

# C.U.SHAH UNIVERSITY

## Summer Examination-2016

**Subject Name : Computer Aided Design and Engineering**

**Subject Code : 4TE06CDE1**

**Branch :B.Tech (Mechanical)**

**Semester : 6 Date : 06/05/2016**

**Time :02:30 To 05:30**

**Marks :70**

**Instructions:**

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  - (2) Instructions written on main answer book are strictly to be obeyed.
  - (3) Draw neat diagrams and figures (if necessary) at right places.
  - (4) Assume suitable data if needed.
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**Q-1**

**Attempt the following questions:**

**14**

- a) Computer Aided Design is an activity to
  - (a) prepare drawing on computer
  - (b) perform analysis on computer
  - (c) perform animations of object
  - (d) All of the above
- b) The quality of an image depends on
  - a) No. of pixel used by image
  - b) No. of line used by image
  - c) No. of resolution used by image
  - d) None
- c) Full form of DDA is
  - a) Direct Design Analysis
  - b) Digital Differential Analyser
  - c) Digital Design Algorithm
  - d) Direct Differential Analysis
- d) (2,4) is a point on a circle that has center at the origin. Which of the following points are also on circle?
  - a) (2,-4)
  - b) (-2,4)
  - c) (-4,-2)
  - d) All of above
- e) The transformation in which an object is moved from one position to another in circular path around a specified pivot point is called
  - a) Rotation
  - b) Shearing
  - c) Translation
  - d) Scaling
- f) If a point (x, y) is reflected about an axis which is normal to the XY plane and passing through the origin, the reflected point (x, y) is,
  - a) (x, -y)
  - b) (-x, y)
  - c) (-x, -y)
  - d) (y, x)
- g) The Bezier curve obtained from the four control points is called a
  - a) Quadratic Bezier curve
  - b) Cubic Bezier curve
  - c) Hectare Bezier curve
  - d) Rectangle Bezier curve





2. Determine the parametric equation for tangent Vector.
  3. Determine five points on curve
- b) Write the demerits of Cubic spline and explain the difference between Cubic spline and Bezier curve. 07

**Q-5**

**Attempt all questions**

- a) What is FEA? Explain steps involved in FEA. 07
- b) Figure 1 shows a truss consisting of three elements whose EA/L value is 1000 N/mm 07  
using FEM determine the deflection at node 2 and reaction force at support.

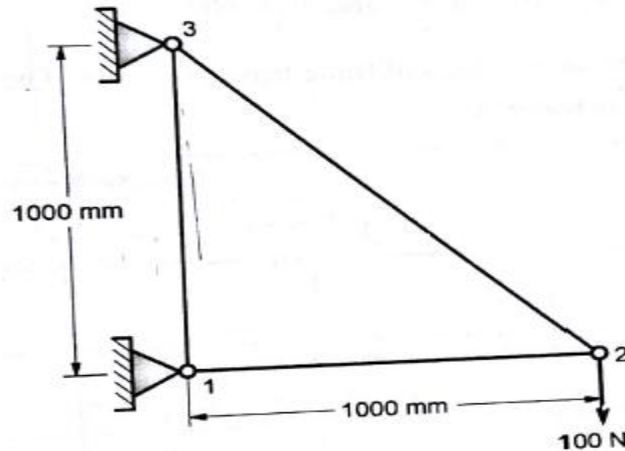


Figure 1

**Q-6**

**Attempt all questions**

- a) A steel tapered bar of 1200 mm length has the cross – sectional areas of 450 mm<sup>2</sup> and 150 mm<sup>2</sup> at two ends. It is fixed at large and subjected to tensile load of 35 kN at free end. The modulus of elasticity for the bar material is 2 x 10<sup>5</sup> N/mm<sup>2</sup>. Model the bar with three finite element each having length of 400 mm and calculate the stresses in each element. 07
- b) A manufacturing firm produces two machine parts using lathes, milling machine and grinding machines. The different machining times required for each part. The machining times available on different machines and the profit on each machine part are given in Table 07

Type of Machine	Machining time Required for Machine part (Minutes)		Maximum Time Available Per week (Minutes)
	I	II	
Lathes	10	5	2500
Milling machines	4	10	2000
Grinding machines	1	1.5	450
Profit per unit	Rs. 50	Rs. 100	

Determine the number of parts I and II to be manufactured per week to maximize the profit.



**Q-7**

**Attempt all questions**

- a) What is design optimization? Explain its application and advantages in engineering design **07**
- b) Explain the following with reference to optimization: **07**
- i) Objective function
  - ii) Constraints
  - iii) Linear Programming Problem (LPP)
  - iv) Non-linear Programming Problem (NLPP)

**Q-8**

**Attempt all questions**

- a) Write a note on wire frame model. **04**
- b) Write a note on Constructive Solid Geometry (CSG). **05**
- c) Write the step by step design procedure in conventional and CAD environment. **05**

