal
 - b) A switch that activates the positive knockout bar
 - c) The switch that controls the mode of operation
 - d) A switch that controls the coil loop

- 161) What is the purpose of a tonnage monitor?
- Functions as a ground fault indicator
 - Monitors the air pressure of the counterbalance
 - Measures the pressure exerted on the die assembly
 - Controls the stroke of the ram
- 162) If you **cannot** obtain a signal from a proximity switch, pressroom personnel should check:
- For possible mechanical failure of the switch
 - The wiring and electrical conditions
 - If the input number is correct
 - All of the above
- 163) What will a tonnage monitor help prevent?
- Excessive offloading
 - Excessive tonnage
 - Poorly set counterbalances
 - Short feeds
 - Only a and b

The following section is categorized by type of tooling and NIMS certification area!

Single Hit Tooling

- Single hit tooling, number of operators/number of palm button relationship
- Types of marks produced during a bending operation
- Type of forming operation that provides slightly indented features
- Type of die assembly that holds two or more blanks
- Name of a cavity found in a die block used for forming
- Minimum number of contact points for a primary datum
- Minimum number of operations a single hit die can perform

Sample questions:

- 1A) A single hit die is being set up in a mechanical press. Two operators are required to operate the press. How many palm button stations are needed for a safe operation?
- a) One (two palm buttons)
 - b) Two (four palm buttons)
 - c) None
 - d) Three (six palm buttons)
- 2A) A single hit tool forms a part similar to a shallow pan. Name the shape found in the die assembly that corresponds to the forming punch:
- a) Forming cavity
 - b) Forming punch
 - c) Stripper
 - d) Punch plate
- 3A) A die assembly holds two or more blanks. What type of die assembly is it?
- a) Deep draw station
 - b) Single station
 - c) Blanking station
 - d) Multi-station
- 4A) What forming operation produces slightly indented features?
- a) Deep draw
 - b) Blanking
 - c) Skiving
 - d) Cupping

- 5A) What type of marks are produced during a bending operation?
- a) Construction marks
 - b) Gouge marks
 - c) Mismatch burr marks
 - d) Fulcrum marks
- 6A) Which one of the following statements is **true** concerning single hit dies?
- a) All single hit dies are only capable of one operation
 - b) Single hit tooling does not use pilots
 - c) All single hit tooling utilizes a solid stripper
 - d) The minimum number of operations a single hit tool can perform is one operation
- 7A) What is the minimum number of contact points necessary for a primary datum?
- a) One
 - b) Three
 - c) Six
 - d) Four

Compound Dies

- Location of the punch and die components
- Purpose of an oil pin in the shedder
- Safety margin relationship between the shedder and die block
- Die component that enters firsts in a compound die blanking and piercing operation
- Advantage of using a compound die over a progressive die
- Purpose of the knockout bar
- Compound die/burr side relationship for blanking and piercing

Sample questions:

- 1B) Which one of the following is an advantage for using a compound die?
- a) Parts fall through the die block, die set and bolster plate
 - b) This type of die is very accurate
 - c) This type of die has a problem keeping parts flat
 - d) Compound dies have short die life due to extensive die taper in the die blocks and punch holder
- 2B) The die block for a compound die is attached to the:
- a) Bottom half of the die set connected to the bolster
 - b) Spring stripper plate
 - c) Top half of the die set connected to the ram
 - d) The servo feed
- 3B) What is the purpose of an oil pin on the shedder?
- a) To break the oil seal for part ejection
 - b) To lubricate the part
 - c) To lubricate the die set bushing and guide post
 - d) To apply hydraulic pressure for forming
- 4B) What is the purpose of the knockout bar on the punch press?
- a) Turns the crankshaft if the press is "bottomed out"
 - b) Feeds the material each revolution of the crankshaft
 - c) Activates the knockout rod which activates the shedder and ejects the part from the die block
 - d) Knockout bars are only found on link motion presses
- 5B) For safety reasons, what is the suggested number of blanks that can be left in the die block before the shedder bottoms out?
- a) One blank
 - b) Two blanks
 - c) Three blanks
 - d) Six blanks

