

Instruction Sheet for the Candidate

Qualification	National Vocational Certificate in Metal Forming & Processing Level 3
Competency Standard	Perform Shearing, Bending and Punching Operations
Purpose of Assessment	Formative Assessment
Candidate Details	Name_____ Registration/Roll Number_____
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within 04 Hrs. time frame (for practical demonstration & assessment):</p> <ul style="list-style-type: none"> • Arrange the raw material • Arrange tools and equipment • Prepare the required tools and equipment • Prepare work piece as per drawing • Perform Shearing operation • Perform punching operation • Perform bending operation • Perform Deburring of product • Carryout inspection of the finished products
Time: 04 Hrs.	During a practical assessment, under observation by an assessor, you are required to
Minimum Evidence Required	<p>Arrange the raw material</p> <ol style="list-style-type: none"> 1. Select the raw material according to job requirements. 2. Select form/shape of raw material on near net Shape principle <p>Arrange tools and equipment</p> <ol style="list-style-type: none"> 1. Identify standard techniques as per safety procedures 2. Select forming tools and equipment based on manufacturers specification 3. Select the desired Die according to the job requirement. 4. Select the Punch according to the job requirement <p>Prepare the required tools and equipment</p> <ol style="list-style-type: none"> 1. Measure the strip dimensions for given operation 2. Set parameters of forming machine (Pressure, Time, Temperature

- etc.) according to job specifications
3. Energize the machine as per SOPs
4. Prepare the metal stock as per SOPs.
5. Set number of Dies according to requirement.
6. Set the Punch according to the job requirement

Prepare work piece as per drawing

1. Interpret job's drawing
2. Perform measurement for marking on job as per drawings/ specifications
3. Apply Dimensional data and shape according to the given task
4. Clamp the work piece using PPEs as per job requirement

Perform Shearing operation

1. Energize Shearing Machine as per SOPs
2. Load continuous feed of stock as per production requirements.
3. Operate Shearing machine as per SOP
4. Unload finished product as per SOP
5. Maintain production record of work
6. Verify product deviations and report

Perform punching operation

1. Energize Punching Machine as per SOPs
2. Select Punch (Steel, Carbide etc) as per requirement
3. Select the Die cutout in the shape of requirement
4. Assemble sheet metal stock, Punch and Die.
5. Position sheet metal stock between the Punch and Die inside the punch press
6. Press Punch downward at high speed through the Sheet and Die
7. Remove the slug that is punched out of the sheet
8. Maintain production record of work
9. Verify product deviations and report

Perform bending operation

1. Energize Bending Machine as per SOPs
2. Select tool as per job requirement (production quantity, sheet metal material and degree of bending etc.)
3. Select Die for Bending operation as per requirement.
4. Position the sheet over the Die and held in place by the back gauge
5. Energize press brake to perform Bending operation
6. Apply force to the sheet with the help of press Die
7. Maintain production record of work
8. Verify product deviations and report

	<p>Perform Deburring of product</p> <ol style="list-style-type: none"> 1. Insert deburring blade into product 2. Apply a small amount of pressure between the blade and interior wall 3. Perform rotation of blade around the interior wall of the tube while applying pressure 4. Use a deburring machine to grind the burr off in case of Mechanical deburring 5. Use combustive gases to generate thermal energy and essentially scald the burrs out of the metal in Thermal deburring 6. Use a solution of salt or glycol to conduct energy through the burrs in Electrochemical deburring <p>Carryout inspection of the finished products</p> <ol style="list-style-type: none"> 1. Follow standard procedure of inspection 2. Measure the work piece for conformance to specification 3. Carryout product repair (if required) 4. Inspect products after rework or repair 5. Record the deviations, if any, according to SOPs
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Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate in Metal Forming & Processing Level 3
Competency Standard	Perform Shearing, Bending and Punching Operations
Purpose of Assessment	Formative Assessment
Assessment Task	<ul style="list-style-type: none"> • Arrange the raw material • Arrange tools and equipment • Prepare the required tools and equipment • Prepare work piece as per drawing • Perform Shearing operation • Perform punching operation • Perform bending operation • Perform Deburring of product • Carryout inspection of the finished products

I can.....

