



**UNIVERSITI KUALA LUMPUR  
Malaysia France Institute**

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**FINAL EXAMINATION  
JANUARY 2010 SESSION**

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**SUBJECT CODE** : FGB 20203  
**SUBJECT TITLE** : CNC AND CAD/CAM TECHNOLOGY  
**LEVEL** : BACHELOR  
**TIME / DURATION** : 9.00am – 11.30am  
( 2.5 HOURS )  
**DATE** : 30 APRIL 2010

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**INSTRUCTIONS TO CANDIDATES**

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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 questions paper consists of **SIX (6)** questions. Answer **FIVE (5)** questions only.
  6. Answer **ALL** questions in English.
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**THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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**INSTRUCTION: Choose only 5 questions to answer.**  
**Please use the answer booklet provided.**

**Question 1**

Describe state 4 differences between Conventional machine , Numerical Control machine and Computer numerical control machine

(12 Marks)

Gives 4 advantages and 4 disadvantages of CNC machine.

(8 Marks)

**Question 2.**

Please state the definition and the usage at the stated block format  
N, G, X, Y, Z, I, J, K, F, H, S, T, M.

(9 Marks)

Explain the definition of Machine origin and work coordinates system.

(6 Marks)

Explain how to set the offset of CNC lathe machine in x and z directions

(5 Marks)

**Question 3**

Write down at least 5 possible causes of poor finishing at the work piece.

(6 Marks)

Write down at least 4 possible causes of tool breakage at the tool bits.

(6 Marks)

Explain the terms backlash and how it is minimized in CNC machine tools.

(8 Marks)

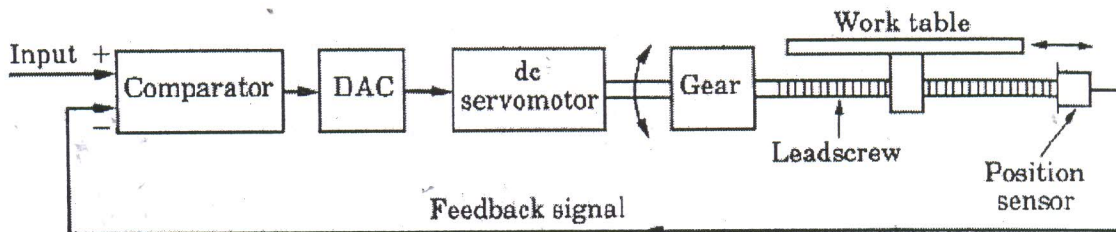
**Question 4**

A CNC machine is equipped with an open loop positioning system. The stepping motor used has 300 steps angles. The output shaft directly coupled to a lead screw with a pitch= 2 mm. The worktable of positioning system is driven by the lead screw. The table must move to the distance of 10 mm from its present position at a travel speed of 0.5 m/min. Determine;

- i) How many pulses are required to move the table to the specified distance. (12 Marks)
- ii) The required motor speed and pulse rate ratio to achieve the desired table speed. (4 Marks)

**Question 5**

A CNC worktable is driven by a closed-loop positioning system consisting of a dc servomotor, lead-screw and optical encoder (position sensor) as shown in Figure 1 below. The lead screw has a pitch of 3mm and is couple to the motor shaft with a gear ratio 5:1 (5 turns of motor for 1 turn of the lead screw). The optical encoder generates 180 pulses/rev of the lead screw. The table has been programmed to move a distance of 100mm at feed rate of 0.5m/min.



**Figure 1**

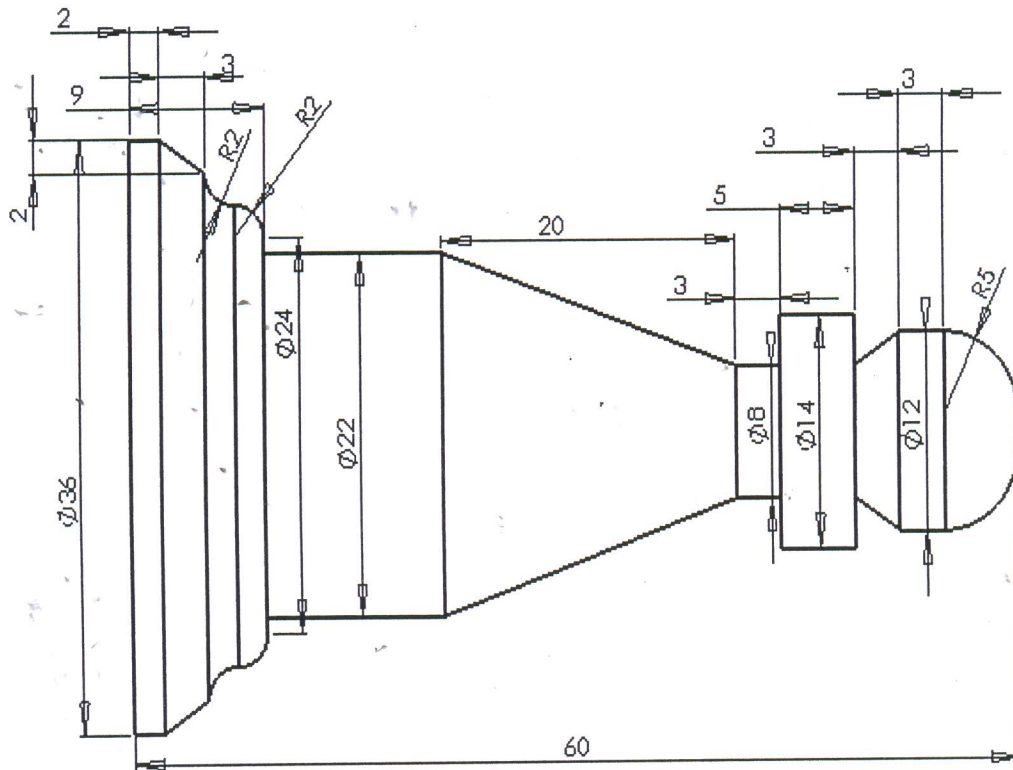
Determine

- a) How many pulses are received by the control system to verify that has moved exactly 75mm. (8 marks)
- b) Pulse rate (6 marks)
- c) Motor speed that corresponds to the specified feed rate. (6 marks)

**Question 6**

1. Write down in table form the absolute coordinates (6 Marks)
2. Write the program of the drawings in figure 2. (10 Marks)
3. Explain the tool use ( minimum 3 tools ) and its usage (4 Marks)

**Figure2**



Given information:

Drawing: Not to scale

Raw material: Aluminium Alloy, diameter 36mm x 70mm billet

**END OF QUESTION**