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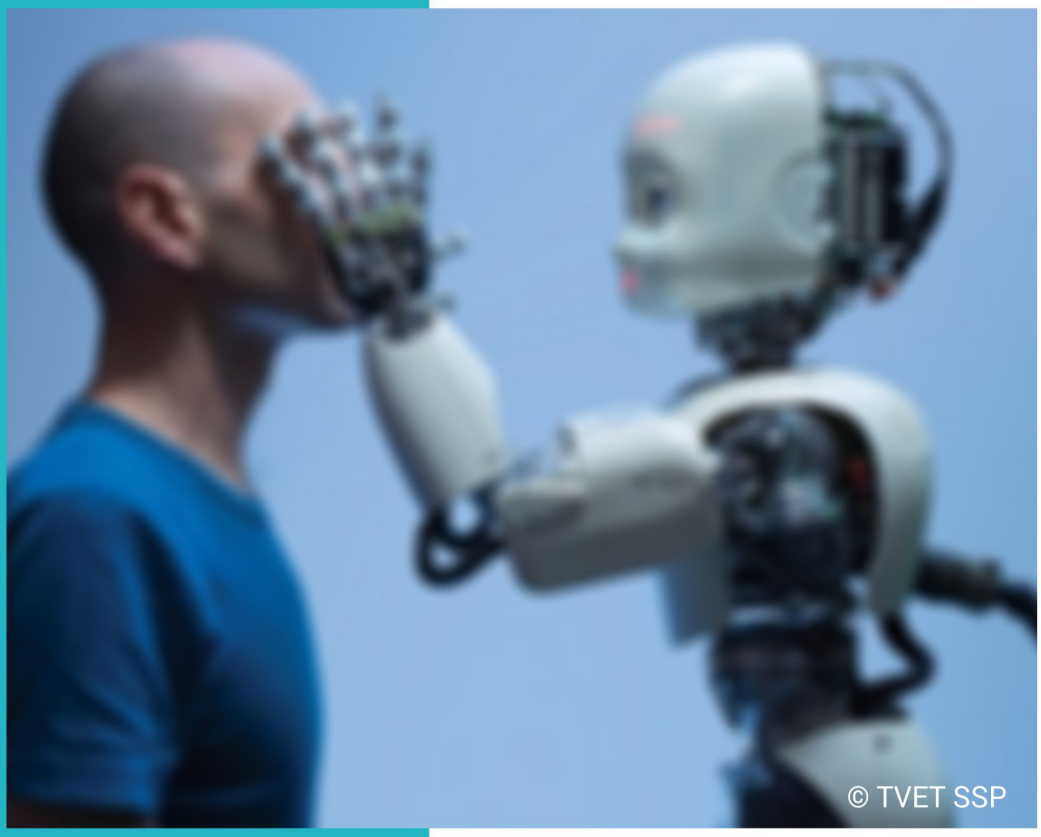
ROBOTICS



ASSESSMENT PACKAGE

National Vocational Certificate Level 1

Version 1 - October, 2019

NAVTTC

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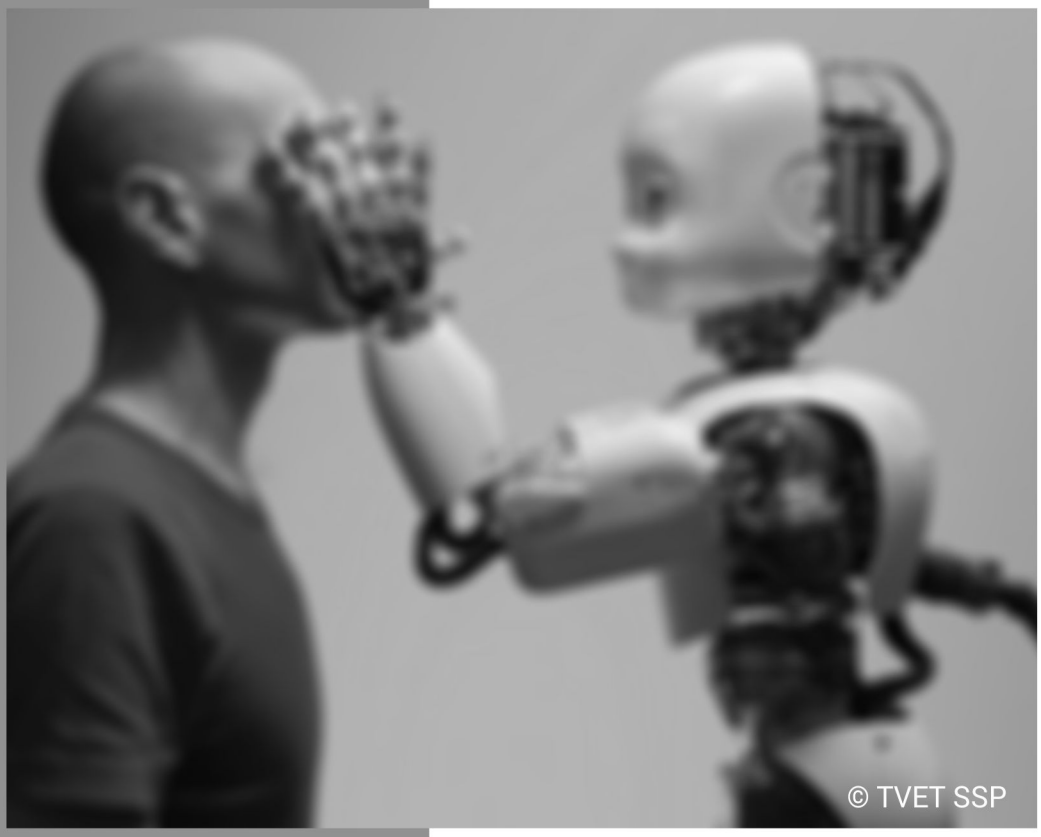
Document Version
October, 2019
Islamabad, Pakistan

ROBOTICS



ASSESSMENT PACKAGE

National Vocational Certificate Level 1

Version 1 - October, 2019

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level1 -4 Robotics Technician
Competency Standards	**0714001050 Perform basic machining operations**
Assessment Task	Manufacture the robotic arm base given in **Annexure-A.** Your task should be completed based on the following points: 1) Drawing sheet generation of each component using orthographic projection views and basic drawing lines concepts 2) Use of foils and bench voices while finishing the parts 3) Use of lathe machine operations for manufacturing the parts 4) Use of welding for binding purposes

I can…….

