| **Paper Code: ME-031** | **Roll No.** | | | | | | | | | |
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**B.TECH.**
**SEVENTH SEMESTER EXAMINATION, 2016-17**
**COMPUTER AIDED MANUFACTURING**

[Time: 3 hrs.] [Max. marks: 100]

**Note:** Attempt all questions. All questions carry equal marks.

**1.** Attempt any four parts of the following: - **(5x4=20)**

(a) In factory operations, list the situations where manual labor is usually preferred over automation.
(b) Explain what is meant by levels of automation in manufacturing? NC belongs to what level of automation?
(c) Compare the important features of NC and CNC systems.
(d) Describe open loop and closed loop system used in NC machines.
(e) Discuss the reasons for higher accuracy and productivity obtainable from NC machines.

**2.** Attempt any four parts of the following: - **(5x4=20)**

(a) Discuss the advantages and disadvantages of:
(i) Incremental and absolute programming, (ii) Floating and fixed zero

(b) What is the purpose of using canned cycles? Three holes of diameter 15 mm are to be drilled as follows:

| | | |
|---|---|---|
| Absolute locations: | A | 25,40 (mm) |
| | B | 60,55 (mm) |
| | C | 80,75 (mm) |
| Feed | 150 mm/min. | |
| Drill speed | 1400 rpm | |
| R-plane | 2 mm above the work surface | |
| Overrun | 1 mm | |
| Work thickness | 20 mm | |

Prepare a part programming manuscript for canned drilling cycle.

(c) Discuss the advantages and disadvantages of using paper tape for NC's. What instructions are normally included in a block of part program in WAF?

(d) Write down the APT geometry statements for the following:
(i) Line: Tangent to two circles $C_1$ and $C_2$.
(ii) Circle of radius R: Tangent to two lines $L_1$ and $L_2$.

(e) With the help of a suitable sketch illustrate the following:
(i) part surface, (ii) drive surface, (iii) check surface

**3.** Attempt any two parts of the following:- **(10 x2 = 20)**

(a) Briefly explain and describe with neat sketches, the principle and working of:
(i) an encoder, (ii) stepper motor

(b) Describe the automatic speed control of DC motor with closed loop feedback with the tachometer and develop the formula for angular speed.

(c) Explain with the help of diagram/table the principle and working of a Circular Interpolator.

**4.** Attempt any two parts of the following: - **(10 x2 = 20)**

(a) Briefly explain the guidelines for implementing group technology. Explain the advantage achieved by group technology and its limitations.

(b) What are the advantages and disadvantages of using backward planning? Discuss the potential difficulties of implementing a generative process planning system.

(c) Define FMS clearly by showing the various desirable features/components that are required for proper functioning with reference to current day manufacturing scene.

**5.** Attempt any two parts of the following:- **(10 x2 = 20)**

(a) Describe in brief, the characteristics of robot controllers used for:
(i) limited sequence control, (ii) play back with continuous path control

(b) Write briefly about various methods for robot programming. Explain features of VAL robot programming.

(c) Define the term AI. Describe the forward and backward reasoning methods used in expert system. Give an example of the same.