Answer all the following Questions

QUESTION 1 .... (10)

1-The two axes of an x-y positioning table are each driven by a stepping motor connected to a leadscrew with a 4:1 gear reduction. The number of step angles on each stepping motor is 200. Each leadscrew has a pitch = 5.0 mm and provides an axis range =400.0 mm. There are 16 bits in each binary register used by the controller to store position data for the two axes. (a) What is the control resolution of each axis? (b) What are the required rotational speeds and corresponding pulse train frequencies of each stepping motor in order to drive the table at 600 mm/min in a straight line from point (25, 25) to point (300,150)? Ignore acceleration.

QUESTION2 .... (15)

1. Define the following: NC, CNC, DNC, APT, EIA, RAM, ROM, PRZ, MRZ and CPU.
2. What are the advantages and disadvantages of CNC machines?

QUESTION 3 .... (20)

- Explain (*in More Details*) CNC machine components.

QUESTION 4 .... (5)

- Explain the following EIA standard line format in CNC machine tool

  N10 G02 X33.3 Y16.8 Z12.1 R20 S920 F15 M03 EOB

QUESTION 5 .... (5)

Explain G81 and G84

QUESTION 6 .... (15)

Write a part program using G and M codes for machining the following CNC steel part.
- The milling parameters are:

Feed rate 80 mm/min

Rotational speed 1250 rpm

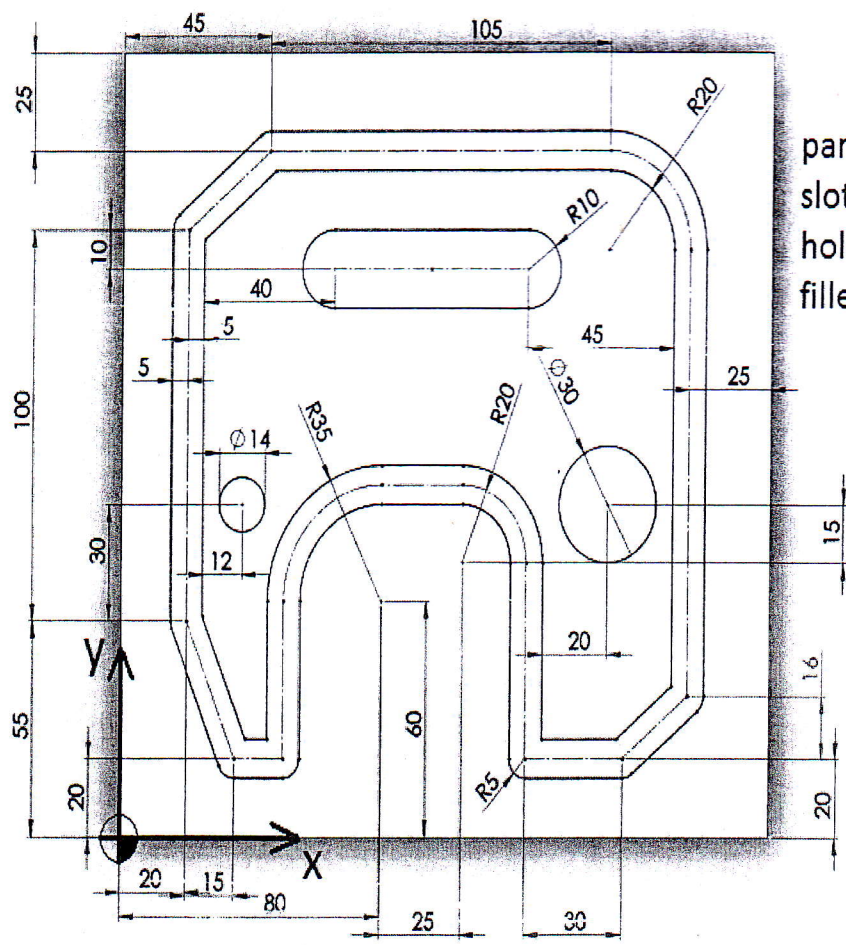Cutter diameters as shown in table
  - Drilling parameters are:

Feed rate 50 mm/min

Drill speed 800 rpm

Twist drill diameters as shown in table

- ➢ Coolant must be used.
- ➢ Assume any other required data.

Tools	Type	Diameter
T1	End mill	10 mm
T2	End mill	20 mm
T3	Twist drill	14 mm
T4	Twist drill	30 mm

part (200x200x30) mm
slots depth 15 mm
holes depth 20 mm
fillets 5 mm