Performance Criteria	**Yes**	**No**
1. Recognize basics of lines used in engineering drawings		
2. Understand different types of lines in engineering drawings		
3. Understand types of drawing views		
4. Identify assembly requirements according to drawings		
5. Understand job layout according to assembly requirement		
6. Carry-Out Sawing		
7. File the Work-Piece		
8. Carry out Drilling Process		
9. Produce Threads on Work-Piece		
10. Perform Hand Reaming		
11. Prepare Materials for Lathe Operations		
12. Select Tools and Equipment		
13. Set Lathe Machine for Operations		
14. Select and Mark Material/s as per Drawing/Job Requirement		
15. Cut and Prepare Edge/s of Base Materials		
16. Knowledge of welding equipment		
17. Fit-up Base Materials		
18. Knowledge of materials		

Candidate's Signature_____ Assessor's Signature_____ Date: _____

Instruction Sheet for the Candidate

Qualification	National Vocational Certificate Level 1 -4 ROBOTICS TECHNICIAN
Competency Standard(s)	**0714001050 Perform Basic Machining Operations**

Candidate Details	Name_____ Registration/Roll Number_____
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given timeframe (for practical demonstration & assessment):** Manufacture the robotic arm base given in **Annexure-A.** Your task should be completed based on the following points: 1. Drawing sheet generation of each component using orthographic projection views and basic drawing lines concepts 2. Use of foils and bench voices while finishing the parts 3. Use of lathe machine operations for manufacturing the parts 4. Use of welding for binding purposes
Time: 2.5 hrs.	During a practical assessment, under observation by an assessor, you are required Perform the above task, demonstrating the following criteria:
Minimum Evidence Required	1. Recognize basics of lines used in engineering drawings 2. Understand different types of lines in engineering drawings 3. Understand types of drawing views 4. Identify assembly requirements according to drawings 5. Understand job layout according to assembly requirement 6. Carry-Out Sawing 7. File the Work-Piece 8. Carry out Drilling Process 9. Produce Threads on Work-Piece 10. Perform Hand Reaming 11. Prepare Materials for Lathe Operations 12. Select Tools and Equipment 13. Set Lathe Machine for Operations 14. Select and Mark Material/s as per Drawing/Job Requirement 15. Cut and Prepare Edge/s of Base Materials 16. Knowledge of welding equipment 17. Fit-up Base Materials 18. Knowledge of materials

Assessors Judgment Guide

Qualification	National Vocational Certificate Level 1 -4 ROBOTICS TECHNICIAN
Competency Standard(s)	Perform basic machining operations
Candidate Details	Name: _____ Registration/Roll Number: _____Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ **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	Manufacture the robotic arm base given in **Annexure-A.** Your task should be completed based on the following points: 1) Drawing sheet generation of each component using orthographic projection views and basic drawing lines concepts 2) Use of foils and bench voices while finishing the parts 3) Use of lathe machine operations for manufacturing the parts 4) Use of welding for binding purposes

	During the practical assessment, candidate demonstrated the following:	**Yes**	**No**	**Remarks**
1.	Recognized basics of lines used in engineering drawings			
2.	Understand different types of lines in engineering drawings			
3.	Understand types of drawing views			
4.	Identified assembly requirements according to drawings			
5.	Understand job layout according to assembly requirement			
6.	Carried-Out Sawing			
7.	Filed the Work-Piece			
8.	Carried out Drilling Process			
9.	Produced Threads on Work-Piece			
10.	Performed Hand Reaming			
11.	Prepared Materials for Lathe Operations			
12.	Selected Tools and Equipment			
13.	Set Lathe Machine for Operations			
14.	Selected and Mark Material/s as per Drawing/Job Requirement			
15.	Cut and Prepare Edge/s of Base Materials			
16.	Knowledge of welding equipment			
17.	Fit-up Base Materials			
18.	Knowledge of materials			

Competent ☐	**Not Yet Competent** ☐

Knowledge Assessment

Qualification	National Vocational Certificate Level1 -4 Robotics Technician
Competency Standard(s)	Perform basic machining operations
Candidate Details	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ 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 orthographic projection views? *Candidate's response*		
2.	What are the lines types and pencil types used for generation the engineering drawing?		
3.	What are the types of foils used for finishing the work piece and their importance under different circumstances?		
4.	What are the basic type of lathe machines? Define the basic lathe machine operations?		
5.	If we remove the lathe machine from our assembly lines then what kind of robots should be placed to perform those operations?		
6.	Explain the types of welding's?		
7.	Explain the importance of robotic arms in the field of welding. And why robots are more important in welding fields than humans?		
8.	Can one robot do the foiling operations alone? If yes than how much minimum axis robots can be used for such operations?		

9.			
10.			
11.			
12.			

