

## Instruction Sheet for the Candidate

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	Perform Mechanical Testing on Universal Testing Machine
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name _____ Registration/Roll Number _____
<b>Guidance for Candidate</b>	<p><b>To meet this standard, you are required to complete the following within 04 Hrs. time frame (for practical demonstration &amp; assessment):</b></p> <ul style="list-style-type: none"> <li>• CU1. Measure tensile properties of the specimen</li> <li>• CU2. Measure Compressive strength of the specimen</li> <li>• CU3. Measure the Bending strength of specimen</li> <li>• CU4. Measure Shear strength of the specimen</li> </ul>
<b>Time: 04 Hrs.</b>	During a practical assessment, under observation by an assessor, you are required to
<b>Minimum Evidence Required</b>	<p><b>CU1. Measure tensile properties of the specimen</b></p> <p><b>P1.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.</p> <p><b>P2.</b> Mark the gauge length points on the specimen.</p> <p><b>P3.</b> Measure the initial cross sectional area of the specimen.</p> <p><b>P4.</b> Select the gripping device as per standard specimen.</p> <p><b>P5.</b> Inspect the functioning condition of the gripping device.</p> <p><b>P6.</b> Grip the specimen in gripping device according to standard.</p> <p><b>P7.</b> Attach the extensometer with the specimen if required.</p> <p><b>P8.</b> Apply the load on the specimen up to fracture.</p> <p><b>P9.</b> Note the values of applied load after specific intervals.</p> <p><b>P10.</b> Note the extension produced against the noted applied load.</p> <p><b>P11.</b> Calculate stress and strain from the values of load and extension.</p> <p><b>P12.</b> Sketch stress strain curve.</p> <p><b>P13.</b> Calculate the required mechanical properties.</p> <p><b>CU2. Measure Compressive strength of the specimen</b></p> <p><b>P1.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.</p> <p><b>P2.</b> Calculate the initial cross sectional area of the specimen.</p> <p><b>P3.</b> Prepare the end surfaces of the specimen.</p> <p><b>P4.</b> Inspect the working condition of fixtures used for compression.</p> <p><b>P5.</b> Fix the specimen, between fixtures, in the machine.</p> <p><b>P6.</b> Apply the load on the specimen up to surface failure.</p> <p><b>P7.</b> Note the value of load at which surface get failure.</p> <p><b>P8.</b> Calculate compressive stress.</p>

	<p><b>P9.</b> Record the results.</p> <p><b>CU3. Measure the Bending strength of specimen</b></p> <p><b>P1.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.</p> <p><b>P2.</b> Inspect the working condition of bend test fixture.</p> <p><b>P3.</b> Fit the bend test fixture in the machine.</p> <p><b>P4.</b> Adjust the span between two rollers of the fixture according to the length of the specimen.</p> <p><b>P5.</b> Fit the mandrel in the machine.</p> <p><b>P6.</b> Place the specimen on the rollers of the fixture.</p> <p><b>P7.</b> Apply the load on the specimen up to maximum selected bend.</p> <p><b>P8.</b> Note the bending force.</p> <p><b>P9.</b> Measure bending strength by using formula.</p> <p><b>P10.</b> Record the results.</p> <p><b>CU4. Measure Shear strength of the specimen</b></p> <p><b>P1.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.</p> <p><b>P2.</b> Calculate the cross sectional area of the Specimen.</p> <p><b>P3.</b> Prepare the machine for test.</p> <p><b>P4.</b> Install the fixture of shear test.</p> <p><b>P5.</b> Place the sample within the fixture.</p> <p><b>P6.</b> Apply the load for single shear or double shear test.</p> <p><b>P7.</b> Set the machine speed according to sample.</p> <p><b>P8.</b> Note the maximum/breaking force.</p> <p><b>P9.</b> Calculate shear strength.</p> <p><b>P10.</b> Record the results.</p>
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## Self-Assessment Checklist

<b>Candidate Name</b>	
<b>Registration No.</b>	
<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	Perform Mechanical Testing on Universal Testing Machine
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Assessment Task</b>	<ul style="list-style-type: none"> <li>• CU1. Measure tensile properties of the specimen</li> <li>• CU2. Measure Compressive strength of the specimen</li> <li>• CU3. Measure the Bending strength of specimen</li> <li>• CU4. Measure Shear strength of the specimen</li> </ul>

I can.....

