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**CONFIDENTIAL**

**SET A**

# UNIVERSITI KUALA LUMPUR
## Malaysia France Institute

## FINAL EXAMINATION

## JANUARY 2014 SESSION

| | | |
|---|---|---|
| **SUBJECT CODE** | : | **FGD 30102** |
| **SUBJECT TITLE** | : | **INSTRUMENT CALIBRATION** |
| **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.**

**THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

**SECTION A (Total: 60 marks)**

**INSTRUCTION: Answer ALL questions.**

**Please use the answer booklet provided.**

**Question 1**

(a) Explain the purposes of re-calibration of an instrument.

(4 marks)

(b) Describe the process of calibration for measuring instrument in accordance to standards procedure.

(8 marks)

(c) Evaluate the requirement for verification of measuring gauges.

(8 marks)

**Question 2**

(a) Describe the material types and material hardness for micrometer measuring faces.

(6 marks)

(b) With aids of diagram, describe truncated threads for micrometer screw.

(10 marks)

(c) Name standard of references for instrument calibration besides ISO.

(4 marks)

**Question 3**
***(Please refer Table 1 to answer question 3)***

(a) Explain the basic requirement for calibration data

(4 marks)

(b) Calculate average readings and measurement error.

(6 marks)

(c) Write a report and plot graph showing the measurement average versus measurement error.

(10 marks)

| Date calibrated:01/12/2014 | | Item: External Micrometer | | Item serial no: MM 22334 | |
|---|---|---|---|---|---|
| Standard: Gauge Blocks | | Standard Serial no: 9468 | | Report no: C010112/6 | |
| Dry bulb reading: 21.5°C | | R.H:68% | | Location: Metrology Lab | |
| Wet bulb reading:17.5°C | | Time: 0830 hrs | | Calibrated by: Mr. X | |
| Standard reading in mm | **1st RUN** | | **2nd run** | | **3rd run** | |
| | | | | | | |
| 0 | 0 | | 0 | | 0.002 | |
| 2.5 | -0.002 | | 0.003 | | 0.001 | |
| 5.8 | 0.002 | | 0.002 | | 0 | |
| 7.2 | -0.003 | | 0 | | 0.002 | |
| 10 | 0.001 | | 0.002 | | 0 | |

Table 1: Calibration data

**SECTION B (Total: 40 marks)**

**INSTRUCTION:**
**Answer TWO (2) questions only.**

**Please use the answer booklet provided.**

**Question 4**

With aid of diagram elaborate the methods of testing flatness of the measuring faces for spindle and anvil.

(20 marks)

**Question 5**

Write calibration procedures for testing squareness and parallelism of a precision Vernier caliper ranges from 0- 300mm.

(20 marks)

**Question 6**

Describe standard operating procedures to inspect sensitivity and repeatability of reading for dial gauges with 0.001 mm accuracy.

(20 marks)

**END OF QUESTION**