Feedback to the Candidate
Candidate's Signature_____Assessor's Signature_____

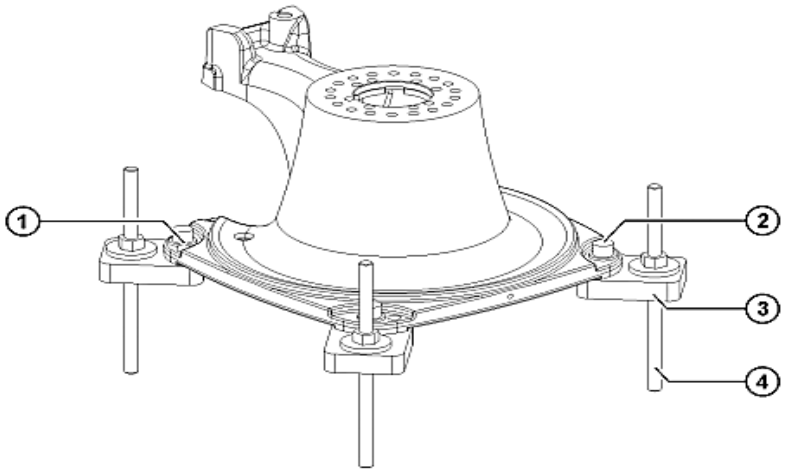


Fig. 6-1: Mounting base with centering

1 Locating pin for centering
2 Allen screw
3 Bedplate
4 Resin-bonded anchor

Annexure-A

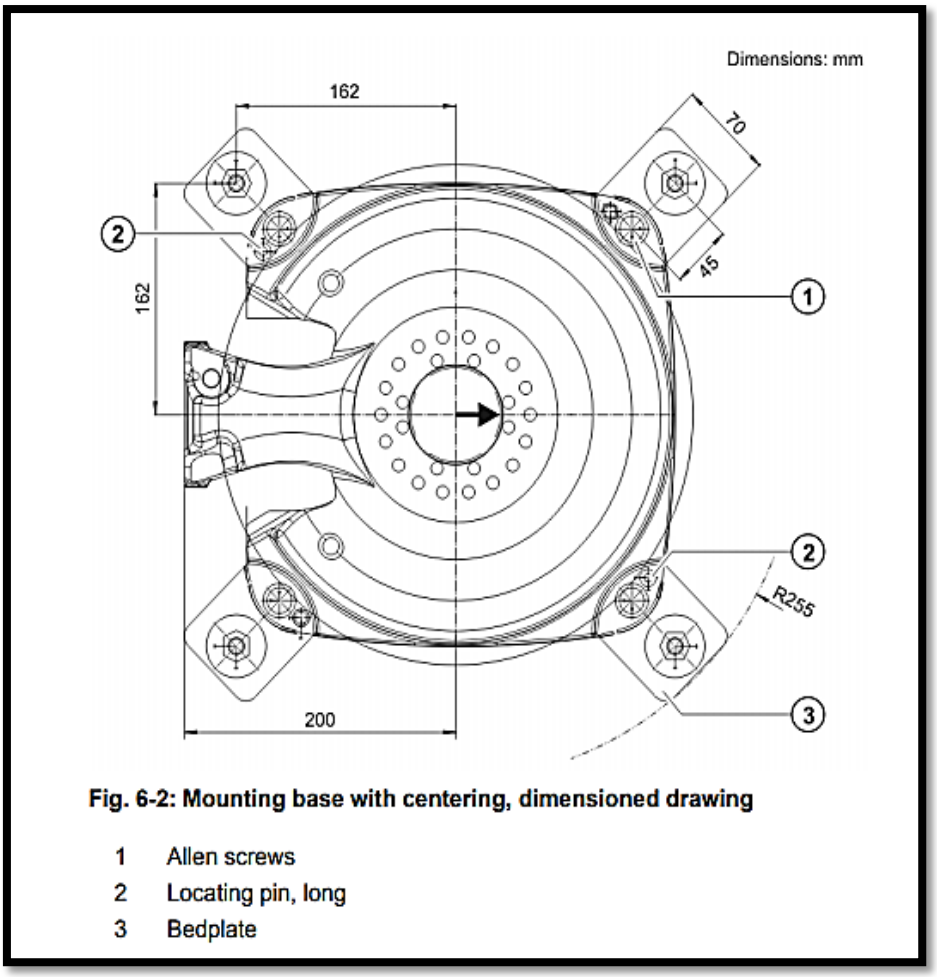


Fig. 6-2: Mounting base with centering, dimensioned drawing

1 Allen screws
2 Locating pin, long
3 Bedplate

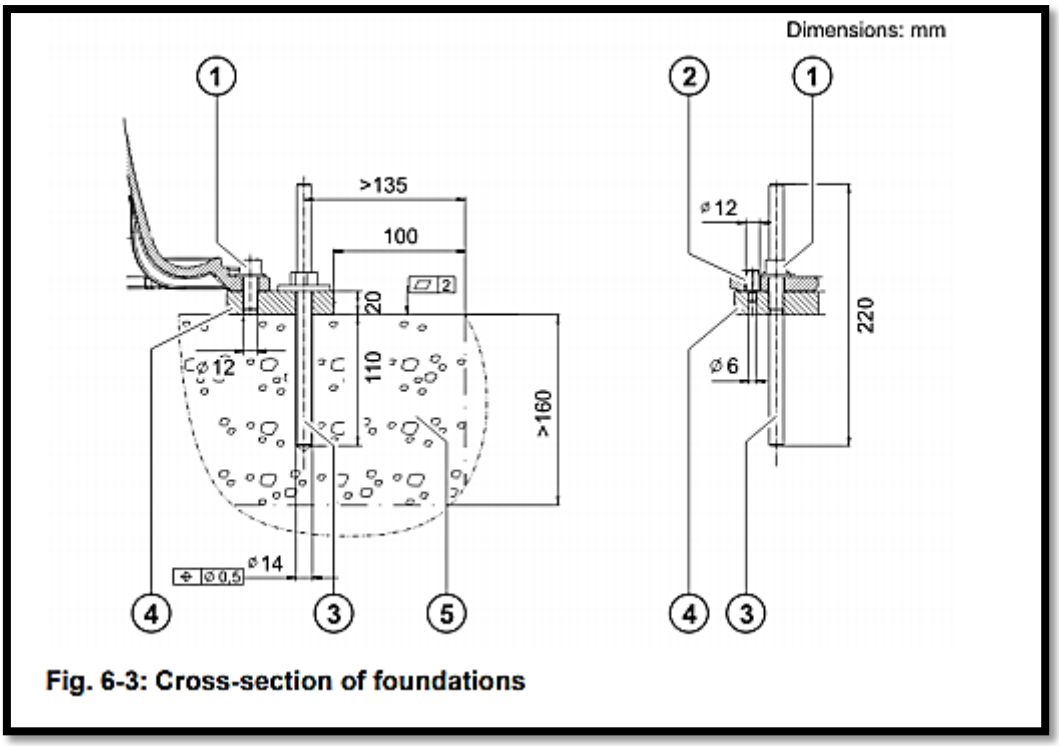


Fig. 6-3: Cross-section of foundations

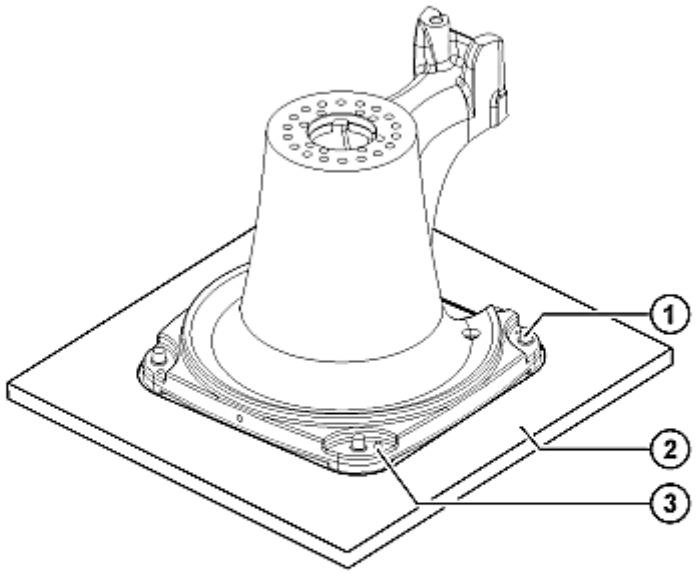
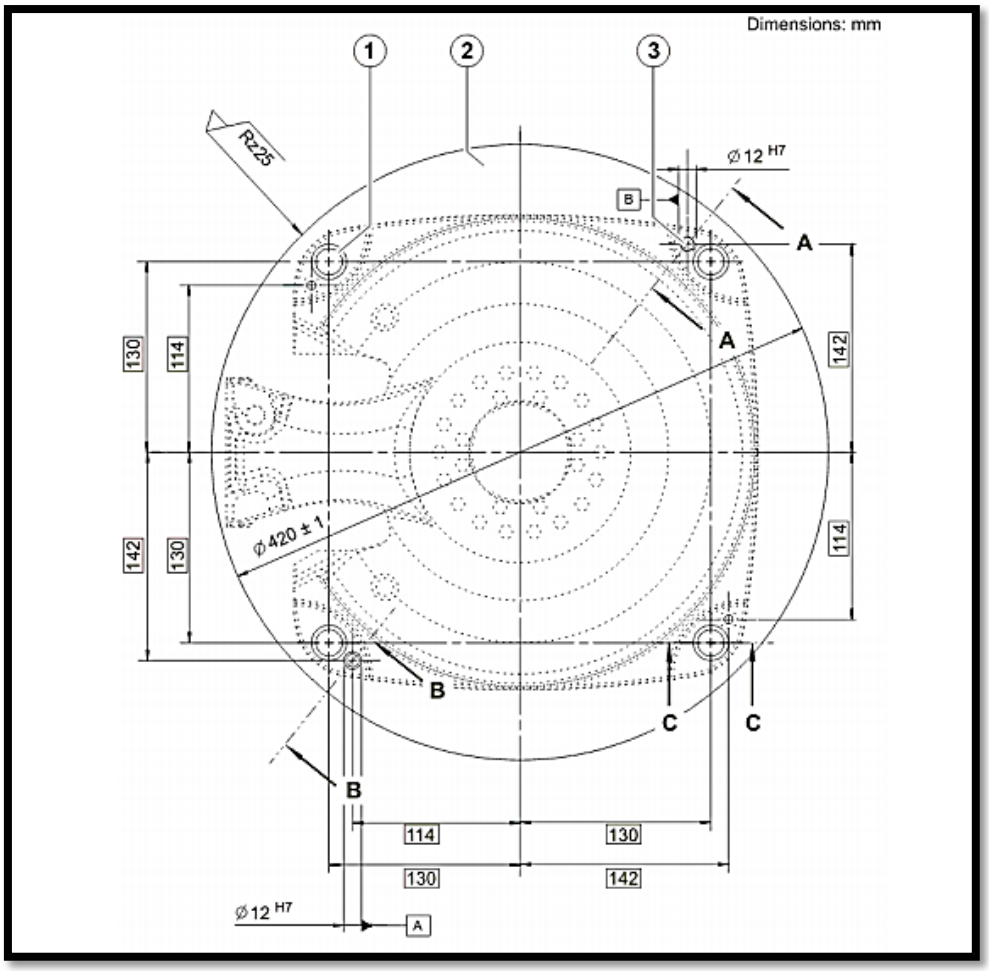


