

E-206

B.E. VII Semester (Main & Re) Examination Dec. 2015

Computer Aided Manufacturing

Branch : Mechanical Engg.

Time: Three Hours]

[Max. Marks : 75

[Min. Marks : 30

Note : Attempt **all** the questions of Section-A, **Four** from Section-B and **three** questions from Section-C.

Section-A

(Objective Type Question)

Note : This Section will contain **ten** objective type questions. They may be fill in the blanks, True/False or Multiple Choice Type. 1.5×10=15

1. In Numerical control machines, motion is controlled along multiple axes, normally at least x and y, and a tool spindle that moves in z. (True/False)
2. DNC stands for :
 - (a) Direct Numerical control
 - (b) Distributed numerical control
 - (c) Both (a) and (b)
 - (d) None of them
3. Control loop unit of M.C.U is always:
 - (a) A hardware unit
 - (b) A software unit
 - (c) A control unit
 - (d) None of them
4. Rotation about Z-axis is called:

(a) A-axis	(b) B-axis
(c) C-axis	(d) None of them

P.T.O.

5. Cellular manufacturing uses the information of :
 - (a) Part matrix incidence matrix
 - (b) Classification and coding
 - (c) Coding structure
 - (d) None of them
6. FMS stands for _____
7. Robots are specified by
 - (a) Pay load
 - (b) Dimension of work envelope
 - (c) Degree of freedom
 - (d) All of them
8. Choose the basic element for an automated machine tool :
 - (a) Logic
 - (b) NC taps programming
 - (c) Software
 - (d) Work stations
9. APT stands for _____
10. MCU is the main brain behind the operation of a :
 - (a) NC machine tool
 - (b) CNC machine tool
 - (c) DNC machine tool
 - (d) None of them

Section-B

(Short Answer Type Question)

Note : This section will contain **six** questions. Students will ask to attempt any **four** questions out of six questions. $6 \times 4 = 24$

1. Explain the functions of machine control unit of a NC machine and how the axis of motion are determined.
2. Define computer aided manufacturing. Explain the implementation of a typical CAM process on a CAM system.

3. Differentiate clearly in all aspects, between CNC and DNC.
4. Explain the different approaches used in CAPP.
5. What is parallel programming? How is it useful in CNC technology?
6. What is an Industrial robot? Discuss degree of freedom in robots and its importance with suitable examples and sketches.

Section-C

(Long Answer Type Questions)

Note : This Section will contain **five** questions. Students will ask to attempt any **three** questions out of **five** questions. $12 \times 3 = 36$

1. Explain off line use of computers and computer process interface in detail.
2. Explain manufacturing system concepts in detail.
3. Discuss the major elements of FMS. What is meant by palletising? Discuss the importance of palletising in FMS stations.
4. Specify the three principal classification of geometric modelling system and write about each of them in detail.
5. Write short notes on the following :
 - (a) CAPP
 - (b) Product development cycle
 - (c) NC support roller

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E-335

B. E. VII Semester (Main & Re-Exam.) Examination December – 2016

COMPUTER AIDED MANUFACTURING

Branch : Mech.

Time : Three Hours]

[Maximum Marks : 75

[Minimum Marks : 30

Note : Attempt all the questions of Section – A, four from Section – B and three questions from Section – C.

SECTION – A

[Marks : $1.5 \times 10 = 15$

(Objective Type Questions)

Note : The Section will contain ten Objective Type Questions. They may be fill in the blanks. True/False or Multiple Choice Type.

1. The phenomenon of stick-slip is more predominant when the sliding speed is :
(a) Zero (b) Low
(c) High (d) Equal to the cutting speed
2. The Machine tool in which the system of continuous path numerical control is applied is the :
(a) Shaping Machine (b) Grinding Machine
(c) Milling Machine (d) Drilling Machine
3. In an NC machine programmed instructions are stored on :
(a) Punched tape
(b) Head box
(c) Graphic terminal

P.T.O.

