P1692

[4859]-32

B.E. (Mechanical)
CAD/CAM & AUTOMATION
(2008 Pattern) (Semester-I)

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

Instructions to the candidates:

1) Answer 3 questions from each section.
2) Answer to the two sections should be written in separate books.
3) Figures to the right indicate full marks.
4) Use of calculator to allowed.
5) Assume suitable data, if necessary.
6) Neat diagrams must be drawn whenever necessary.

SECTION-I

Q1) a) With the example of mid point transformation of a line, prove that geometic transformations are point based. **[8]**

b) Explain with suitable sketch orthographic, isometric and perspective projections. **[10]**

OR

Q2) a) A Triangle PQR with vertices p(0,0), Q(3.5,0) and R(2,3) is translated through 4 and 2 units along x and y directions respectively. Then it is rotated about new position if 'R' by 70° in counter clockwise direction. Find concatenated matrix and final position of triangle. **[10]**

b) Derive transformation matrix for reflection about an axis and plane.**[8]**

Q3) a) Discuss parametric modeling of Beta-spline curve. State disadvantages of Bezier curve. **[8]**

b) Explain the concept of feature based modeling in detail. **[8]**

OR

Q4) a) Explain C^0, C' and C^2 continuity with suitable example. **[8]**

b) Explain in detail boundary representation. **[8]**

Q5) a) Consider a 3 steped bar as shown in fig.1. with an axial load of P=400kN. find nodal displacements & stresses in each elements. **[10]**
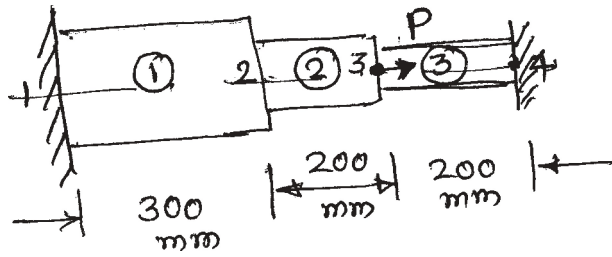
A_1=2400 mm² A_2=1800 mm² A_3=1200 mm²

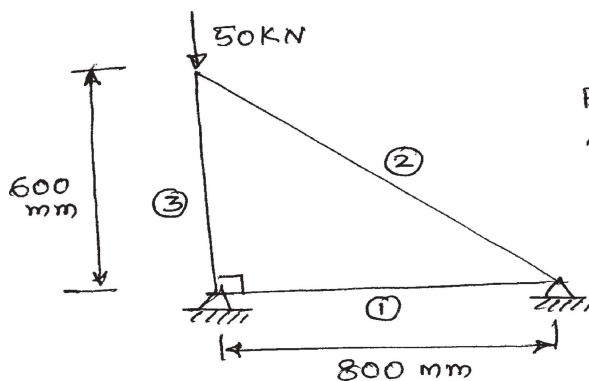E_1=70×10⁹N/m² E_2=200×10⁹N/m² E_3=70×10⁹N/m²

<u>Fig.1.Q.5(a)</u>

b) Explain galerkin's method. **[6]**

OR

Q6) a) A three truss bar element shown in fig.2. Determine **[10]**

   i)   Element stiffness matrix.

   ii)   Global stiffness matrix.

   iii) Nodal displacement.

   iv) Stresses in each element.

   v)   Reactions.

