

B. TECH
(SEM VII) THEORY EXAMINATION 2018-19
COMPUTER AIDED MANUFACTURING

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x 10 = 20**

- a. What are the basic elements of Automation?
- b. What is open loop and closed loop control system?
- c. Differentiate between CNC and DNC machines.
- d. What are the basic components of NC system?
- e. How Automatic Tool Changer (ATC) works?
- f. Explain any two feedback devices.
- g. Write any four codes for canned cycle used in CNC part programming.
- h. What are the different types of statements in APT language?
- i. What are the advantages of Group Technology?
- j. What are the laws of robots?

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

- a. What are different types of automated manufacturing system? Discuss in brief with suitable examples.
- b. What are the different types of co-ordinate system used in NC system? Explain in brief with suitable examples.
- c. What is the difference between liner and circular interpolation? Explain each term in the following block of information.
 N015 G91 G02 X50 Y62.5 I15 J25
 Also calculate the arc radius in the above sequence.
- d. Write NC part program for the component on lathe as shown in figure 1. All dimensions are given in mm. Diameter and length of raw material is 22 mm and 40 mm. Assume speed = 800 RPM and feed = 200 mm/min.

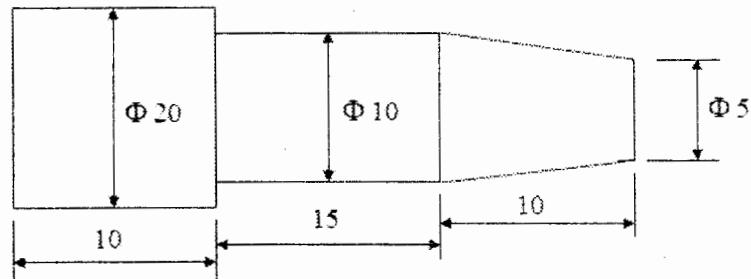


Figure. 1

- e. Define computer aided process planning. Discuss its advantages and disadvantages. Also discuss under what kind of environment should generative process planning be used instead of variant process planning?

SECTION C

3. **Attempt any one part of the following:** **10 x 1 = 10**

- (a) Define “Automation”. Discuss the importance and need of automation in manufacturing industry.
- (b) Write down the shorts notes on the following:
 - (i) Automated Flow Lines
 - (ii) Automated Guided Vehicles (AGVs)

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

- (a) Discuss the factors by which accuracy and productivity of NC machines can be increased compared to conventional machine.
- (b) What are the different input media used in NC machine also discuss their advantages and disadvantages over each other?

5. Attempt any *one* part of the following: **10 x 1 = 10**

- (a) What are the requirements of an interpolator? Explain the working and principle operation of a Digital Differential Analyzer (DDA), used for linear interpolation.
- (b) What is adaptive control system? Discuss the ACC and ACO types of adaptive control with the help of suitable examples.

6. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Illustrate the following with the help of a suitable sketch:
(i) Part surface (ii) Drive surface (iii) Check surface
Also explain how these are incorporated in APT motion statement?

(b) Write geometry and motion statement in APT program of the component made of mild steel of thickness 20 mm as shown in figure 2. All dimensions are in mm.

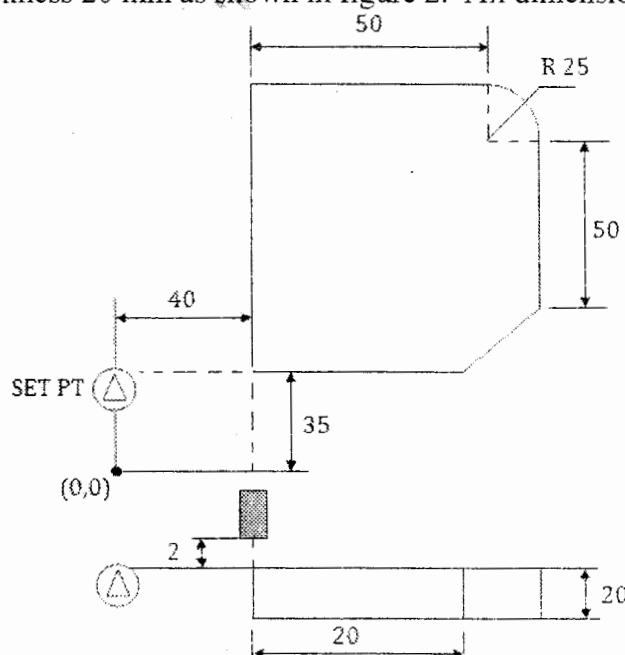


Figure . 2

7. **Attempt any one part of the following:** **10 x 1 = 10**

(a) State and explain the principle objectives of FMS? Also give the area of applications of FMS in industries with a suitable block diagram.

(b) Explain the following term related to robot:

(i) Accuracy, (ii) Work Volume, (iii) Resolution, (iv) Repeatability.