- 6B) A compound die has both a blanking and piercing operation. Which component should enter the material first?
- a) Piercing punch
 - b) Die block
 - c) Blanking punch
 - d) Stop block or bumper
- 7B) For a compound die, the burr side for a blank and a pierced opening will be on _____.
- a) Opposite sides
 - b) Same side
 - c) Sometimes on the opposite side and sometimes on the same side
 - d) None of the above

Progressive Dies

- Definition of a progression, pitch or advance
- Function of the levelers on a guided spring stripper
- Pass line/lifter relationship
- Progressive die and feed unit alignment
- Details to be inspected prior to starting a progressive die for production
- Side of the die that should be tightened first in a progressive die setup
- Function of the pilot release

Sample questions:

- 1C) Define an advance for a progressive die:
- a) The male member of a complete die assembly
 - b) The distance the stock must be fed to allow a clean operation at each press stroke
 - c) The distance a punch enters a die block for a piercing operation
 - d) The distance traveled by the ram during one half of the total press cycle

- 2C) Define the function of a pilot release:
- a) The pilot release determines the distance the stock is moved on each press cycle
 - b) Stops used to prevent the blanking and forming punches from entering too deeply into mating die components
 - c) Die components that control the flow of metal in a draw operation
 - d) A mechanism that releases feed roller pressure allowing the pilots to locate the material prior to any work performed in the die
- 3C) What is the function of levelers on guided spring strippers?
- a) Levelers raise the strip above the die block for easier movement
 - b) Levelers eject the final part through the die block onto a conveyor
 - c) Levelers prevent the spring stripper from tipping when starting material through the die
 - d) Levelers are used as a knockout on a compound progressive die
- 4C) How should the pass line be set for a progressive die with lifters?
- a) The pass line should be below the level of the lifters
 - b) The pass line should be above the level of the lifters
 - c) The pass line should be at the same level of the lifters
 - d) Any height will work
- 5C) Which side of a progressive die should be tightened first in a progressive die setup?
- a) The top half of the die (punch holder)
 - b) The bottom half of the die (die shoe)
 - c) Both are tightened at the same time
 - d) It really doesn't matter, the setup will be the same
- 6C) What will happen if a progressive die is not aligned with the feeding unit?
- a) The die will function normally
 - b) The progression will lengthen on each stroke
 - c) The progression will remain the same on each stroke
 - d) The strip will tend to bind and possibly buckle the coil stock

- 7C) Which of the following details should setup personnel check before starting a production run with a progressive die?
- a) The pass line is at the correct height
 - b) The ram and die are set at the proper shut height
 - c) The pilot release is set correctly
 - d) Slugs are releasing from the die block openings
 - e) All of the above
 - f) Only b and c

Deep Draw Dies

- The effect of air cushion pins that are not all the same length
 - Function of air pins in a deep draw operation
 - Possible root cause of a sudden dimensional change in a drawn part
 - Items to check if the slide adjustment nuts are not turning equally
 - Effect on the process when a leak exists in a press air cushion
 - Purpose and function of a developed blank
 - Cause of shock lines on drawn parts
- 1D) Which one of the following statements best describes the function of air pins in a deep draw operation?
- a) Stop the press when tonnage changes
 - b) Provide even pressure at a consistent length
 - c) Control the flow of metal between the draw ring and draw radius
 - d) b and c are correct
- 2D) What will happen to the part if all the air cushion pins are not the same length?
- a) Uneven wall height
 - b) Uneven inside diameter
 - c) Uneven flatness
 - d) All of the above
 - e) Only a and b

