## [5254]-31

B.E. (Mechanical)

CAD/CAM & AUTOMATION

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 100*

Instructions to the candidates:

1) *Answer Q. No.1 OR 2, No.3 OR 4, No.5 OR.6, No.7 OR 8, Q.No.9 OR 10, No.11 OR 12.*

2) *Answers to the two sections should be written in separate answer-books.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Use of electronic non programmable pocket calculator is allowed.*

5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Find the new position of position of square ABCD, if it is rotated about its own center point by 45° in counterclockwise direction. Also sketch the stepwise transformations to achieve this rotation. **[12]**
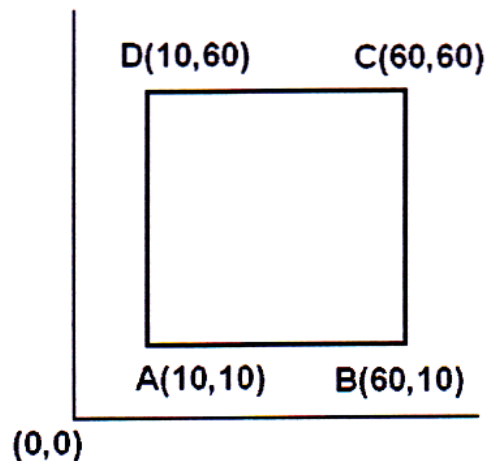
b) Write a short notes on transformation matrix for isometric projection. **[4]**

OR

Q2) a) Draw 03 orthographic views of a triangle having vertices A (1, 2, 1), B (4, 3, 4) and C (5, 8, 2). **[12]**

b) Write a short notes on mapping of geometric model. **[4]**

Q3) a) Write parametric equation for circle having center point, C (3, 3, 0) and radius=3. If circle is divided into 8 parts, calculate coordinates on circle. **[10]**

b) What are different Solid Model Creation Schemes? Explain with neat sketch a Constructive Solid Geometry (CSG). State its advantages and limitations. **[6]**

OR

Q4) a) Find the equation of 2D Hermite cubic spline having control points $P_0(2, 3)$ and P_1 (10, 1). The lines from point $P_2(8, 6)$ are tangent to curve at P_0 and P_1. Take u = 0.25. **[10]**

b) Explain following with neat sketch : **[6]**

   • Tabulated Surface

   • Bezier Surface

   • Offset Surface

Q5) a) Consider the stepped bar shown in following figure. Assume modulus of elasticity 2×10^5 N/mm². Determine nodal displacements, elemental stresses and support reactions. **[12]**
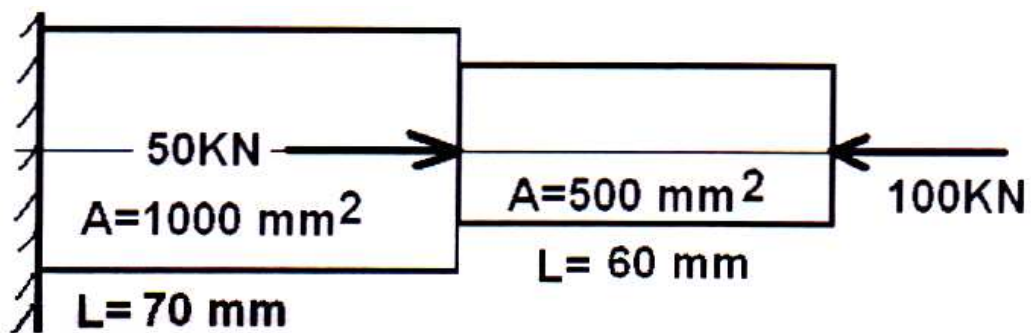
b) Write a short note on relationship between local and global coordinates in 1D element. **[6]**

Q6) a) Consider the Truss as shown if figure given below. Determine nodal displacements, elemental stresses and support reactions. **[12]**
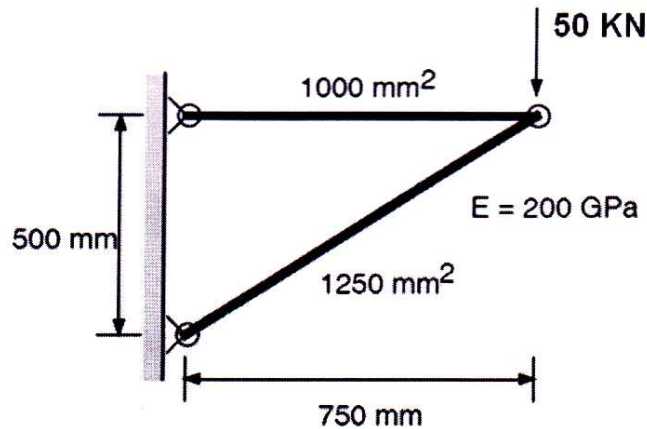
b) What is CST element? How shape functions are computed using area method. **[6]**