$E_1=E_2=E_3= 2×10^5 N/mm^2$
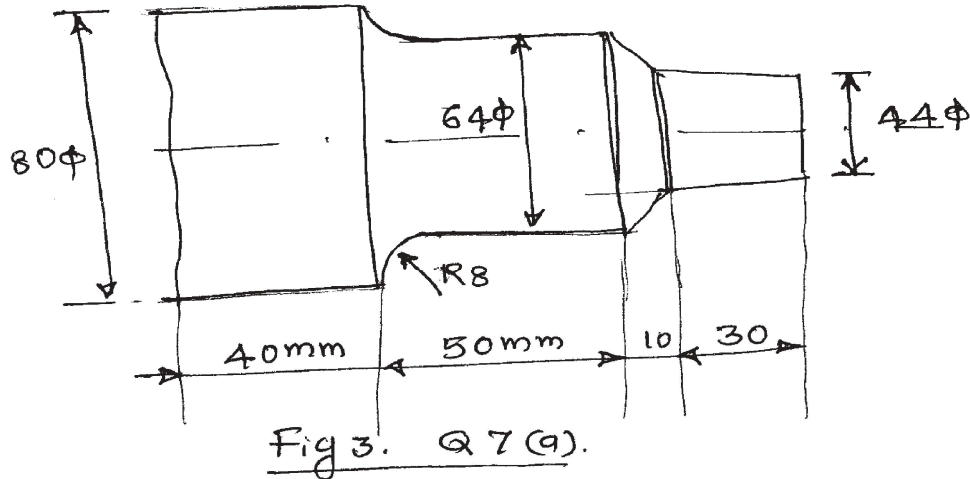$A_1=A_2=A_3 = 100 mm^2$

<u>Fig.2 Q6(a)</u>

b) Explain Rayleigh Ritz method. **[6]**
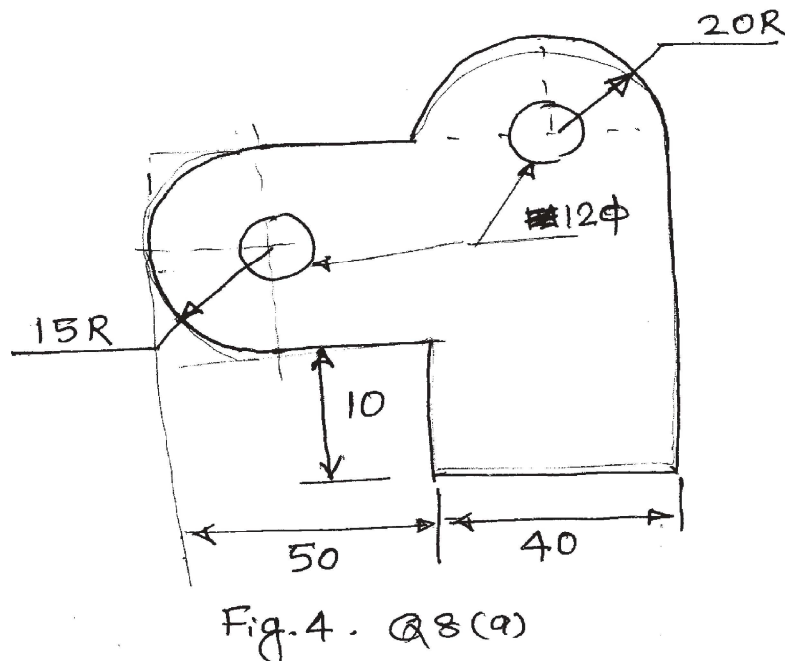
Q7) a) Explain the concept of CIM in detail.   **[8]**

b) Write a CNC part program for roughing and finishing of the turning component as shown in fig3. Row material size $150 \times 80\phi$. Assume suitable speed, feed and depth of cuts for mild steel materials.   **[10]**

Fig 3. Q 7 (a).

OR

Q8) a) Write CNC part program for contouring and drilling of the component as shown in fig 4. by using G & M codes. Assume suitable data for speed, feed, and depth of cut for the aluminium blank size $100 \times 60 \ mm^2$ **[10]**

Fig.4. Q8(a)

b) Explain the concept of DNC with neat sketch.   **[8]**

Q9) a) Explain in detail flexible manufacturing system. With all its components.**[8]**

   b) Describe automatic storage & Retrival system. **[8]**

<div align="center">OR</div>

*Q10)*a) Explain the concept of Group technology. **[8]**

   b) Explain generative type of process Planning in detail. **[8]**

*Q11)*a) Explain different application areas of robot in detail. **[8]**

   b) What is configuration of robot? Explain any two configurations in detail. **[8]**

<div align="center">OR</div>

*Q12)*a) Explain various motion commands used in VAL programming language.**[8]**

   b) Explain with neat sketch different types of Joints used in robots. **[8]**

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