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INDUSTRIAL AUTOMATION AND ROBOTICS TECHNICIAN LEVEL 6

ENG/OS/IA/CR/06/6

Install and Maintain Robotic Systems

July/August 2025

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

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PRACTICAL ASSESSMENT

INSTRUCTIONS TO ASSESSOR

1. Assess the candidate as the practical progresses observing the critical areas
2. You are required to mark the practical as the candidate perform the tasks
3. You are required to take video clips at critical points
4. Ensure the candidate has a name tag and registration code at the back and front

OBSERVATION CHECKLIST

Candidate's Name & Registration Code			
Assessors Name & Registration Code			
Venue of Assessment			
Date of Assessment			
Items to be Evaluated: *(Please award marks as appropriate. Give a brief comment on your observation)*	**Marks Available**	**Marks Obtained**	**Comments**
1. Observed occupational health and safety: i. Wore helmet ii. Wore overall/dust coat iii. Wore safety boots iv. Located Emergency stop button v. Located the stop button *Award 1 mark each*	**5**		
Sub Total 1	**5**		
TASK 1: Install components.			
2. **Correctly** identified following items: i. Feed Stand ii. Parts Bin iii. Assembly Feeder iv. T-nut v. Mounting bracket vi. Thumbscrew *Award 1 mark each*	**6**		
3. **Correctly** installed the Feed Stand: i. The front or rear end cap from the left side of the work surface was tightly fixed.	**4**		

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ii. Screws were tightened and the feed stand was firmly fixed *Award 2 mark each*			
4. **Correctly** installed the Parts Bin: i. Mounting brackets was correctly installed and firmly fixed ii. Parts Bin was correctly attached to the top of the mounting bracket *Award 2 marks each*	**4**		
5. **Correctly** installed the Assembly Feeder: i. Mounting brackets and mounting screws were firmly fixed ii. Escapment adjustment screw correctly tightened i.e. valve body remains in feeder *Award 2 marks each*	**4**		
Sub Total 2	**18**		
Task 2: Troubleshoot and run the system			
6. Robot arm **accurately** moved from home location to Feed stand	**5**		
7. Robot arm **correctly** griped and lifted the valve body	**5**		
8. Robot arm **accurately** moved from Feed Stand location to Assembly Feeder location	**5**		
9. Robot arm **correctly** placed the valve body in the Assembly Feeder i.e. smoothly	**5**		
10. Robot arm **correctly** repeats the above steps until the Assembly Feeder is full	**5**		
Sub Total 3	**25**		

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Task 3: Write a maintenance report			
11. **Correctly** described identified all the errors in the program *Award 5 marks*	**5**		
12. **Correctly** described the corrective actions taken to fix the all the errors identified *Award 5 marks*	**5**		
13. **Correctly** wrote recommendations for preventing future errors *Award 5 marks*	**5**		
Sub Total 4	**15**		
Task 4: Program the Robot Arm Using Offline Simulation			
14. Robot arm **accurately** moved from home location to the safe location *Award 5 marks*	**5**		
15. Robot arm **correctly** griped and lifted the valve body *Award 5 marks*	**5**		
16. Robot arm **accurately** moved from safe location to the parts bin location *Award 5 marks*	**5**		
17. Robot arm **correctly** placed the valve body at parts bin *Award 5 marks*	**5**		
18. Robot arm **correctly** repeated the above steps until the Assembly feeder was empty *Award 5 marks*	**5**		

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19. Student demonstrated how to **correctly** shut down the system *Award 2 marks*	**2**		
Sub-Total 3	**27**		
GRAND TOTAL	**90**		

ASSESSMENT OUTCOME

The candidate was found to be:

Competent ☐ Not yet Competent ☐

(Please tick as appropriate)

(The candidate is competent if the candidate obtains at least 50%)

Feedback from the Candidate:

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Feedback to the Candidate:

Candidate Signature **Date:**

_____ _____

Assessor's Signature **Date**

_____ _____

APPENDIX:

INSTRUCTIONS TO THE ASSESSOR:

You are required to provide the Candidate with a pre-written robot program intended to move valve bodies from the Feed Stand to the Assembly Feeder. The robot arm should repeat this process until the Assembly Feeder is full.

To evaluate the trainee's debugging and troubleshooting skills, the following categories of errors should be introduced into the program:

i. Syntax errors: Introduce errors that violate basic programming rules
   - Misspell keywords or variables
   - Omission of required punctuation e.g. semicolons, parentheses
   - Use of invalid characters or incorrect case
   - Inconsistent or improper spacing that affects code structure

ii. Logical errors: Introduce mistakes in the logic that affect the intended behavior
   - Robot moves to the Assembly Feeder before picking up valve body
   - Gripper opens at the wrong location
   - Robot arm fails to release the valve body at the correct destination
   - Robot arm returns to home location in middle of the operation

iii. Sequence errors: Alter the operational order:
   - Gripper opens before reaching the valve body
   - Robot returns to home location before releasing the valve body
   - Gripper is commanded to open twice unnecessarily

iv. Timing errors: Introduce incorrect or missing delays:
   - No delay after gripping the valve body
   - Excessive long or short wait times between steps
   - Lack of synchronization with external devices

v. Missing safety conditions: Omit safety-critical elements:
   - No programmed safe location
   - Absence of emergency stop logic
   - No validation of gripper position or obstacle checks

Assessment requirement: The Candidate must:

- Identify and correct all errors introduced into the program
- Document each error and corresponding corrective action in a maintenance report
- Provide recommendations for preventing such errors in future programs

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