

[This question paper contains 5 printed pages.]

Your Roll No.

3203

J

MEM (PE)

Paper—ME.665

COMPUTER AIDED MANUFACTURE

Time : 3 Hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

1. (a) Define NC, CNC and DNC with suitable examples in relation to Computer Aided Manufacturing. 4
- (b) Discuss parameters in detail and neat sketches which are responsible for reducing or eliminating the activities of operators in CNC technology. 6
- (c) Elaborate advantages and limitations of computer aided manufacturing. Give suitable examples. 5
- (d) How complex shaped components are easier to machine on CNC machine tools ? Discuss with suitable examples and sketch. 5
2. (a) Elaborate in detail factors which a production controller would consider while preparing a feasibility report to adopt CNC technology in the industry for the first time. 5

- (b) Discuss in detail sequential engineering and concurrent engineering in relation to CAM. How do these two differ ?
What is alternative terminology for concurrent engineering? 5
- (c) Elaborate the term 'product development cycle'. 4
- (d) What is Computer Integrated Manufacturing ? Discuss CIM hardware and software. Discuss the evolution of computer integrated manufacturing with neat sketches and suitable examples. 6
3. (a) Discuss the enabling technologies of CIM using suitable diagrams. 5
- (b) What is an Industrial Robot ? Discuss degree of freedom in robots and its importance with examples. 5
- (c) Elaborate various types of sensors used in robots. What are different configurations of robots ? Discuss in detail.
Also enlist various applications and limitations of robots. 10
4. (a) What is group technology ? Define coding and classification. What is production flow analysis ? How is it useful in computer aided manufacturing ? 5
- (b) Define Computer Aided Process Planning. Discuss its various types with examples.

- Elaborate future trends of CAPP. Also discuss advantages and limitations of CAPP. 10
- (c) What is Parallel Programming ? How is it useful in CNC technology? 5
5. (a) Discuss the role of CAM in precision sheet metal industries alongwith applications and limitations. 5
- (b) Describe either CNC Turret Punch Press or CNC Press Brake with a neat sketch, applications, major design parameters and safety aspects. 5
- (c) Elaborate any *five* with sketches w.r.t. CAM in sheet metal industries : 10
- (i) Lifter table,
 - (ii) NC Support roller,
 - (iii) Automatic loading/unloading positioning equipment,
 - (iv) Auto storage and retrieval system,
 - (v) Sheet thickness detector,
 - (vi) Auto indexing,
 - (vii) Automatic operation stop function.
6. (a) What are cutter compensation and tool length compensation ? Explain with neat sketches. 5
- (b) Distinguish between Flexible Manufacturing Cell and Flexible Manufacturing System.

Elaborate major benefits of using FMS in industries.

Draw a typical layout of FMS used in industries.

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- (c) Enlist various elements of FMS alongwith their major features. 4

- (d) Discuss tool crib in industries. Draw a typical block diagram of advanced FMS control.

Also discuss system management in FMS, tool management and controlling precision. 6

7. (a) What is Computer Optimized Manufacturing ? Discuss its applications and limitations. 3

- (b) Name any one multifunctional program based on state of art principles and used in computer optimized manufacturing.

Also elaborate its capabilities with suitable example.

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- (c) What is APT ? Discuss its major statements with examples : Enlist any ten GCodes and MCodes.

Write an APT program to turn a cylindrical component on CNC lathe.

Length of component is 600 mm and has diameters

100 mm, 125 mm and 160 mm at equi-distant of 200

mm. Material of the component is mild steel.

Assume any other missing data. 6

- (d) Write short notes on following : 4
- (i) Computer Aided Design and its typical flow chart.
 - (ii) Acceptance tests in CNC.
 - (iii) Accuracy, repeatability and resolution.
 - (iv) Point to point and continuous path control.