4. Brushless servo motors are universally used in :
(a) NC Machine Tool
☒ (b) CNC Machine
(c) DNC Machine Tool
(d) None of these
5. NC tooling is an important element in achieving proper geometry. ☒ True/False
6. The heart of automobile technology is :
(a) Robots
(b) Computer
(c) Sensor
☒ (d) Control System
7. Which one of the following is considered a high-level language ?
(a) Machine language
(b) FORTRAN
(c) Assembly language
☒ (d) None of the above
8. All computers use the same set of binary code :
☒ (a) True
(b) False
9. Flexible Manufacturing System (FMS) allows for :
(a) Automated design
(b) Efficient factory management
☒ (c) Rapid tool design and tool manufacturing
~~(d) Rapid and inexpensive product change~~

10. Industrial Automation usually results in :

- (a) Loss of job
- (b) Increase in job
- (c) No change in the total no of jobs
- (d) None of the above

SECTION – B

[Marks : $6 \times 4 = 24$]

(Short Answer Type Questions)

1. Explain the working of direct numerical control machine with the help of a neat diagram.
2. What do you understand by N C Coding ? Explain the ISO and EIA standard codes for N C coding.
3. What is group technology ? How is it useful in FMS.
4. What do you understand by Adaptive control of manufacturing process ? Discuss in details.
5. Explain and describe with neat sketches, the principle and working of stepper motor.
6. Compare Robots and CNC machines.

SECTION – C

[Marks : $12 \times 3 = 36$]

(Long Answer Type Questions)

1. Explain manufacturing system concepts in details.
2. Define the term AI. Describe the forward and backward reasoning methods used in expert system. Give an examples of the same.
3. Explain the purpose of position and speed control of NC Machine.

The work table of a N. C. Machine is driven by a stepper motor coupled directly to the lead screw of pitch 5.00 mm. The table is required to move 300 mm. From its present

position at a speed of 600 mm/mm. How many pulses are required to move the table and the required pulse rate ? Stepper motor has step angle of 180.

4. Describe in brief, the characteristics of robot controller used for :

- (i) Limited sequence control and
- (ii) Play back with continuous path control

5. Give atleast *five* applications of robots in each of the following operations :

- (i) Material handling and transfer
 - (ii) Processing
 - (iii) Assembly and inspection
 - (iv) Storage and retrieval
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B. E. VII Semester Examination, December-2017

COMPUTER AIDED MANUFACTURING

Branch : Mechanical Engg.

(Main & RE Exam)

Time : Three Hours]

[Maximum Marks : 75

[Minimum Marks : 30

Note : Attempt all questions from Section - A, four questions from Section - B and three questions from Section - C.

SECTION - A

(Objective Type Questions)

1. In CNC machine tool, the part program entered into the computer memory
 - (a) can be used only once
 - (b) can be used again and again
 - (c) can be used again but it has to be modified every time
 - (d) cannot say
2. In an NC Machine programmed instructions are stored on _____
3. Several machine tools can be controlled by a central computer in :
 - (a) NC (Numerical Control) machine tool
 - (b) CNC (Computer Numerical Control) machine tool
 - (c) DNC (Direct Numerical Control) machine tool
 - (d) CCNC (Central Computer Numerical Control) machine tool

P. T. O.

4. The machine tool, in which calculation and setting of the operating conditions like depth of cut, feed, speed are done during the machining by the control system itself, is called :
- (a) Computer Numerical Control System
 - (b) Direct Numerical Control System
 - (c) Machining Centre System
 - (d) Adaptive Control System
5. The Robot designed with Polar coordinate systems has
- (a) Three linear movements
 - (b) Three rotational movements
 - (c) Two linear and one rotational movement
 - (d) Two rotational and one linear movement
6. The Robot designed with Cartesian coordinate systems has
7. During the execution of a CNC part program block N020 G02 X45.0 Y25.0 R5.0 the type of tool motion will be :
- (a) Circular Interpolation - clockwise
 - (b) Circular Interpolation - counterclockwise
 - (c) Linear Interpolation
 - (d) Rapid feed
8. In an NC machining operation, the tool has to be moved from point (5, 4) to point (7, 2) along a circular path with centre at (5, 2). Before starting the operation, the tool is at (5, 4). The correct G and N codes for this motion are

9. In an open loop control system :
- (a) Output is independent of control input
 - (b) Output is dependent on control input
 - (c) Only system parameters have effect on the control output
 - (d) None of the above
10. The device, fed to the control unit of NC machine tool which sends the position command signals to sideway transmission elements of the machine, is called as

SECTION – B[Marks : $6 \times 4 = 24$]**(Short Answer Type Questions)**

1. Draw the product cycle revised with CAD/CAM overlaid.
2. Write down the steps which are helpful in utilization of Numerical Control in manufacturing.
3. A continuous - voltage signal is to be converted to digital form by an ADC. The actual full-scale range of this voltage is 0 to 2.0v , but an amplifier is use to magnify this range to 0 to 10v. A 10-bit ADC will be used. Determine the number of quantization levels, the resolution and the spacing between adjacent quantization levels.
4. Draw the block diagram of Adaptive Control System and explain briefly.
5. What do you understand by NC coding ? Explain the ISO and EIA standard codes for NC coding ?
6. How complex shaped components are easier to machine on CNC machine tools ? Discuss with suitable examples and sketches.