Fig. 6-4: Machine frame mounting

1 Allen screw with conical spring washer
2 Mounting surface
3 Locating pin



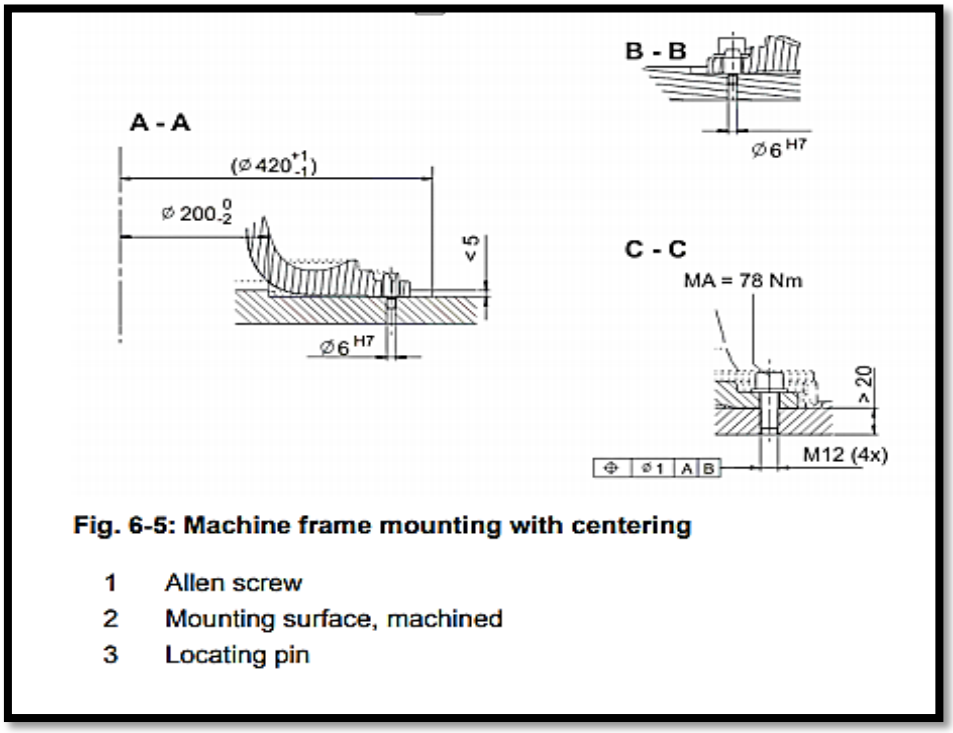


Fig. 6-5: Machine frame mounting with centering

1 Allen screw
2 Mounting surface, machined
3 Locating pin

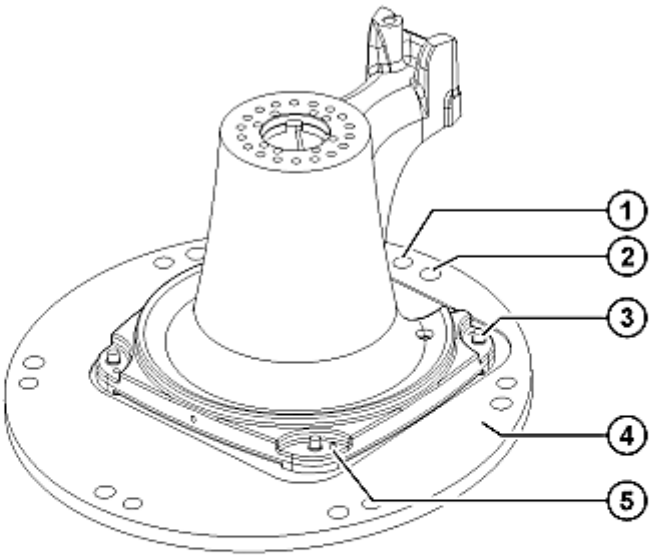


Fig. 6-6: Adapter plate

1	Pin for centering the adapter plate
2	Hexagon bolt with conical spring washer
3	Allen screw with conical spring washer
4	Adapter plate
5	Locating pin

Knowledge Assessment

Qualification	National Vocational Certificate Level1 -4 Robotics Technician
Competency Standard(s)	0714001050 Perform basic machining operations
Candidate Details	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ 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 orthographic projection views?		
	Candidate's response		
2.	What are the lines types and pencil types used for generation the engineering drawing?		
3.	What are the types of foils used for finishing the work piece and their importance under different circumstances?		
4.	What are the basic types of lathe machines? Define the basic lathe machine operations?		

5.	If we remove the lathe machine from our assembly lines then what kind of robots should be placed to perform those operations?		
6.	Explain the types of welding's?		
7.	Explain the importance of robotic arms in the field of welding. And why robots are more important in welding fields than humans?		
8.	Can one robot do the foiling operations alone? If yes than how much minimum axis robots can be used for such operations?		
9.			
10.			
11.			
12.			