- 3D) What is the rationale for using a developed blank?
- a) To make the blank harder to load to increase labor cost
 - b) To create an evenly stretched draw panel
 - c) To crowd material in corners for buckling and tearing
 - d) To test the capabilities of simulation software
- 4D) What may be the root cause for sudden dimensional changes in a drawn part?
- a) Bent air pins
 - b) Leaking air pressure or nitrogen cylinders
 - c) Broken springs
 - d) The press ram backing off
 - e) All of the above
 - f) Only a and d
- 5D) What may result if a press air cushion has a leak?
- a) Inconsistently formed parts
 - b) Nothing, the press will run fine, just turn up the air pressure
 - c) The part will tear at the radius
 - d) The press will lock up at BDC on each stroke
- 6D) If the slide adjustment nuts are not turning equally, check:
- a) If the sprocket key is missing
 - b) If the adjusting chain is broken
 - c) For a loose worm shaft sprocket
 - d) All of the above
 - e) Only a and b
- 7D) What may cause shock lines on drawn parts?
- a) The material is being drawn too slow
 - b) The punch press has too much tonnage for the die
 - c) The difference in the flow of material as it is being drawn
 - d) Draw beads on the guide rails and stock tray

Stamping Level III
Single Hit Tooling, Compound Dies,
Progressive Dies and Deep Draw Dies
Sample Test Answers

- | | | |
|-------|-------|-------|
| 1) A | 18) B | 35) D |
| 2) C | 19) C | 36) C |
| 3) D | 20) A | 37) C |
| 4) C | 21) C | 38) D |
| 5) A | 22) D | 39) B |
| 6) B | 23) D | 40) A |
| 7) A | 24) A | 41) D |
| 8) B | 25) E | 42) B |
| 9) D | 26) A | 43) B |
| 10) A | 27) C | 44) C |
| 11) C | 28) D | 45) D |
| 12) B | 29) B | 46) C |
| 13) D | 30) B | 47) A |
| 14) C | 31) A | 48) C |
| 15) D | 32) D | 49) B |
| 16) B | 33) B | 50) C |
| 17) B | 34) E | 51) D |

- | | | | | | |
|-----|---|-----|---|------|---|
| 52) | B | 72) | B | 92) | C |
| 53) | A | 73) | C | 93) | A |
| 54) | D | 74) | E | 94) | B |
| 55) | B | 75) | B | 95) | A |
| 56) | B | 76) | C | 96) | B |
| 57) | D | 77) | A | 97) | C |
| 58) | C | 78) | A | 98) | B |
| 59) | A | 79) | C | 99) | C |
| 60) | A | 80) | B | 100) | D |
| 61) | C | 81) | C | 101) | E |
| 62) | B | 82) | D | 102) | B |
| 63) | E | 83) | C | 103) | C |
| 64) | C | 84) | C | 104) | D |
| 65) | C | 85) | A | 105) | B |
| 66) | D | 86) | B | 106) | D |
| 67) | C | 87) | A | 107) | B |
| 68) | A | 88) | B | 108) | A |
| 69) | B | 89) | C | 109) | C |
| 70) | A | 90) | D | 110) | A |
| 71) | C | 91) | B | 111) | C |

112) D	132) C	152) C
113) C	133) D	153) C
114) C	134) B	154) D
115) B	135) C	155) C
116) A	136) B	156) B
117) D	137) A	157) B
118) D	138) A	158) D
119) B	139) B	159) C
120) B	140) D	160) A
121) A	141) A	161) C
122) C	142) B	162) D
123) C	143) C	163) E
124) A	144) C	1A) B
125) D	145) D	2A) A
126) C	146) B	3A) D
127) B	147) A	4A) D
128) A	148) B	5A) A
129) A	149) D	6A) D
130) B	150) D	7A) B
131) B	151) B	1B) B

2B) C

3B) A

4B) C

5B) C

6B) A

7B) B

1C) B

2C) D

3C) C

4C) C

5C) A

6C) D

7C) E

1D) B

2D) D

3D) B

4D) E

5D) A

6D) D

7D) C