

Third Year

Numerical Control of Machine Tools

Answer the Following Questions

Q(1) (25 Marks) :

- a) Describe in detail the four APT statements in the APT language illustrating your answer with different examples.
- b) Define & determine the following with neat sketches & through scientific statements:
1. Incremental Programming.
 2. Canned cycles for drills.
 3. Cutter Compensation.
 4. Mirror Image.
 5. The relationship of I & J modifiers to X & Y axes, give example to illustrate your answer.

Q(2) (18 Marks) :

Write the computer program for the part shown in Fig(1) for the CNC vertical milling machine tool, illustrating the meaning of each step. Depth of cut is 5.0 mm. Assume any missing data.

Q(3) (17 Marks) :

Write the computer program for the part shown in Fig(2) for the CNC lathe machine tool, illustrating the meaning of each step. Assume any missing data.

Q(4) (10 Marks) :

Write a complete APT program for the part shown in Fig (3). Diameter of the cutter is 10mm, the intolerance and out tolerance = 0.01mm, spindle speed = 1500 r.p.m, and feed rate = 50 mm/min. Coolant is used.

Wishing the best of luck for all of you
Prof.Dr.Tawfik Tawfik El-Midany

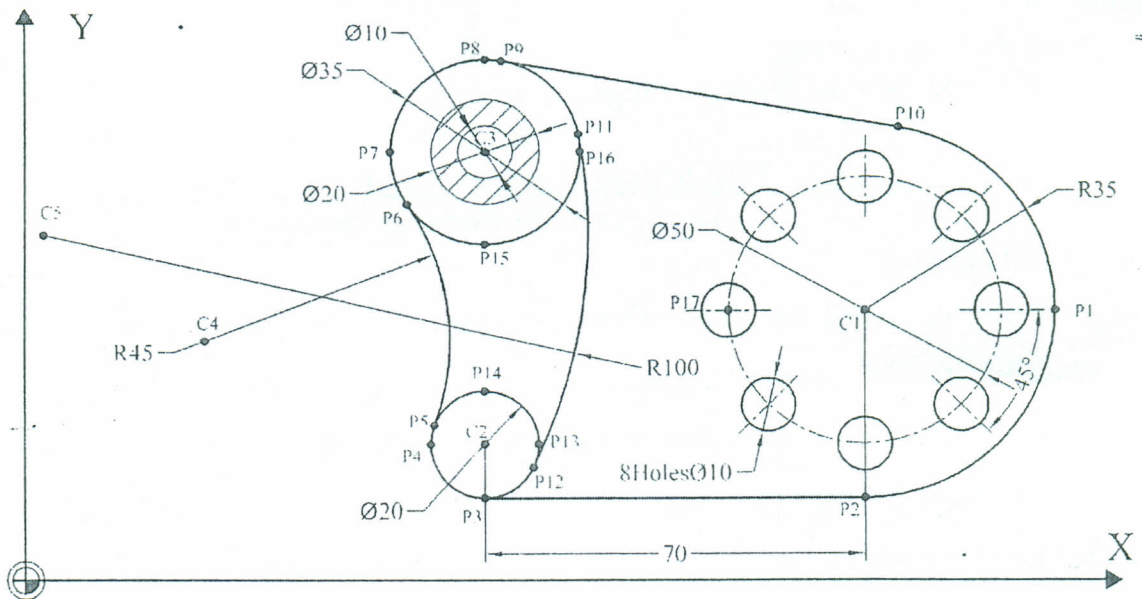


Fig.1

Point	Coordinates	Point	Coordinates
P1	(135 , 50)	P12	(39 , 20.5)
P2	(100 , 15)	P13	(40 , 25)
P3	(30 , 15)	P14	(30 , 35)
P4	(20 , 25)	P15	(30 , 62.5)
P5	(21 , 29)	P16	(47.5 , 80)
P6	(16 , 74.5)	P17	(75 , 50)
P7	(12.5 , 80)	C1	(100 , 50)
P8	(30 , 97.5)	C2	(30 , 25)
P9	(34 , 102)	C3	(30 , 80)
P10	(108 , 84)	C4	(-20 , 47.5)
P11	(47 , 89)	C5	(-50 , 66)

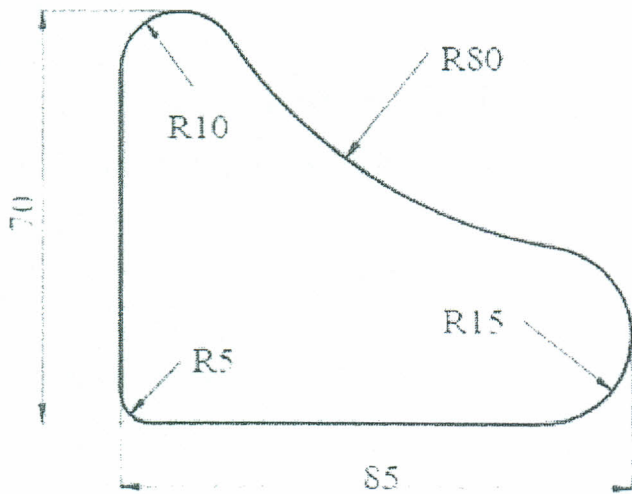


Fig.3

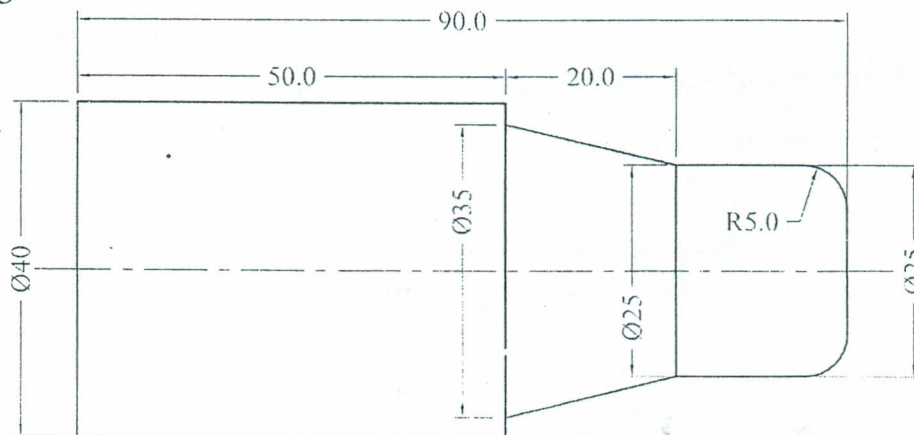


Fig.2

