



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JANUARY 2014 SESSION**

SUBJECT CODE : FGD 12102
SUBJECT TITLE : METROLOGY
LEVEL : DIPLOMA
TIME / DURATION : 2 HOURS
DATE :

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. Please write your answers on the answer booklet provided.
 4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
 5. This question paper consists of **TWO (2) sections**. Section A and B. Answer all questions in Section A. For section B answer **TWO (2) questions only**.
 6. Answer all questions in English.
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THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

- (a) Illustrate the concept of metrology in manufacturing industries. (3 marks)
- (b) Categorize **SEVEN (7)** basic units' symbols and physical quantities of Metric System. (7 marks)
- (c) Justify the methods of measurement for:
i) Measuring
ii) Gauging (6 marks)
- (d) Differentiate between precision and accuracy of measurement. (4 marks)

Question 2

- (a) Explain the concept of direct measurement in metrology. (3 marks)
- (b) Describe **FIVE (5)** types of instrument for indirect measurement. (5 marks)
- (c) Referring to the diagram in figure(s) below writes the readings of the followings instruments:

i.

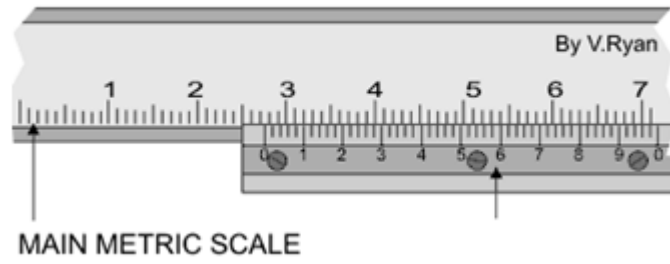


Figure 1: Vernier caliper

(4 marks)

ii.

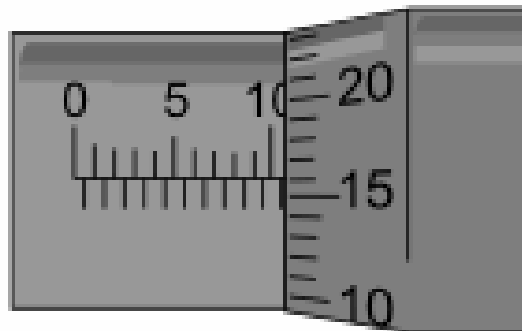


Figure 2: Micrometer

(4 marks)

iii.



Figure 3: Universal Bevel Protractor

(4 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO (2) questions only.

Please use the answer booklet provided.

Question 3

- a) Referring to the drawing in Figure 4 below interpret the Feature Control Frame (FCP) accordingly.

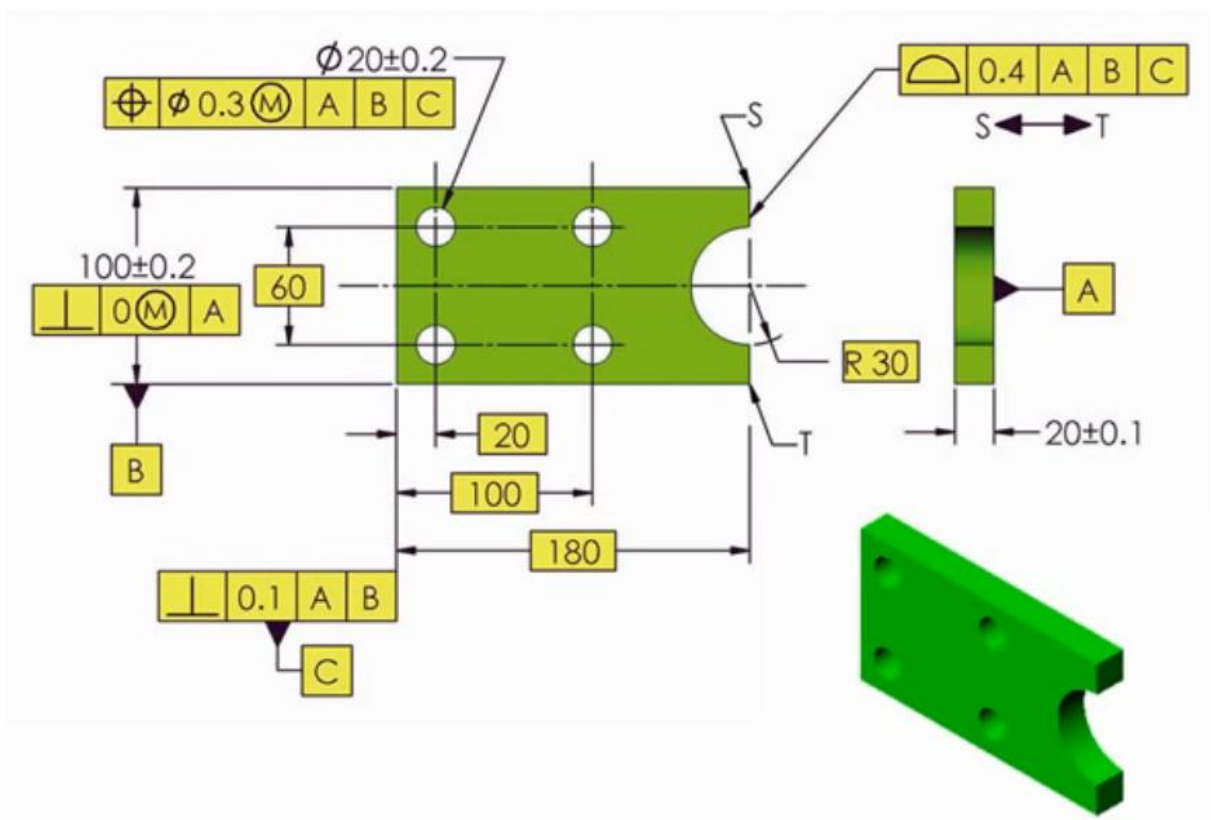


Figure 4: Feature Control Frame (FCP)

(20 marks)

Question 4

Inspection using Optical Comparator or Profile Projector provides manufacturers with a way to ensure the parts are in good condition.

- a) With aid of diagram determine the length of one light wave and give your explanation regarding the inspection.

(12 marks)

- b) Analyze the magnification concept of Optical Comparator application.

(8 marks)

Question 5

Coordinate measuring machine is the most technologically advanced measuring equipment to be used in the manufacturing industries.

- a) Describe the cantilever-type Coordinate Measuring Machine (CMM).

(4 marks)

- b) Explain the usage of probe in measurement using CMM.

(8 marks)

- c) List out **FOUR (4)** advantages of CMM applications.

(8 marks)

END OF QUESTION