EME-031

B. Tech.

(SEM. VII) (ODD SEM.) THEORY EXAMINATION, 2014-15

COMPUTER AIDED MANUFACTURING

Time : **3 Hours]** [Total Marks : **100**

1 Attempt any FOUR parts : 5×4=20

a) Briefly describe the three phases of analog to digital conversion process with neat block diagram.

b) What is adaptive control? Draw a block diagram showing the relationship of adaptive control software to APT program.

c) What are different interpolation schemes possible and explain any one of it.

d) The work table of a positioning system is driven by a lead screw whose pitch = 60mm. the lead screw is connected to the output shaft of a stepper motor through a gear box whose ratio is 5:1 (five turns of the motor to one turn of the lead screw). The stepper motor has 48 step angles. The table must move a distance of 250 mm from its present position at a linear velocity = 500 mm/min. determine how many pulses are required to move the table the specified distance.

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e) What is the difference between a closed-loop control system and an open-loop control system?

f) Compare Hardware Interpolator with Software Interpolator of DDA technique.

2 Attempt any TWO parts : 10×2=20

a) Briefly explain the ten strategies for automation and write short notes on automation migration strategy.

b) What is the common NC machine tool available for the traditional machining operation?

c) I. Write the basic elements of an automated system and basic type of control system.

II. What is the difference between fixed automation and programmable automation?

3 Attempt any TWO parts : 10×2=20

a) Write the complete APT part program to perform the profile milling operation for the part drawing in FIG 1. Tooling =20mm diameter end mill with two teeth, cutting speed =125mm/min. and feed = 0.10mm /tooth. The part is 10mm thick. Use the lower left corner of the part as the origin in the x-y axis system.
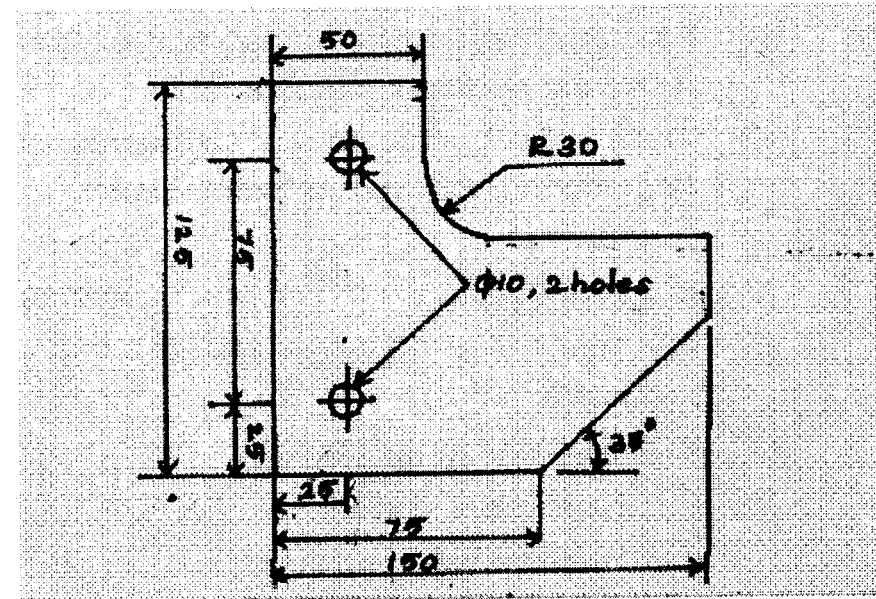

FIG 1

The two holes in the part have already been drilled and will be used for clamping the part during milling. Postprocessor call statement is MACHINE/MILL, 01

b) Write short notes on manual part programming with example.

c) What are some of the benefits usually cited for NC compared to using manual alternative methods? Enlist any ten G codes and M codes.

4 Attempt any TWO parts : 10×2=20

a) What is Computer Integrated Manufacturing (CIM) ? Mention various elements of CIM and functions of CIM.

b)   With a block diagram explain the main building blocks of FMS and problems in implementing it.

c)   What is generative process planning? Compare retrieval and generative process planning methodologies.

5   Attempt any TWO parts :   10×2=20

a)   Write briefly about the various methods for robot programming

b)   Write short notes on the following :

    I.   Economics of robotics

    II.   Features of VAL programming

c)   Discuss briefly the use of sensors and artificial intelligence for intelligent manufacturing.