[4364]-431

B. E. (Mechanical Eng.) Examination - 2013
CAD-CAM &
AUTOMATION
(2008 Course)

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

Instructions :

(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 logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(5) Assume suitable data, if necessary.

SECTION-I

Q1. a) Explain reflection of geometrical entity about line $y = m \bullet x + c$, with schematic representation and write concatenated transformation matrix.   [08]

b) Find concatenated matrix if the transformations are performed as per the following sequence.   [10]

i) Rotation through 45^0 anticlockwise.

ii) Translation through +5 and -8 units along the x and y directions.

iii) Rotation through 60^0 clockwise.

What is the effect of above transformations on triangle having co-ordinates A(0,0) B(10,0) and C(0,8).

OR

Q2. a) Compare Geometrical transformation and mapping.   [04]

b) Write OPEN GL command for vertex, Color, Scale and translate.   [04]

c) A tetrahedron is defined by the following points A(2,3,4,) B(6,3,4) C(2,5,4) and D(4,4,10) with a transformation matrix generate data for the orthographic view of the object in viewing plane.   [08]

Q3. a) Explain non parametric and parametric curves. Compare its mathematical formulations for circle and advantages of parametric representation of circle. [06]

   b) A circle is represented by center point (5,5) and radius 7 units. Find parametric equation of circle by recursive method and determine the various points on the circle in first quadrant if increment of angle is 15^0. [10]

<center>OR</center>

Q4. a) Plot the hermit cubic spline curve for the points at the value of u=0, 0.2, 0.4,0.6, 0.8, and 1 having the end points P0 (1,1) and P1 (7,4). The tangent vector for end P0 is defined by the line between P0 and another point P2 (8,7) whereas the tangent vector for end P1 is defined by the line between P1 and point P2 (8,7). [10]

   b) Explain CSG method of solid modeling with the example of any mechanical component. [06]

Q5. a) An axial step bar is shown in figure. It is subjected to axial pull of 5 kN. If material of bar is uniform and having a modulus of elasticity as 200 GPa. Determine deflection and stresses in each element and reaction force. [12]
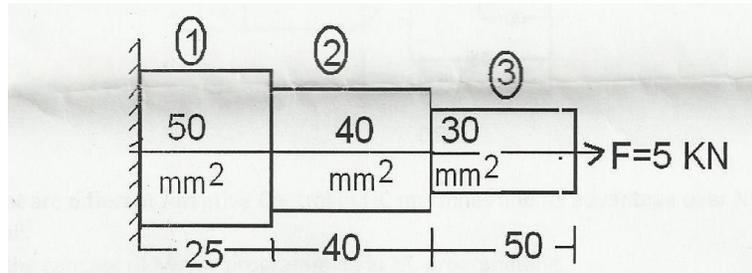
   b) Explain the concept of shape function for 1 – D element. [04]

<center>OR</center>

Q6. a) Derive the element stiffness matrix and stress vector for truss element. [08]
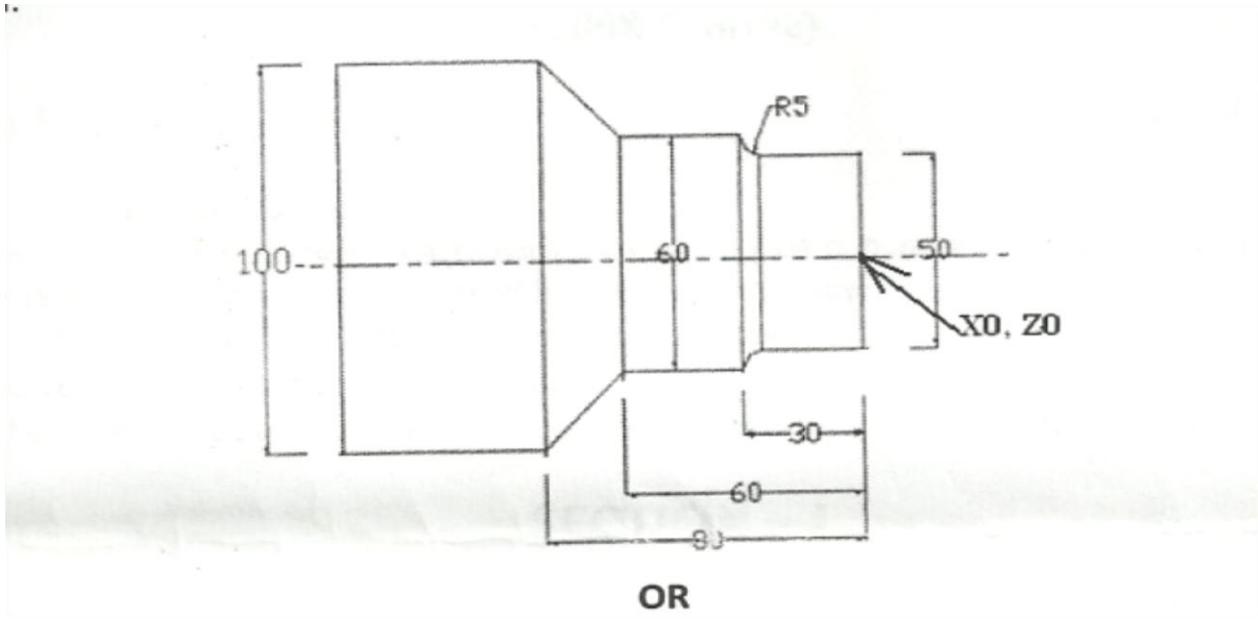   b) Explain plane stress and plane strain with suitable examples. [08]

<center>**SECTION –II**</center>

Q7. a) Explain fixed Zero and floating zero for CNC machine. [04]
   b) Explain G00, G01, G02 and M03 codes in part programming. [04]

<center>2</center>

c) Write a CNC part program to take a finish cut for the shape shown in the figure. Assume suitable machining data. [10]

OR

OR

Q8. a) What are different Adaptive Control in NC machines and its advantage over NC system. Explain any one in detail. [08]

b) Explain the concept of mirror programming in NC programming. [04]

c) Explain Canned cycle for drilling and tapping. [06]

Q9. a) Compare various types of automation. [08]

b) Explain Group technology layout with appropriate figure. [08]

OR

Q10. a) Explain Machining center. [08]

b) What are the various elements of Flexible Manufacturing system? [08]

Q11. a) Explain the various joints used in Robot. [08]

b) Explain Articulated configuration robot with application and draw its work envelope. [08]

OR

Q12. a) Write short note on teach pendant method of programming [06]

b) Compare types of actuators used in robot. Explain stepper motor as an actuator for driving robot joint. [10]