

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End-Term Examination, Nov.-Dec. 2017
B. Tech. in Mechanical Engineering, Semester VII

Roll No.....

ME702: CAD-CAM

Time: 3 hours Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1A Objective type questions (10 questions @ 1 mark)

10

- i. The software that provides users with various functions to perform geometric modelling and construction. Editing and manipulation of existing geometry. drafting and documentation is known as:
(A) Operating system (B) Application software
(C) Graphics software (D) Programming language
- ii. Which of the following is not a synthetic entity?
(A) Cubic spline curve (B) Bezier curve (C) B-spline curve (D) Hyperbola
- iii. In the following geometric modelling techniques which are not three-dimensional modelling?
(A) Wireframe modelling (B) Drafting (C) Surface modelling (D) solid modelling
- iv. 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
(A) Controller (B) tape (C) Feedback unit (D) None of the above
- v. 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) Adaptive Control System
(C) Direct Numerical Control System (D) Machining Centre System
- vi. Transfer machines can be defined as
(A) Material processing machines (B) Material handling machines
(C) Material processing and material handling machines
(D) Component feeders for automatic assembly
- vii. Which belt conveyor prevents sliding down of material at an inclination of 55° with horizontal?
(A) Flat belt conveyor (B) Troughed belt conveyor
(C) Blanket belt conveyor (D) Woven wire belt conveyors
- viii. What do Flexible Manufacturing systems (FMS) do?
(A) Moves materials between operations
(B) Co-ordinates the whole process of manufacturing and manufactures a part, component or product
(C) Moves and manipulates products, parts or tools
(D) Completely manufactures a range of components without significant human intervention during the processing

ix. During the execution of a CNC part program block NO20 GO2 X45.0 Y25.0 R5.0 the type of tool motion will be

- (A) Circular Interpolation – clockwise (C) Linear Interpolation
(B) Circular Interpolation – counterclockwise (D) Rapid feed

x. In finish machining of an island on a casting with CNC milling machine, an end mill with 10 mm diameter is employed. The corner points of the island are represented by (0, 0), (0, 30), (50, 30) and (50, 0). By applying cutter radius right compensation, the trajectory of the cutter will be

- (A) (-5, 0), (-5, 35), (55, 35), (55, -5), (-5, -5) (B) (0, -5), (55, -5), (55, 35), (-5, 35), (-5, -5)
(C) (5, 5), (5, 25), (45, 25), (45, 5), (5, 5) (D) (5, 5), (45, 5), (45, 25), (5, 25), (5, 5)

Q.1B Short answer type questions (4 questions @ 2.5 marks) 10

- Briefly describe the types of storage devices used in computers.
- Write topological terms used in Boundary representation method (B-rep).
- Differentiate contact and non-contact type CAQC systems? With examples.
- Differentiate NC, CNC and DNC systems?

Q.2A What are the hardware requirements of a Design workstation? Explain. 05

Q.2B What are the reasons for implementing a computer aided design system? With the help of a block diagram, explain the computer aided design process. 05

Q.3 Explain 3-D scaling, rotation, reflection and translation with suitable example? 8

OR

Q.3 Find the transformed coordinates when a square [(1, 1), (2, 1), (1, 2) and (2, 2)] is rotated by 90° anticlockwise about a line passing through one of its vertex (1, 1) and parallel to x-axis? 8

Q.4A Explain in brief the basic elements of a CSG model. Discuss the main building operation of CSG schemes with examples? 05

Q.4B What are the basic components of NC system and explain the function of each component? 05

Q.5A Describe the axis representation system used for CNC Milling machines. Discuss the various interpolation methods used in NC machines. 05

Q.5B Explain the types of flexibilities in FMS and discuss the factors on which these flexibilities depend 06

Q.6A Write a short note on automated guided vehicle (AGV) systems 05

Q.6B Explain briefly the MICLASS system of codification. 06

Q.7A Explain in detail the scanning laser system used in computer aided quality control 05

Q.7B Differentiate between: i) Fixed zero and floating zero positioning
ii) Absolute and incremental positioning 05

Q.8 Write complete process planning and part program of a component (Fig.1) for machining on a lathe. This part is to be machined from a rolled stock of 40 mm diameter. Assume suitable depth of cut for rough cutting and finish turning. 10

Q.9 Write a part program using G and M codes to machine the contour as shown in figure 2 and drill a hole. The component is 18 mm thick. 10

Assume:

- Suitable tools and name them
- Suitable speed and feed for machining
- Show starting point and load/unload point

OR

Q.9 a) Give different line definitions in APT geometry. 04+06

- b) Explain the APT statements:
 i) GOTO and GO/TO ii) GODLTA and GOBACK and iii) INTOL and OUTTOL.

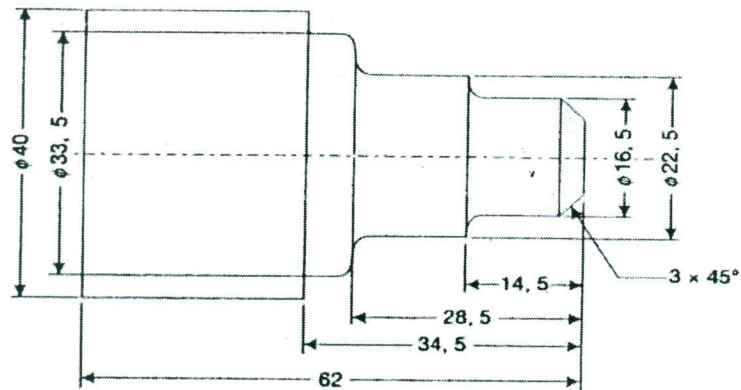


Fig. 1

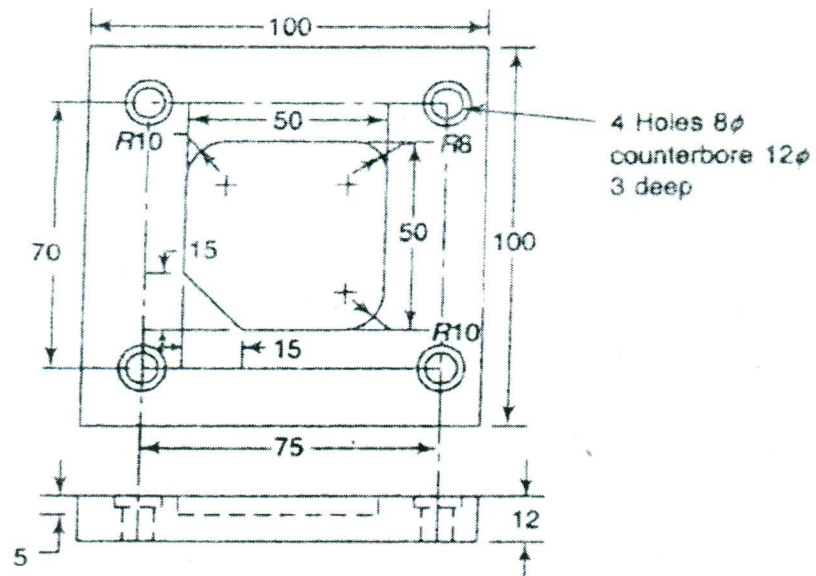


Fig. 2