Performance Criteria	Yes	No
1. Select the raw material according to job requirements.	<input type="checkbox"/>	<input type="checkbox"/>
2. Select form/shape of raw material on near net Shape principle	<input type="checkbox"/>	<input type="checkbox"/>
3. Identify standard techniques as per safety procedures	<input type="checkbox"/>	<input type="checkbox"/>
4. Select forming tools and equipment based on manufacturers specification	<input type="checkbox"/>	<input type="checkbox"/>
5. Select the desired Die according to the job requirement.	<input type="checkbox"/>	<input type="checkbox"/>
6. Select the Punch according to the job requirement	<input type="checkbox"/>	<input type="checkbox"/>
7. Measure the strip dimensions for given operation	<input type="checkbox"/>	<input type="checkbox"/>
8. Set parameters of forming machine (Pressure, Time, Temperature etc.) according to job specifications	<input type="checkbox"/>	<input type="checkbox"/>
9. Energize the machine as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
10. Prepare the metal stock as per SOPs.	<input type="checkbox"/>	<input type="checkbox"/>
11. Set number of Dies according to requirement.	<input type="checkbox"/>	<input type="checkbox"/>
12. Set the Punch according to the job requirement	<input type="checkbox"/>	<input type="checkbox"/>
13. Interpret job's drawing	<input type="checkbox"/>	<input type="checkbox"/>
14. Perform measurement for marking on job as per drawings/ specifications	<input type="checkbox"/>	<input type="checkbox"/>

15. Apply Dimensional data and shape according to the given task	<input type="checkbox"/>	<input type="checkbox"/>
16. Clamp the work piece using PPEs as per job requirement	<input type="checkbox"/>	<input type="checkbox"/>
17. Energize Shearing Machine as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
18. Load continuous feed of stock as per production requirements.	<input type="checkbox"/>	<input type="checkbox"/>
19. Operate Shearing machine as per SOP	<input type="checkbox"/>	<input type="checkbox"/>
20. Unload finished product as per SOP	<input type="checkbox"/>	<input type="checkbox"/>
21. Maintain production record of work	<input type="checkbox"/>	<input type="checkbox"/>
22. Verify product deviations and report	<input type="checkbox"/>	<input type="checkbox"/>
23. Energize Punching Machine as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
24. Select Punch (Steel, Carbide etc) as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
25. Select the Die cutout in the shape of requirement	<input type="checkbox"/>	<input type="checkbox"/>
26. Assemble sheet metal stock, Punch and Die.	<input type="checkbox"/>	<input type="checkbox"/>
27. Position sheet metal stock between the Punch and Die inside the punch press	<input type="checkbox"/>	<input type="checkbox"/>
28. Press Punch downward at high speed through the Sheet and Die	<input type="checkbox"/>	<input type="checkbox"/>
29. Remove the slug that is punched out of the sheet	<input type="checkbox"/>	<input type="checkbox"/>
30. Maintain production record of work	<input type="checkbox"/>	<input type="checkbox"/>
31. Verify product deviations and report	<input type="checkbox"/>	<input type="checkbox"/>
32. Energize Bending Machine as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
33. Select tool as per job requirement (production quantity, sheet metal material and degree of bending etc.)	<input type="checkbox"/>	<input type="checkbox"/>
34. Select Die for Bending operation as per requirement.	<input type="checkbox"/>	<input type="checkbox"/>
35. Position the sheet over the Die and held in place by the back gauge	<input type="checkbox"/>	<input type="checkbox"/>
36. Energize press brake to perform Bending operation	<input type="checkbox"/>	<input type="checkbox"/>
37. Apply force to the sheet with the help of press Die	<input type="checkbox"/>	<input type="checkbox"/>
38. Maintain production record of work	<input type="checkbox"/>	<input type="checkbox"/>
39. Verify product deviations and report	<input type="checkbox"/>	<input type="checkbox"/>
40. Insert deburring blade into product	<input type="checkbox"/>	<input type="checkbox"/>
41. Apply a small amount of pressure between the blade and interior wall	<input type="checkbox"/>	<input type="checkbox"/>
42. Perform rotation of blade around the interior wall of the tube while applying pressure	<input type="checkbox"/>	<input type="checkbox"/>
43. Use a deburring machine to grind the burr off in case of Mechanical deburring	<input type="checkbox"/>	<input type="checkbox"/>

44. Use combustive gases to generate thermal energy and essentially scald the burrs out of the metal in Thermal deburring	<input type="text"/>	<input type="text"/>
45. Use a solution of salt or glycol to conduct energy through the burrs in Electrochemical deburring	<input type="text"/>	<input type="text"/>
46. Follow standard procedure of inspection	<input type="text"/>	<input type="text"/>
47. Measure the work piece for conformance to specification	<input type="text"/>	<input type="text"/>
48. Carryout product repair (if required)	<input type="text"/>	<input type="text"/>
49. Inspect products after rework or repair	<input type="text"/>	<input type="text"/>
50. Record the deviations, if any, according to SOPs	<input type="text"/>	<input type="text"/>

