

073206T4CHE

CHEMICAL ENGINEERING TECHNOLOGY LEVEL 6

ENG/OS/CE/CR/02/6

Perform Process Quality Control

July/August 2025



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

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: <i>Please award marks as appropriate. Give a brief comment on your observation.</i>	Marks Available	Marks Obtained	Comments
TASK 1: Determine the concentration of solution X using a Colorimeter			
1. Wore Personal Protective Equipment • Dustcoat • Dust mask • Safety shoes • Safety goggles <i>(Award 1 Mark each, total 3 Marks)</i>	4		
2. Selected the appropriate wavelength based on the colour of potassium permanganate (KMnO ₄) <i>(Award 1 Mark for complete task, 0 Marks otherwise)</i>	1		
3. Calibrated the colorimeter with a clear cuvette containing distilled water <i>(Award 1 Mark for filling the cuvette with distilled water to appropriate height and wiping it, 1 Mark for handling the cuvette by top edge of the ridged sides and positioning it so that the light beam passes through, 1 Mark for correct calibration, total = 3 Marks)</i>	3		

4. Labelled six clean, dry, test tubes as blank, Std 1, Std 2, Std 3, Std 4 and Std 5 <i>(Award 1 Mark for complete task, 0 Marks otherwise)</i>	1		
5. Added 1, 2, 3, 4 and 5 mL of 0.001 M KMnO_4 solution into Test Tubes Std 1, Std 2, Std 3, Std 4 and Std 5, respectively <i>(Award 1 Mark for each test tube that is added with the correct amount of 0.001 M KMnO_4 solution, total = 5 Marks)</i>	5		
6. Added 10, 9, 8, 7, 6 and 5 mL of distilled water into Blank, Std 1, Std 2, Std 3, Std 4 and Std 5, respectively <i>(Award 1 Mark for each test tube that is added with the correct amount distilled water, total = 5 Marks)</i>	5		
7. Thoroughly mixed each solution with stirring rod. Cleaned and dried the stirring rod between stirrings. <i>(Award 1 Mark stirring each solution, 1 Mark for cleaning and drying the stirring rod between stirrings, award zero marks in total if the stirring rod is not cleaned or dried between stirrings, total = 2 Marks)</i>	2		
8. Calculated the concentration of the solutions in the test tubes using equation 1 and completed Table 1 <i>(Award 1 Mark for each concentration calculated and entered in Table 1, award 0 Marks for any concentration not</i>	5		

<i>determined or entered in Table 1, total = 5 Marks)</i>			
9. Emptied the water from the cuvette used during calibration <i>(Award 1 Mark for complete task, 0 otherwise)</i>	1		
10. Used the solution in test tube 1, rinsed the cuvette twice with approximately 1 mL amounts of solution from the test tube, and then fill the cuvette with the solution. Cap the cuvette. <i>(Award 1 Mark for completing the task, 0 Marks for skipping part or inaccurate step)</i>	1		
11. Wiped the outside of the cuvette with tissue paper, placed the cuvette in the calorimeter and closed the lid <i>(Award 1 Mark for completing the task, 0 Marks for skipping part or inaccurate step)</i>	1		
12. Took the reading of transmittance and recorded the data in Table 2 <i>(Award 1 Mark for taking the reading and recording, 0 Marks for if reading is not taken or recorded)</i>	1		
13. Similarly, took the transmittance reading for the remaining samples Std 2 through Std 5 <i>(Award 3 Marks for each sample in test tube Std 2 through Std 5 using the steps and marks as allocated for test tube 1, total = 12 Marks)</i>	12		

14. Filled the absorbance column completed Table 2 for standards Std 1 through Std 5 <i>(Award 1 Mark for each correct absorbance, total = 5 Marks)</i>	5		
15. Plotted a graph of absorbance against concentration <i>(Award 1 Mark for title, 1 mark for labelling of the axes (should include units where applicable), 1 Mark for the y-axis and x-axis scale that allow accurate plotting without overcrowding, 2 Marks for plotting (1 Mark for at least 50% of points correctly plotted, full marks for all points correctly plotted), 1 Mark for a curve/line of best fit that is accurately drawn based on data trends, total = 6 Marks)</i>	6		
16. Measured about 10 mL of the solution into a clean, dry, test tube. <i>(Award 1 Mark for complete task, 0 otherwise, total = 1 Mark)</i>	1		
17. Rinsed the cuvette twice with approximately 1 mL amounts of the solution X and then filled the cuvette with the solution X. <i>(Award 1 Mark for rinsing the cuvette twice and 1 Mark for filling it with solution X, total 2 Marks or zero)</i>	2		
18. Capped the cuvette. Wiped the outside with a tissue and placed the cuvette in the Colorimeter and closed the Colorimeter lid. <i>(Award 1 Mark for capping, 1 Mark for wiping and 1 Mark for placing the cuvette)</i>	2		

<i>in the colorimeter and closing the lid, total 2 Marks or zero)</i>			
19. Took the transmittance reading and recorded in Table 2 <i>(Award 1 Mark or zero for taking and recording the reading correctly)</i>	1		
20. Determined the corresponding absorbance and recorded it in Table 2 <i>(Award 1 Mark for correct absorbance based on transmittance, 0 Marks otherwise)</i>	1		
21. Used the graph to determine the concentration of the solution X <i>(Award 1 Mark or zero for interpolation lines on the graph, 1 Mark for correctly determined concentration of solution (0.003 M), total 2 Marks)</i>	2		
22. Performed housekeeping - Cleaned the apparatus (beakers, test tubes, cuvette, measuring cylinder, test tube rack) - Wiped the work station clean - Disposed the waste as per the protocols <i>(Award 1 Mark for each, 0 Mark for undone tasks, total 3 Marks)</i>	3		
GRAND TOTAL	65		
ASSESSMENT OUTCOME			

The candidate was found to be:	
Competent ☐	Not yet Competent ☐
<i>(Please tick as appropriate)</i>	
<i>(The candidate is competent if the candidate obtains at least 50%)</i>	
Feedback from the Candidate:	
Feedback to the Candidate:	
Candidate Signature	Date:
Assessor's Signature	Date