



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CLD20502
COURSE TITLE : BASIC ENGINEERING WORKSHOP
PROGRAMME NAME : DIPLOMA IN CHEMICAL ENGINEERING TECHNOLOGY (FOOD)
DATE : 24 JANUARY 2026
TIME : 2:00PM - 4:00PM
DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Section A consist total of 60 marks. Answer ALL questions.
5. Section B consist of three questions. Answer TWO (2) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Refer to the attached Formula/ Appendies. ☐ Tick if applicable

THERE ARE 8 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 60 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

Ahmad is a student attending a practical session in the engineering workshop. Before starting his work, he puts on his **safety goggles, gloves, and safety shoes**. His instructor reminds everyone to **follow the safety rules** displayed on the workshop wall.

While using a machine, Ahmad makes sure he is **handling the tools correctly** and keeps his work area clean. He also checks that the machine is **switched off** before adjusting the workpiece. Because Ahmad follows the correct procedures and uses protective equipment, he is able to complete his task **safely without any accidents**.

This shows that when students **respect workshop safety rules**, accidents can be prevented and a safe working environment can be maintained.

- (a) List five general safety rules that should be followed in an engineering workshop.
(5 marks)
- (b) List five personal protective equipments (PPE) relevant to arc welding.
(5 marks)
- (c) Explain any two potential hazards associated with operating a lathe machine.
(10 marks)

Question 2

During a practical session in the engineering workshop, **Aiman**, a Diploma student, is assigned to fabricate a small metal component according to a given drawing. He uses several tools to help him finish his work. This workshop activity helps Aiman understand the **correct use of measurement tools** and the importance of **accuracy and precision** in engineering work.

- (a) State the specific function of the following measurement tools used in the workshop:

i. Ruler (2 marks)

ii. Measuring tape (2 marks)

iii. Outside caliper (2 marks)

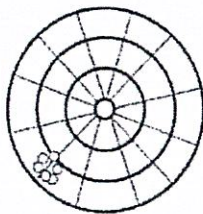
iv. Vernier caliper (2 marks)

v. Micrometer (2 marks)

vi. Protractor (2 marks)

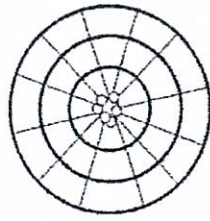
- (b) Identify the meaning of each condition shown below based on its accuracy and precision.

i.



(4 marks)

ii.



(4 marks)

Question 3

Alex is a junior technician at a metal fabrication plant. His supervisor has assigned him to join two heavy-duty steel plates for a structural frame. Before beginning the task, Alex must select the appropriate equipment and ensure the workstation is set up correctly. As he positions himself and prepares to make the first weld, he recalls his training regarding the transformation that occurs the moment the circuit is completed and the metal begins to fuse.

- (a) List TWO types of arc welding.

(4 marks)

- (b) State FOUR conditions that happened when the electrode struck an arc during arc welding process.

(8 marks)

- (c) Identify the safety precaution for each welding hazard below.

- i. UV radiation

(2 marks)

- ii. Electric Shock

(2 marks)

- iii. Fumes and Gas

(2 marks)

- iv. Burn

(2 marks)

SECTION B (Total: 40 marks)

Answer TWO (2) questions only.

Please use the answer booklet provided.

Question 1

Mastery of precision measurement using a Vernier caliper is a fundamental requirement for high-accuracy engineering. Precision ensures that all manufactured components meet strict quality standards and maintain dimensional consistency across production batches. Based on the provided diagrams, calculate and record the final reading for the Vernier caliper shown below.

- (a) 1 division at Vernier scale is 0.02 mm

Refer Below - Figure1 : Vernier Caliper with vernier scale 0.02 mm .

(5 marks)

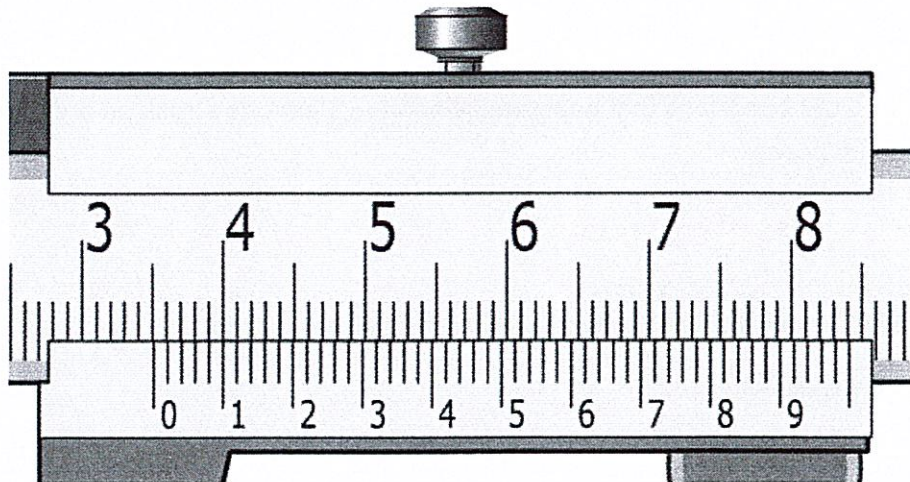


Figure 1: Vernier Caliper with vernier scale 0.02 mm

- (b) 1 division at Vernier scale is 0.05 mm

Refer Below - Figure2 : Vernier Caliper with vernier scale 0.05 mm .