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level 1 -4 Robotics Technician
Competency Standards	**0714001051 Operate the electronic measuring instruments**
Assessment Task	**1. Measure resistance, inductance and capacitance using analogue and digital multi meter?** **2. Generate 5VRMS 50hz AC signal using function generator then apply the voltage signal to the load (AH-50W-1K ohm) and measure the current passing through Load, VRMS & frequency using oscilloscope and DMM.**

I can……

Performance Criteria	**Yes**	**No**
1. Classify the instrument type (analogue/digital).	☐	☐
2. Check the type of power source needed.	☐	☐
3. Evaluate and assemble the device and probes with proper procedure (as per manual).	☐	☐
4. Perform zero error tests as described in the procedure.	☐	☐
5. Identify the measuring units/parameters of the device as per SOP.	☐	☐
6. Set the readability of the instrument with respect to range.	☐	☐
7. Record the findings and develop the report.	☐	☐
8. Determine the type of electrical/electronic parameter to be measures.	☐	☐
9. Select the relevant measuring instrument as per parameter to be measured.	☐	☐
10. Test point identification for measurement.	☐	☐
11. Connect the instrument according to the prescribed method.	☐	☐
12. Follow the procedure for reading value on the display	☐	☐
13. Identify the type of quantity to be measures.	☐	☐
14. Identify components and control knobs of oscilloscope.	☐	☐
15. Familiarize with operating panel and display control.	☐	☐
16. Adjust screen resolution and calibrate screen with probes.	☐	☐
17. Measure the AC/DC signal on oscilloscope using function generator.	☐	☐
18. Followed health and safety measures.	☐	☐

Candidate's Signature_____ Assessor's Signature_____

Date: _____

Instruction Sheet for the Candidate

Qualification	National Vocational Certificate Level 1 -4 Robotics Technician
Competency Standard(s)	**0714001051 Operate the electronic measuring instruments**

Candidate Details	Name_____ Registration/Roll Number_____
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given time frame of 3 hours (for practical demonstration & assessment):** 1. **Measure resistance, inductance and capacitance using analogue and digital multi meter?** 2. **Generate 5VRMS 50hz AC signal using function generator then apply the voltage signal to the load (AH-50W-1K ohm) and measure the current passing through Load, VRMS & frequency using oscilloscope and DMM**
Time: 3 hrs.	During a practical assessment, under observation by an assessor, you are required to perform the above tasks demonstrating the following criteria:
Minimum Evidence Required	1. Classify the instrument type (analogue/digital). 2. Check the type of power source needed. 3. Evaluate and assemble the device and probes with proper procedure (as per manual). 4. Perform zero error tests as described in the procedure. 5. Identify the measuring units/parameters of the device as per SOP. 6. Set the readability of the instrument with respect to range. 7. Record the findings and develop the report. 8. Determine the type of electrical/electronic parameter to be measures. 9. Select the relevant measuring instrument as per parameter to be measured. 10. Test point identification for measurement. 11. Connect the instrument according to the prescribed method. 12. Follow the procedure for reading value on the display 13. Identify the type of quantity to be measures. 14. Identify components and control knobs of oscilloscope. 15. Familiarize with operating panel and display control. 16. Adjust screen resolution and calibrate screen with probes. 17. Measure the AC/DC signal on oscilloscope using function generator. 18. Follow health and safety measures.

Assessors Judgment Guide

Qualification	National Vocational Certificate Level -4 ROBOTICS TECHNICIAN
Competency Standard(s)	Operate the electronic measuring instruments
Candidate Details	Name: _____ Registration/Roll Number: _____Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ **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	**3. Measure resistance, inductance and capacitance using analogue and digital multi meter?** 4. **Generate 5VRMS 50hz AC signal using function generator then apply the voltage signal to the load (AH-50W-1K ohm) and measure the current passing through Load, VRMS & frequency using oscilloscope and DMM.**

During the practical assessment, candidate demonstrated the following:		**Yes**	**No**	**Remarks**
1.	Classified the instrument type (analogue/digital).			
2.	Checked the type of power source needed.			
3.	Evaluated and assemble the device and probes with proper procedure (as per manual).			
4.	Performed zero error tests as described in the procedure.			
5.	Identified the measuring units/parameters of the device as per SOP.			
6.	Set the readability of the instrument with respect to range.			
7.	Recorded the findings and develop the report.			
8.	Determined the type of electrical/electronic parameter to be measures.			
9.	Selected the relevant measuring instrument as per parameter to be measured.			
10.	Tested point identification for measurement.			
11.	Connected the instrument according to the prescribed method.			
12.	Followed the procedure for reading value on the display			
13.	Identified the type of quantity to be measures.			
14.	Identified components and control knobs of oscilloscope.			
15.	Familiarized with operating panel and display control.			
16.	Adjusted screen resolution and calibrate screen with probes.			
17.	Measured the AC/DC signal on oscilloscope using function generator.			
18.	Followed health and safety measures.			

Competent ☐	**Not Yet Competent** ☐

Feedback to the Candidate
Candidate's Signature_____Assessor's Signature_____

Knowledge Assessment

Qualification	National Vocational Certificate Level1 -4 ROBOTICS TECHNICIAN
Competency Standard(s)	0714001051 Operate the electronic measuring instruments
Candidate Details	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ 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.	Define analogue measuring instruments?		
2.	Enlist names of deflecting measuring instruments?		
3.	Define Digital measuring instruments?		
	Th		
4.	Define zero error?		
5.	Write the Unit of resistance, inductance, capacitance, voltage, current, frequency?		

6.	Describe basic functionality of oscilloscope?		
7.	Describe basic functionality of function generator?		
8.			
9.			
10.			

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level1 -4 Robotics Technician
Competency Standards	0714001052 Use measuring instruments for mechanics
Assessment Task	Given is the engine block and parts of different vehicles as **Annexure –A** and available in-front of you in your lab. You are requested to take the measurements of each part and write its differences in necessary columns. Your task should be completed while utilizing the following tools: 1) Use of graduated measurements tools 2) Use of combination set for effective measurement 3) Use of gauges for necessary measurements 4) Use of micro-meter and Vernier tools for measurements where necessary 5) Use of profile gauges, dial thickness gauges, dial caliper for necessary measurements

I can……

Performance Criteria	**Yes**	**No**
1. Take measurements using a Steel rule	☐	☐
2. Take measurements using a Hook rule	☐	☐
3. Take measurements using a Folding rule	☐	☐
4. Take measurements with Trammels	☐	☐
5. Take Measurement with Square head	☐	☐
6. Perform leveling with square head as spirit level	☐	☐
7. Measure depth with square head as depth gauge	☐	☐
8. Measure height with square head as height gauge	☐	☐
9. Take measurement with fixed gauge and plug gauge.	☐	☐
10. Take measurement with adjustable gauge	☐	☐
11. Take measurement with small hole gauge	☐	☐
12. Take measurement with telescope gauge	☐	☐
13. Take measurement with outside micro-meter	☐	☐
14. Take measurement with inside micrometer	☐	☐
15. Take measurement with depth micrometer	☐	☐
16. Measure threads with micrometer	☐	☐
17. Take measurement with Vernier micrometer	☐	☐
18. Take measurement with Vernier caliper	☐	☐

19. Take measurement with height gauge		
20. Take measurement with Vernier depth gauge		
21. Take measurement with dial calliper		
22. Take measurement with dial thickness gauge		
23. Take measurement with dial Indicator		
24. Exercise on gauge blocks		
25. Exercise on tool makers microscope		
26. Practice on Profile Projector		
27. Practice Of Digital Instruments		
28. Measure tolerance and allowances		