Candidate's Signature _____ Assessor's Signature _____

Date: _____

Assessors Judgment Guide

Qualification	National Vocational Certificate in Metal Forming & Processing Level 3
Competency Standard	Perform Shearing, Bending and Punching Operations
Purpose of Assessment	Formative Assessment
Candidate Details	Name: _____ Registration/Roll Number: _____ Signature: _____
Assessment Outcome	<div style="display: flex; justify-content: space-between; align-items: center;"> COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> </div> Name of the Assessor _____ Assessor's code: _____ Signature: _____

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment		✓					
Other Requirement							

Observation Checklist

Assessment Task		<ul style="list-style-type: none">• Arrange the raw material• Arrange tools and equipment• Prepare the required tools and equipment• Prepare work piece as per drawing• Perform Shearing operation• Perform punching operation• Perform bending operation• Perform Deburring of product• Carryout inspection of the finished products		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select the raw material according to job requirements.			
2.	Select form/shape of raw material on near net Shape principle			
3.	Identify standard techniques as per safety procedures			
4.	Select forming tools and equipment based on manufacturers specification			
5.	Select the desired Die according to the job requirement.			
6.	Select the Punch according to the job requirement			
7.	Measure the strip dimensions for given operation			
8.	Set parameters of forming machine (Pressure, Time, Temperature etc.) according to job specifications			
9.	Energize the machine as per SOPs			
10.	Prepare the metal stock as per SOPs.			
11.	Set number of Dies according to requirement.			
12.	Set the Punch according to the job requirement			
13.	Interpret job's drawing			
14.	Perform measurement for marking on job as per drawings/ specifications			
15.	Apply Dimensional data and shape according to the given task			
16.	Clamp the work piece using PPEs as per job requirement			
17.	Energize Shearing Machine as per SOPs			

18.	Load continuous feed of stock as per production requirements.			
19.	Operate Shearing machine as per SOP			
20.	Unload finished product as per SOP			
21.	Maintain production record of work			
22.	Verify product deviations and report			
23.	Energize Punching Machine as per SOPs			
24.	Select Punch (Steel, Carbide etc) as per requirement			
25.	Select the Die cutout in the shape of requirement			
26.	Assemble sheet metal stock, Punch and Die.			
27.	Position sheet metal stock between the Punch and Die inside the punch press			
28.	Press Punch downward at high speed through the Sheet and Die			
29.	Remove the slug that is punched out of the sheet			
30.	Maintain production record of work			
31.	Verify product deviations and report			
32.	Energize Bending Machine as per SOPs			
33.	Select tool as per job requirement (production quantity, sheet metal material and degree of bending etc.)			
34.	Select Die for Bending operation as per requirement.			
35.	Position the sheet over the Die and held in place by the back gauge			
36.	Energize press brake to perform Bending operation			
37.	Apply force to the sheet with the help of press Die			
38.	Maintain production record of work			
39.	Verify product deviations and report			
40.	Insert deburring blade into product			
41.	Apply a small amount of pressure between the blade and interior wall			

42.	Perform rotation of blade around the interior wall of the tube while applying pressure			
43.	Use a deburring machine to grind the burr off in case of Mechanical deburring			
44.	Use combustive gases to generate thermal energy and essentially scald the burrs out of the metal in Thermal deburring			
45.	Use a solution of salt or glycol to conduct energy through the burrs in Electrochemical deburring			
46.	Follow standard procedure of inspection			
47.	Measure the work piece for conformance to specification			
48.	Carryout product repair (if required)			
49.	Inspect products after rework or repair			
50.	Record the deviations, if any, according to SOPs			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Qualification	National Vocational Certificate in Metal Forming & Processing Level 3
Competency Standard	Perform Shearing, Bending and Punching Operations
Purpose of Assessment	Formative Assessment
Candidate Details	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
Assessment Outcome	<div style="display: flex; justify-content: space-around; align-items: center;"> COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> </div> Name of the Assessor: _____ Assessor's code: _____ Signature of the Assessor: _____

Candidate's response is not required to be identical, but similar concepts and/or keywords must be used. Oral questioning may be used to clarify candidate understanding of topic and its application.

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)		Satisfactory	Not Satisfactory
1.	Enlist types of punch presses		
2.	State types of bending angles		
3.	Define strain rate sensitivity		

4.	Define shearing		

Feedback to the Candidate	
Candidate's Signature_____	Assessor's Signature _____