(5 marks)

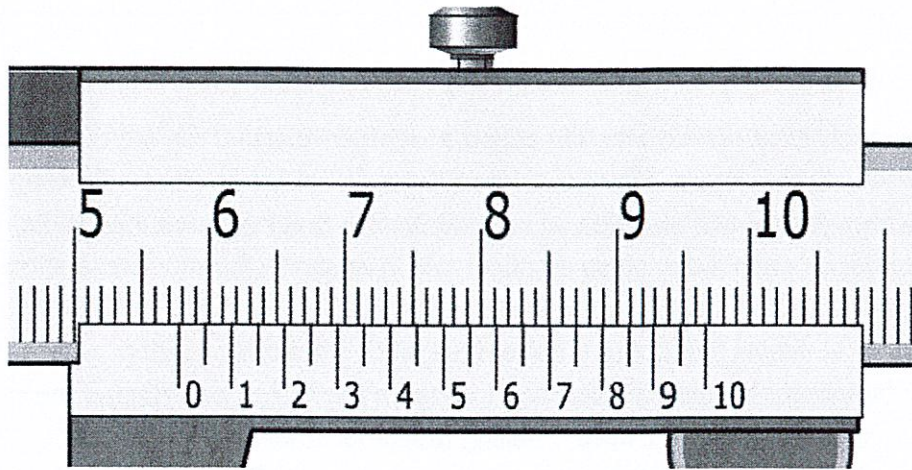


Figure 2: Vernier Caliper with vernier scale 0.05 mm

- (c) Referring to the diagram in Figure 3, outline **FIVE poor work ethics** practised in the workshop that may cause incidents/accidents related to safety and health.
Refer Below - Figure3 : .

(10 marks)

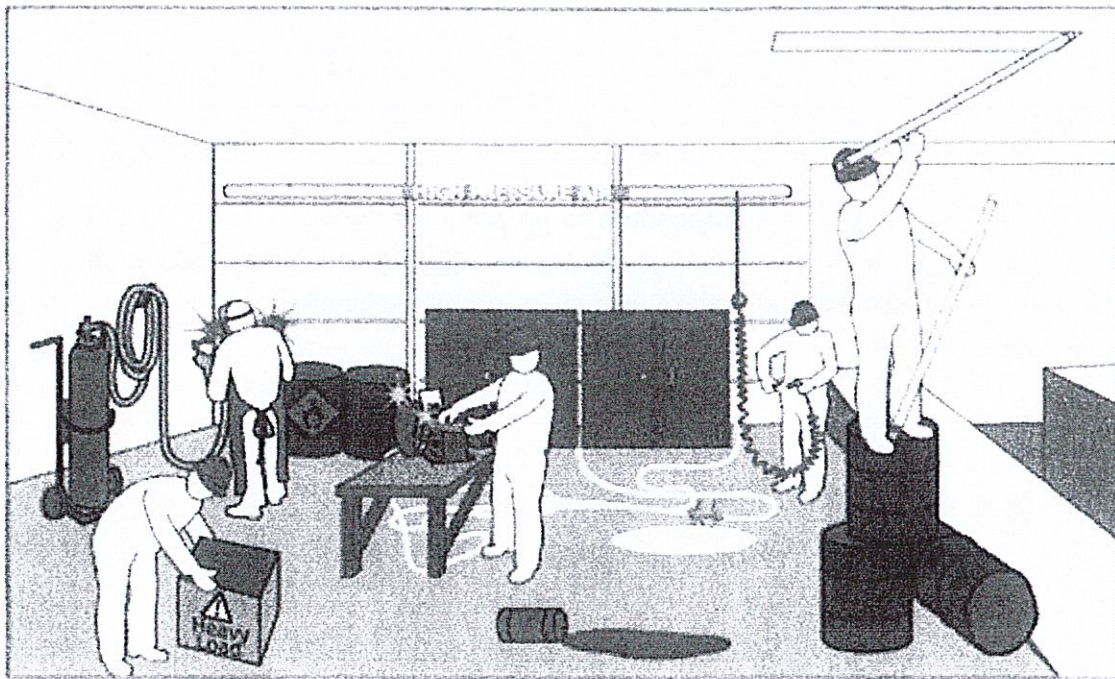


Figure 3:

Question 2

Khai is a lead technician tasked with fabricating a weather-resistant marine control box. The project begins with welding a heavy-duty steel base. Khai knows that **achieving a high-quality weld requires careful attention to several factors that influence the weld's strength and appearance, as each factor plays a critical role in ensuring the process is effective and free of defects.**

Next, he moves to **metal fitting and GI sheet metal container fabrication**, where he must **analyze key factors that influence accuracy** to ensure the box is watertight. Finally, for the precision-machined handle, Khai uses a **milling machine**, where he must accurately **set the X, Y, and Z (0,0,0) zero reference** to ensure every component fits together perfectly for the final assembly.

- (a) Explain three important considerations when performing metal fitting to ensure proper assembly and alignment.

(6 marks)

- (b) Describe three challenges faced during the fabrication of a GI sheet metal container.

(6 marks)

- (c) Explain the step-by-step procedure to properly set the X, Y, and Z (0,0,0) zero reference at a corner of workpiece before starting a milling process. Include sketches of end mill and workpiece to support your explanation.

(8 marks)

Question 3

At the Precision Structural Workshop, the lead inspector, Mr. Chen, is conducting a final audit of the new trainees. He emphasizes that producing a structural bond is not just about melting metal; it is a disciplined technical process. He tells the trainees, "In arc welding, **achieving a high-quality weld requires careful attention to several factors that influence the weld's strength and appearance. Each factor plays a critical role in ensuring the welding process is effective and free of defects.**" To pass the audit, trainees must demonstrate they can manage the equipment from the initial setup through to the final cleanup, while controlling every variable of the arc.

- (a) Describe the step-by-step process for setting up an arc welding machine, from equipment preparation until slag removal after welding.

(10 marks)

- (b) Explain five essential factors that contribute to achieving a good-quality weld in arc welding.

(10 marks)

END OF EXAMINATION PAPER