<b>Performance Criteria</b>	<b>Yes</b>	<b>No</b>
<b>P1.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P2.</b> Mark the gauge length points on the specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P3.</b> Measure the initial cross sectional area of the specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P4.</b> Select the gripping device as per standard specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P5.</b> Inspect the functioning condition of the gripping device.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P6.</b> Grip the specimen in gripping device according to standard.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P7.</b> Attach the extensometer with the specimen if required.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P8.</b> Apply the load on the specimen up to fracture.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P9.</b> Note the values of applied load after specific intervals.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P10.</b> Note the extension produced against the noted applied load.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P11.</b> Calculate stress and strain from the values of load and extension.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P12.</b> Sketch stress strain curve.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P13.</b> Calculate the required mechanical properties.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P14.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P15.</b> Calculate the initial cross sectional area of the specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P16.</b> Prepare the end surfaces of the specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P17.</b> Inspect the working condition of fixtures used for compression.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P18.</b> Fix the specimen, between fixtures, in the machine.	<input type="checkbox"/>	<input type="checkbox"/>

<b>P19.</b> Apply the load on the specimen up to surface failure.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P20.</b> Note the value of load at which surface get failure.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P21.</b> Calculate compressive stress.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P22.</b> Record the results.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P23.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P24.</b> Inspect the working condition of bend test fixture.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P25.</b> Fit the bend test fixture in the machine.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P26.</b> Adjust the span between two rollers of the fixture according to the length of the specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P27.</b> Fit the mandrel in the machine.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P28.</b> Place the specimen on the rollers of the fixture.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P29.</b> Apply the load on the specimen up to maximum selected bend.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P30.</b> Note the bending force.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P31.</b> Measure bending strength by using formula.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P32.</b> Record the results.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P33.</b> Inspect the dimensions of standard specimen with the help of measuring instruments.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P34.</b> Calculate the cross sectional area of the Specimen.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P35.</b> Prepare the machine for test.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P36.</b> Install the fixture of shear test.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P37.</b> Place the sample within the fixture.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P38.</b> Apply the load for single shear or double shear test.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P39.</b> Set the machine speed according to sample.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P40.</b> Note the maximum/breaking force.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P41.</b> Calculate shear strength.	<input type="checkbox"/>	<input type="checkbox"/>
<b>P42.</b> Record the results.	<input type="checkbox"/>	<input type="checkbox"/>

Candidate's Signature\_\_\_\_\_ Assessor's Signature\_\_\_\_\_

Date: \_\_\_\_\_

## Assessors Judgment Guide

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	Perform Mechanical Testing on Universal Testing Machine
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Signature: _____
<b>Assessment Outcome</b>	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> 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"> <li>• CU1. Measure tensile properties of the specimen</li> <li>• CU2. Measure Compressive strength of the specimen</li> <li>• CU3. Measure the Bending strength of specimen</li> <li>• CU4. Measure Shear strength of the specimen</li> </ul>		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Inspect the dimensions of standard specimen with the help of measuring instruments.			
2.	Mark the gauge length points on the specimen.			
3.	Measure the initial cross sectional area of the specimen.			
4.	Select the gripping device as per standard specimen.			
5.	Inspect the functioning condition of the gripping device.			
6.	Grip the specimen in gripping device according to standard.			
7.	Attach the extensometer with the specimen if required.			
8.	Apply the load on the specimen up to fracture.			
9.	Note the values of applied load after specific intervals.			
10.	Note the extension produced against the noted applied load.			
11.	Calculate stress and strain from the values of load and extension.			
12.	Sketch stress strain curve.			
13.	Calculate the required mechanical properties.			
14.	Inspect the dimensions of standard specimen with the help of measuring instruments.			
15.	Calculate the initial cross sectional area of the specimen.			
16.	Prepare the end surfaces of the specimen.			
17.	Inspect the working condition of fixtures used for compression.			
18.	Fix the specimen, between fixtures, in the machine.			
19.	Apply the load on the specimen up to surface failure.			

20.	Note the value of load at which surface get failure.			
21.	Calculate compressive stress.			
22.	Record the results.			
23.	Inspect the dimensions of standard specimen with the help of measuring instruments.			
24.	Inspect the working condition of bend test fixture.			
25.	Fit the bend test fixture in the machine.			
26.	Adjust the span between two rollers of the fixture according to the length of the specimen.			
27.	Fit the mandrel in the machine.			
28.	Place the specimen on the rollers of the fixture.			
29.	Apply the load on the specimen up to maximum selected bend.			
30.	Note the bending force.			
31.	Measure bending strength by using formula.			
32.	Record the results.			
33.	Inspect the dimensions of standard specimen with the help of measuring instruments.			
34.	Calculate the cross sectional area of the Specimen.			
35.	Prepare the machine for test.			
36.	Install the fixture of shear test.			
37.	Place the sample within the fixture.			
38.	Apply the load for single shear or double shear test.			
39.	Set the machine speed according to sample.			
40.	Note the maximum/breaking force.			

41.	Calculate shear strength.			
42.	Record the results.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		



## Knowledge Assessment

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	Perform Mechanical Testing on Universal Testing Machine
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
<b>Assessment Outcome</b>	<div style="display: flex; justify-content: space-around; align-items: center;"> <span><b>COMPETENT</b> <input type="checkbox"/></span> <span><b>NOT YET COMPETENT</b> <input type="checkbox"/></span> </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.	What are the mechanical testing methods?		
2.	What is mechanical properties testing?		
3.	What is the purpose of shear test?		

4.	What does a universal testing machine do?		
5.	What is the principle of UTM?		
6.	What care should be taken while performing a test on UTM?		

<b>Feedback to the Candidate</b>	
<b>Candidate's Signature</b> _____	<b>Assessor's Signature</b> _____