Candidate's Signature_____ Assessor's Signature_____

Date: _____

Qualification	National Vocational Certificate Level 1 -4 Robotics Technician
Competency Standard(s)	0714001052 Use measuring instruments for mechanics

Instruction Sheet for the Candidate

Candidate Details	Name_____ Registration/Roll Number_____
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given timeframe (for practical demonstration & assessment):** Given is the engine block and parts of different vehicles as **Annexure –A** and available in-front of you in your lab. You are requested to take the measurements of each part and write its differences in necessary columns. Your task should be completed while utilizing the following tools: 1) Use of graduated measurements tools 2) Use of combination set for effective measurement 3) Use of gauges for necessary measurements 4) Use of micro-meter and Vernier tools for measurements where necessary 5) Use of profile gauges, dial thickness gauges, dial caliper for necessary measurements
Time: 3 hrs.	During a practical assessment, under observation by an assessor, you are required perform the above task and demonstrating the following criteria: 1. Take measurements using a Steel rule 2. Take measurements using a Hook rule 3. Take measurements using a Folding rule 4. Take measurements with Trammels 5. Take Measurement with Square head 6. Perform leveling with square head as spirit level 7. Measure depth with square head as depth gauge 8. Measure height with square head as height gauge 9. Take measurement with fixed gauge and plug gauge. 10. Take measurement with adjustable gauge

Minimum Evidence Required	11. Take measurement with small hole gauge 12. Take measurement with telescope gauge 13. Take measurement with outside micro-meter 14. Take measurement with inside micrometer 15. Take measurement with depth micrometer 16. Measure threads with micrometer 17. Take measurement with Vernier micrometer 18. Take measurement with Vernier caliper 19. Take measurement with height gauge 20. Take measurement with Vernier depth gauge 21. Take measurement with dial calliper 22. Take measurement with dial thickness gauge 23. Take measurement with dial Indicator 24. Exercise on gauge blocks 25. Exercise on tool makers microscope 26. Practice on Profile Projector 27. Practice Of Digital Instruments 28. Measure tolerance and allowances

Assessors Judgment Guide

Qualification	National Vocational Certificate Level 1 -4 Robotics Technician
Competency Standard(s)	Use measuring instruments for mechanics
Candidate Details	Name:_____ Registration/Roll Number: _____Signature: _____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ **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

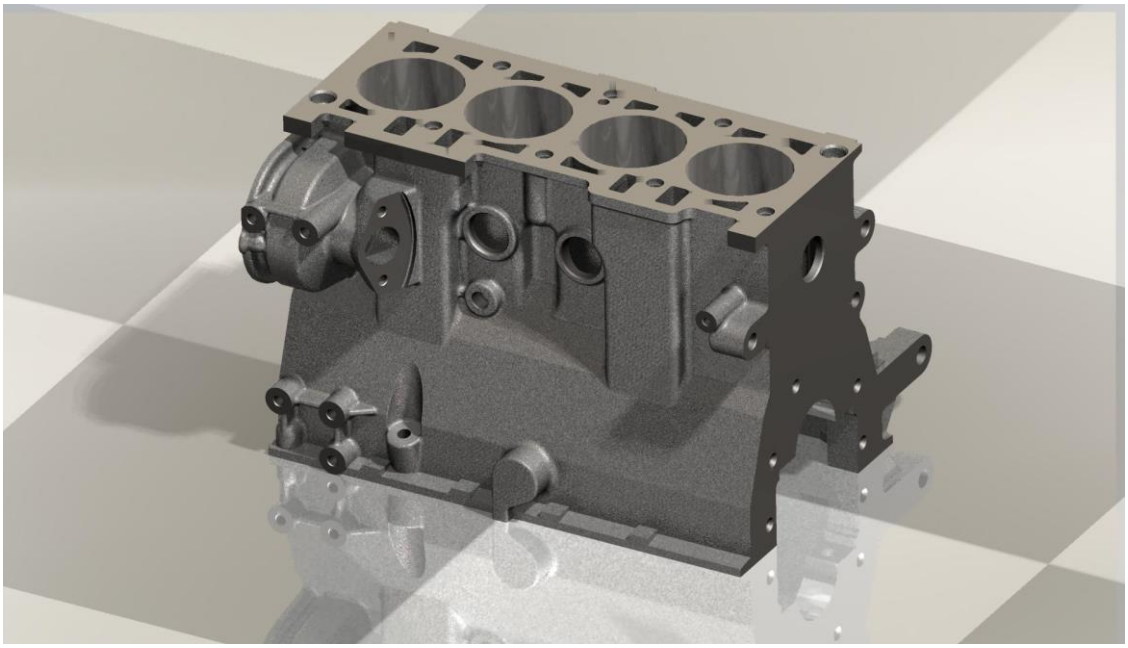
Assessment Task	Given is the engine block and parts of different vehicles as **Annexure –A** and available in-front of you in your lab. You are requested to take the measurements of each part and write its differences in necessary columns. Your task should be completed while utilizing the following tools: 1) Use of graduated measurements tools 2) Use of combination set for effective measurement 3) Use of gauges for necessary measurements 4) Use of micro-meter and Vernier tools for measurements where necessary 5) Use of profile gauges, dial thickness gauges, dial caliper for necessary measurements

	During the practical assessment, candidate demonstrated the following:	**Yes**	**No**	**Remarks**
1.	Took measurements using a Steel rule			
2.	Took measurements using a Hook rule			
3.	Took measurements using a Folding rule			
4.	Took measurements with Trammels			
5.	Took Measurement with Square head			
6.	Performed leveling with square head as spirit level			
7.	Measured depth with square head as depth gauge			
8.	Measured height with square head as height gauge			
9.	Took measurement with fixed gauge and plug gauge.			
10.	Took measurement with adjustable gauge			
11.	Took measurement with small hole gauge			
12.	Took measurement with telescope gauge			
13.	Took measurement with outside micro-meter			
14.	Took measurement with inside micrometer			
15.	Took measurement with depth micrometer			
16.	Measured threads with micrometer			
17.	Took measurement with Vernier micrometer			
18.	Took measurement with Vernier caliper			
19.	Took measurement with height gauge			
20.	Took measurement with Vernier depth gauge			
21.	Took measurement with dial caliper			
22.	Took measurement with dial thickness gauge			
23.	Took measurement with dial Indicator			
24.	Exercised on gauge blocks			
25.	Exercised on tool makers microscope			
26.	Practiced on Profile Projector			
27.	Practiced Of Digital Instruments			
28.	Measured tolerance and allowances			

Competent ☐	**Not Yet Competent** ☐

Feedback to the Candidate
Candidate's Signature_____Assessor's Signature_____

Annexure – A



Knowledge Assessment

Qualification	National Vocational Certificate Level 1 -4 Robotics Technician
Competency Standard(s)	0714001052 Use measuring instruments for mechanics
Candidate Details	Name:_____ Registration/Roll Number: _____ Candidate Signature:_____
Assessment Outcome	**COMPETENT** ☐ **NOT YETCOMPETENT** ☐ 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**
	What is the pitch of Vernier tool?		
	Candidate's response		
	How to measure the pitch of micro-meter tool gauge?		
	How to calibrate the depth gauges?		
	How much manual profile-meter is effective for measurements?		
	How can you find the inner diameter of circular body using Vernier Tool?		
	What is the least count error for dial thickness gauge which you are using for your current task?		