(3)

P. T. O.

SECTION – C

[Marks : $12 \times 3 = 36$]

(Long Answer Type Questions)

1. (a) Explain the six categories of computer process interface that represents the three types of process data.
- (b) Differentiate between ACC and ACO adaptive control system.
2. (a) What are the six basic robot motions ? Explain with neat sketches.
- (b) Write short notes on :
 - (i) manipulator of robot
 - (ii) controller of robot
 - (iii) sensors of robot
3. (a) A digital to analog converter uses a reference voltage source of 10V and uses a binary register with six-digit precision. In two successive sampling instants 0.5 s apart, the data contained in the binary register are as follows : 8

Sampling instant	B1	B2	B3	B4	B5	B6
t-1	1	0	1	0	1	0
t	1	0	1	1	0	1

Determine the voltage level during the sampling interval for a DAC with a first order hold.

- (b) Discuss fixed, programmable and flexible type of automation in industry using suitable examples. 4

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B.E. VII Semester Examination, December 2018

COMPUTER AIDED MANUFACTURING

Branch : Mechanical Engineering

(Main & Re)

Time : Three Hours /

[Maximum Marks : 75

[Minimum Marks : 30

Note : Attempt **all** questions from **Section-A**, **four** questions from **Section-B** and **three** questions from **Section-C**.

Section - A

1.5×10=15

Note : The section will contain **ten** objectives types questions. They may be fill in the blanks, True/false or multiple choice type.

1. In an NC Machine instructions are stored on:
 - (a) Punch tape
 - (b) Head Box
 - (c) Graphic Terminal
2. CAD/CAM Is the relationship between:
 - (a) Science and engineering
 - (b) Manufacturing and marketing
 - (c) Design and manufacturing
 - (d) Design and marketing

P.T.O.

3. Which two disciplines are tied by a common database:
- (a) Documentation and geometric modeling
 - (b) CAD and CAM
 - (c) Drafting and documentation
 - (d) None
4. All Computers use the same set of binary code True/False
5. Normally Robots works on 05 Basic Principle True/False
6. FMS Generally Stands for _____.
7. M Code M05 used for _____.
8. G Code G00 used for _____.
9. The system environment in a mainframe computer consists of:
- (a) Central processing
 - (b) Storage devices
 - (c) Printers and plotters
 - (d) Both central processing and storage devices
10. The nerve centre or brain of any computer system is known as:
- (a) CPU
 - (b) Storage device
 - (c) ALU
 - (d) Monitor

Section - B

6×4=24

1. Explain the working of DNC machines with neat sketch diagram.
2. What do you understand by GT, discuss with neat sketch diagram.
3. What do you understand by G Code & M Code, Give use of 05 G Code & Use of 05 M Code.
4. Give Comparative study among CNC, DNC & Robot.
5. What do you understand by Interpolation, discuss types in details.

6. What do you mean by CIM, discuss with neat sketch.

Section - C

12 × 3 = 36

1. Write short notes on:

- (a) Manipulators of Robot
- (b) Controllers of Robot
- (c) Sensors of Robot

2. What do you mean by Flexible manufacturing system? What are applications and features of FMS, discuss in details.

Write a manual part Programming for Box Facing operation for given component.

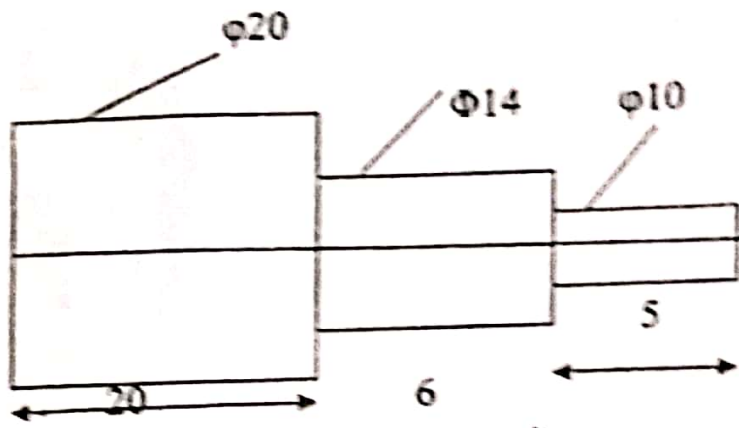


Fig.3.0 Box facing operation

4. Differentiate between ACC and ACO Adaptive Control System.
5. What do you understand by Rapid Prototyping? Give the classification in details.