SECTION - II

Q7) a) Explain NC words G81, G7l, M06 and P001 with suitable example. **[6]**

b) Write CNC part program to take a finishing cut to produce turning job as shown in figure 3. Assume suitable data. **[10]**
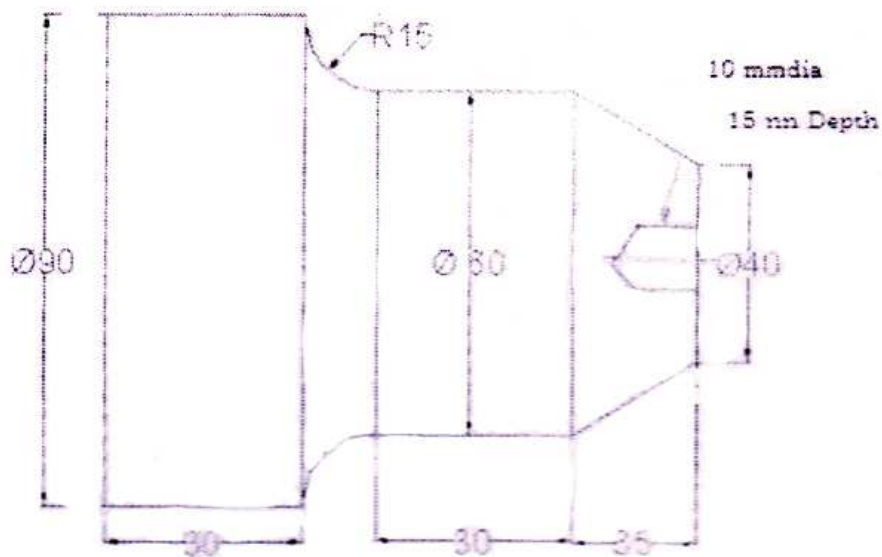

Figure 3 Q. No. 7 (b)

OR

Q8) a) Explain the components of DNC in detail. **[6]**

b) Write complete CNC part program to generate end profile and drill the holes as shown in figure 4. Assume suitable machining data for speed and feed etc. **[10]**
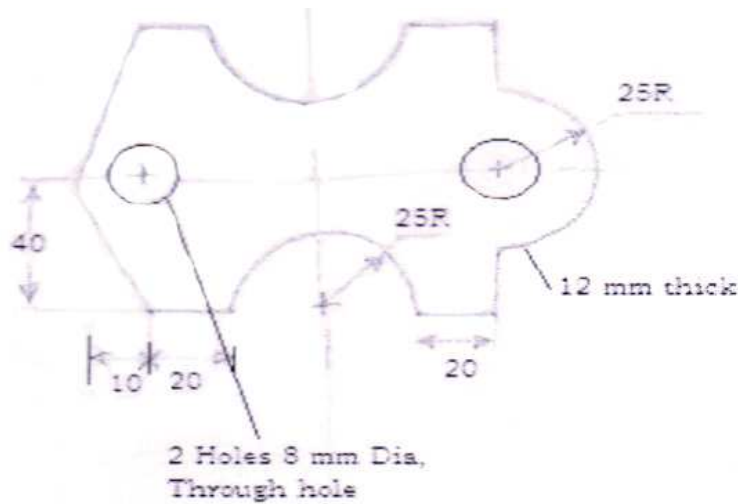

Figure 4 Q. No. 8 (b)

Q9) a) Differentiate between different types of automation. **[8]**

b) Classify machining center and explain any one in detail. **[8]**

OR

Q10) a) Explain in brief Classification of FMS. **[8]**

b) Explain various elements of computer Integrated Manufacturing. **[8]**

Q11) a) Explain SCARA robot with the help of neat Sketch. **[6]**

b) Explain WAIT, DELAY and MOVE commands. **[6]**

c) Explain pneumatic gripper arrangement used to handle thin sheets. **[6]**

OR

Q12) a) Write short notes on lead through programming method. **[6]**

b) Explain various types of joint notations schemes used in robots. **[6]**

c) Explain different types of actuators used in robots. **[6]**

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