	What is the least count for micro-meter available in-front of you?		
	How can you recalibrate your measurement tool/gauge in an actual situation?		

Assessors Judgment Guide

Qualification	National Vocational Certificate Level 1 Robotics Technician
Competency Standard(s)	1. Perform basic machining operations 2. Operate the electronic measuring instruments 3. Use measuring instruments for mechanics 4. Obey the workplace policies and procedures 5. Follow basic communication skills (general) 6. Operate computer functions (general) 7. Comply with work health and safety policies
Candidate Details	Name:_____ Registration/Roll Number: _____Signature: _____
Assessment Outcome	**COMPETENT☐** **NOT YET COMPETENT☐** **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	Given is the required assembly in **Annexure –A.** You are requested to manufacture the complete assembly. Your task should be completed while keeping in mind the following points: 1) Use of necessary tools for drawing generation on sheet of output part i.e. fan 2) Use of measurement tools for necessary assemblies and manufacturing of parts 3) Use of lathe machine for final manufacturing the parts 4) Necessary tolerances and fittings concepts 5) Utilization of oscilloscope and function generator for varying the output through servo motor 6) Servo motor connection with oscilloscope and function generator Following items will be provided by the center: a) Gears b) servo motor c) oscilloscope d) function generator e) required raw material

During the practical assessment, candidate demonstrated the following:		**Yes**	**No**	**Remarks**
1.	Took measurements using a Steel rule			
2.	Took measurements using a Hook rule			
3.	Took measurements using a Folding rule			
4.	Took measurements with Trammels			
5.	Took Measurement with Square head			
6.	Performed leveling with square head as spirit level			
7.	Measured depth with square head as depth gauge			
8.	Measured height with square head as height gauge			
9.	Took measurement with fixed gauge and plug gauge.			
10.	Took measurement with adjustable gauge			
11.	Took measurement with small hole gauge			
12.	Took measurement with telescope gauge			
13.	Took measurement with outside micro-meter			
14.	Took measurement with inside micrometer			
15.	Took measurement with depth micrometer			
16.	Measured threads with micrometer			
17.	Took measurement with Vernier micrometer			
18.	Took measurement with Vernier caliper			
19.	Took measurement with height gauge			
20.	Took measurement with Vernier depth gauge			
21.	Took measurement with dial caliper			
22.	Took measurement with dial thickness gauge			
23.	Took measurement with dial Indicator			
24.	Exercised on gauge blocks			
25.	Exercised on tool makers microscope			

26.	Practiced on Profile Projector			
27.	Practiced Of Digital Instruments			
28.	Measured tolerance and allowances			
29.	Recognized basics of lines used in engineering drawings			
30.	Understand different types of lines in engineering drawings			
31.	Understand types of drawing views			
32.	Identified assembly requirements according to drawings			
33.	Understand job layout according to assembly requirement			
34.	Carried-Out Sawing			
35.	Filed the Work-Piece			
36.	Carried out Drilling Process			
37.	Produced Threads on Work-Piece			
38.	Performed Hand Reaming			
39.	Prepared Materials for Lathe Operations			
40.	Selected Tools and Equipment			
41.	Set Lathe Machine for Operations			
42.	Selected and Mark Material/s as per Drawing/Job Requirement			
43.	Cut and Prepare Edge/s of Base Materials			
44.	Knowledge of welding equipment			
45.	Fit-up Base Materials			
46.	Knowledge of materials			
47.	Classified the instrument type (analogue/digital).			
48.	Checked the type of power source needed.			
49.	Evaluated and assemble the device and probes with proper procedure (as per manual).			
50.	Performed zero error tests as described in the procedure.			
51.	Identified the measuring units/parameters of the device as per SOP.			
52.	Set the readability of the instrument with respect to range.			
53.	Recorded the findings and develop the report.			
54.	Determined the type of electrical/electronic parameter to be measures.			
55.	Selected the relevant measuring instrument as per parameter to be measured.			
56.	Tested point identification for measurement.			
57.	Connected the instrument according to the prescribed method.			
58.	Followed the procedure for reading value on the display			
59.	Identified the type of quantity to be measures.			
60.	Identified components and control knobs of oscilloscope.			
61.	Familiarized with operating panel and display control.			

62.	Adjusted screen resolution and calibrate screen with probes.			
63.	Measured the AC/DC signal on oscilloscope using function generator.			
64.	Followed health and safety measures.			
Competent ☐		**Not Yet Competent** ☐		

Feedback to the Candidate
Candidate's Signature_____**Assessor'sSignature**_____

Annexure – A

Instruction Sheet for the Candidate

Qualification	**National Vocational Certificate Level 1 Robotics Technician**
Competency Standard(s)	1. Perform basic machining operations 2. Operate the electronic measuring instruments 3. Use measuring instruments for mechanics 4. Obey the workplace policies and procedures 5. Follow basic communication skills (general) 6. Operate computer functions (general) 7. Comply with work health and safety policies

Candidate Details	Name_____ Registration/Roll Number_____
Guidance for Candidate	**To meet this standard, you are required to complete the following within the given timeframe (for practical demonstration & assessment):** Given is the required assembly in **Annexure –A**. You are requested to manufacture the complete assembly. Your task should be completed while keeping in mind the following points: 1) Use of necessary tools for drawing generation on sheet of output part i.e. fan 2) Use of measurement tools for necessary assemblies and manufacturing of parts 3) Use of lathe machine for final manufacturing the parts 4) Necessary tolerances and fittings concepts 5) Utilization of oscilloscope and function generator for varying the output through servo motor 6) Servo motor connection with oscilloscope and function generator Following items will be provided by the center: a) Gears b) servo motor c) oscilloscope d) function generator e) required raw material
Time: 4 hrs.	During a practical assessment, under observation by an assessor, you

Minimum Evidence Required	are required to make the robotic assembly given in **Annexure-A** demonstrating the following criteria: 1. Take measurements using a Steel rule 2. Take measurements using a Hook rule 3. Take measurements using a Folding rule 4. Take measurements with Trammels 5. Take Measurement with Square head 6. Perform leveling with square head as spirit level 7. Measure depth with square head as depth gauge 8. Measure height with square head as height gauge 9. Take measurement with fixed gauge and plug gauge. 10. Take measurement with adjustable gauge 11. Take measurement with small hole gauge 12. Take measurement with telescope gauge 13. Take measurement with outside micro-meter 14. Take measurement with inside micrometer 15. Take measurement with depth micrometer 16. Measure threads with micrometer 17. Take measurement with Vernier micrometer 18. Take measurement with Vernier caliper 19. Take measurement with height gauge 20. Take measurement with Vernier depth gauge 21. Take measurement with dial caliper 22. Take measurement with dial thickness gauge 23. Take measurement with dial Indicator 24. Exercise on gauge blocks 25. Exercise on tool makers microscope 26. Practice on Profile Projector 27. Practice Of Digital Instruments 28. Measure tolerance and allowances 29. Recognize basics of lines used in engineering drawings 30. Understand different types of lines in engineering drawings 31. Understand types of drawing views 32. Identified assembly requirements according to drawings 33. Understand job layout according to assembly requirement 34. Carry-Out Sawing 35. Foil the Work-Piece 36. Carry out Drilling Process 37. Produce Threads on Work-Piece 38. Perform Hand Reaming 39. Prepare Materials for Lathe Operations 40. Select Tools and Equipment 41. Set Lathe Machine for Operations 42. Select and Mark Material/s as per Drawing/Job Requirement 43. Cut and Prepare Edge/s of Base Materials 44. Knowledge of welding equipment 45. Fit-up Base Materials 46. Knowledge of materials 47. Classify the instrument type (analogue/digital). 48. Check the type of power source needed. 49. Evaluate and assemble the device and probes with proper procedure (as per manual). 50. Perform zero error tests as described in the procedure. 51. Identify the measuring units/parameters of the device as per SOP.

	52. Set the readability of the instrument with respect to range. 53. Record the findings and develop the report. 54. Determine the type of electrical/electronic parameter to be measures. 55. Select the relevant measuring instrument as per parameter to be measured. 56. Test point identification for measurement. 57. Connect the instrument according to the prescribed method. 58. Follow the procedure for reading value on the display 59. Identify the type of quantity to be measures. 60. Identify components and control knobs of oscilloscope. 61. Familiarize with operating panel and display control. 62. Adjust screen resolution and calibrate screen with probes. 63. Measure the AC/DC signal on oscilloscope using function generator. 64. Follow health and safety measures.

Annexure – A


HS-5

Knowledge Assessment

Qualification	National Vocational Certificate Level 1 Robotics Technician
Competency Standard(s)	1. Perform basic machining operations 2. Operate the electronic measuring instruments 3. Use measuring instruments for mechanics 4. Obey the workplace policies and procedures 5. Follow basic communication skills (general) 6. Operate computer functions (general) 7. Comply with work health and safety policies
Candidate Details	Name: _____ Registration/Roll Number: _____Candidate Signature: _____
	COMPETENT ☐ **NOT YETCOMPETENT** ☐
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.	
Assessment Outcome	Name of the Assessor:_____ Assessor'scode:_____ Signature of the Assessor:_____

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)		**Satisfactory**	**Not Satisfactory**
1.	What is the pitch of Vernier tool?		

2.	How to measure the pitch of micro-meter tool gauge?		
3.	How to calibrate the depth gauges?		
4.	How much manual profile-meter is effective for measurements?		
5.	How can you find the inner diameter of circular body using Vernier Tool?		
6.	What is the least count error for dial thickness gauge which you are using for your current task?		
7.	What is the least count for micro-meter available in-front of you?		
8.	How can you recalibrate your measurement tool/gauge in an actual situation?		
9.			
10.			

Self-Assessment Checklist

Candidate Name	
Registration No.	
Qualification	National Vocational Certificate Level-1 Robotics Technician
Competency Standards	1. Perform basic machining operations 2. Operate the electronic measuring instruments 3. Use measuring instruments for mechanics 4. Obey the workplace policies and procedures 5. Follow basic communication skills (general) 6. Operate computer functions (general) 7. Comply with work health and safety policies
Assessment Task	Given is the required assembly in **Annexure –A.** You are requested to manufacture the complete assembly. Your task should be completed while keeping in mind the following points: 1) Use of necessary tools for drawing generation on sheet of output part i.e. fan 2) Use of measurement tools for necessary assemblies and manufacturing of parts 3) Use of lathe machine for final manufacturing the parts 4) Necessary tolerances and fittings concepts 5) Utilization of oscilloscope and function generator for varying the output through servo motor 6) Servo motor connection with oscilloscope and function generator Following items will be provided by the center: a) Gears b) servo motor c) oscilloscope d) function generator e) required raw material

I can…….

Performance Criteria	**Yes**	**No**
1. Take measurements using a Steel rule	☐	☐
2. Take measurements using a Hook rule	☐	☐
3. Take measurements using a Folding rule	☐	☐
4. Take measurements with Trammels	☐	☐
5. Take Measurement with Square head	☐	☐
6. Perform leveling with square head as spirit level	☐	☐
7. Measure depth with square head as depth gauge	☐	☐
8. Measure height with square head as height gauge	☐	☐
9. Take measurement with fixed gauge and plug gauge.	☐	☐
10. Take measurement with adjustable gauge	☐	☐
11. Take measurement with small hole gauge	☐	☐

12. Take measurement with telescope gauge		
13. Take measurement with outside micro-meter		
14. Take measurement with inside micrometer		
15. Take measurement with depth micrometer		
16. Measure threads with micrometer		
17. Take measurement with Vernier micrometer		
18. Take measurement with Vernier caliper		
19. Take measurement with height gauge		
20. Take measurement with Vernier depth gauge		
21. Take measurement with dial caliper		
22. Take measurement with dial thickness gauge		
23. Take measurement with dial Indicator		
24. Exercise on gauge blocks		
25. Exercise on tool makers microscope		
26. Practice on Profile Projector		
27. Practice Of Digital Instruments		
28. Measure tolerance and allowances		
29. Recognize basics of lines used in engineering drawings		
30. Understand different types of lines in engineering drawings		
31. Understand types of drawing views		
32. Identified assembly requirements according to drawings		
33. Understand job layout according to assembly requirement		
34. Carry-Out Sawing		
35. Foil the Work-Piece		
36. Carry out Drilling Process		
37. Produce Threads on Work-Piece		
38. Perform Hand Reaming		
39. Prepare Materials for Lathe Operations		
40. Select Tools and Equipment		
41. Set Lathe Machine for Operations		
42. Select and Mark Material/s as per Drawing/Job Requirement		
43. Cut and Prepare Edge/s of Base Materials		
44. Knowledge of welding equipment		
45. Fit-up Base Materials		

46. Knowledge of materials		
47. Classify the instrument type (analogue/digital).		
48. Check the type of power source needed.		
49. Evaluate and assemble the device and probes with proper procedure (as per manual).		
50. Perform zero error tests as described in the procedure.		
51. Identify the measuring units/parameters of the device as per SOP.		
52. Set the readability of the instrument with respect to range.		
53. Record the findings and develop the report.		
54. Determine the type of electrical/electronic parameter to be measures.		
55. Select the relevant measuring instrument as per parameter to be measured.		
56. Test point identification for measurement.		
57. Connect the instrument according to the prescribed method.		
58. Follow the procedure for reading value on the display		
59. Identify the type of quantity to be measures.		
60. Identify components and control knobs of oscilloscope.		
61. Familiarize with operating panel and display control.		
62. Adjust screen resolution and calibrate screen with probes.		
63. Measure the AC/DC signal on oscilloscope using function generator.		
64. Follow health and safety measures.		

Candidate's Signature_____Assessor's Signature_____

Date: _____

Annexure – A


HS-5

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