# KADI SARVA VISHWAVIDHYALAYA
# B.E.SEM VI MECHANICAL ENGINEERING-APRIL/2015

**Subject: Computer Aided Design** **Date: 01/05/2015**
**Subject Code: ME 603** **Times: 10:30 am 1:30 pm**
**Total Marks: 70**
**Instructions:**
1. Answer each section in separate Answer sheet.
2. Use of Scientific calculator is permitted.
3. All questions are **Compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective question number.

## SECTION-I

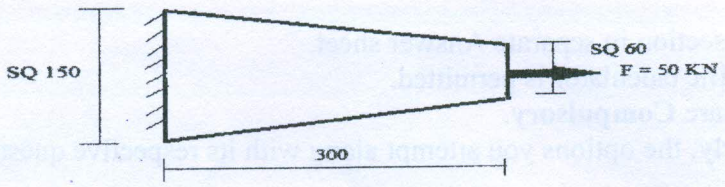
| | | | |
|---|---|---|---|
| **Que:1** | **(A)** | List and explain the important parameters to be considered while selecting CAD systems. List the different application of CAD in mechanical engineering. | **[5]** |
| | **(B)** | Write short note on CSG and B-rep. | **[5]** |
| | **(C)** | Explain Bresenham's algorithm for generation of line. | **[5]** |
| | | **OR** | |
| | **(C)** | Explain DDA algorithm for generation of line. | **[5]** |
| **Que:2** | **(A)** | Derive the transformation matrix for the Rotation. Further give the transformation matrix for scaling, reflection and shear. | **[5]** |
| | **(B)** | A triangle ABC with vertices A (30, 20), B (90, 20) and C (30, 80) is to be scaled by factor 0.5 about a point X (50, 40). Determine (i) the composition matrix and (ii) the coordinates of the vertices for a scaled triangle. | **[5]** |
| | | **OR** | |
| | **(A)** | What is a geometric transformation? What is the significance of homogeneous transformation? | **[5]** |
| | **(B)** | A rectangle is formed by the four point ABCD, whose co-ordinates are: A = (25, 25), B = (25,125), C = (75, 125) and D = (75, 25). Calculate the new co-ordinates:<br>(i) If it is changed by scaling factors Sx = 0.4 and Sy = 0.6<br>(ii) When after scaling centre is remained at same position and scaling factor is 1.5 | **[5]** |
| **Que:3** | **(A)** | Explain Hermite cubic spine curve with neat sketch. | **[5]** |
| | **(B)** | Give your Comments on the need for standardization in Computer Graphics. List various graphics standards available. | **[5]** |
| | | **OR** | |
| | **(A)** | Generate a Bezier curve using the following control points: (2, 0), (4, 3), (5, 2), (4, -2), (5, -3), and (6, -2). | **[5]** |
| | **(B)** | Explain non-parametric representation of curves. State its limitations. | **[5]** |

## SECTION-II

| | | | |
|---|---|---|---|
| **Que:4** | **(A)** | State the advantages and limitations of surface modeling. | **[5]** |
| | **(B)** | What do you understand by geometry and topology in solid modeling? | **[5]** |
| | **(C)** | With neat sketches, explain the various Boolean operations used in CSG solid. | **[5]** |
| | | **OR** | |
| | **(C)** | What are GKS and PHIGS? | **[5]** |

**Que:5** **(A)** What is the significance of shape function? Obtain the shape function, in terms of natural coordinates, for two noded 1-D element. **[5]**

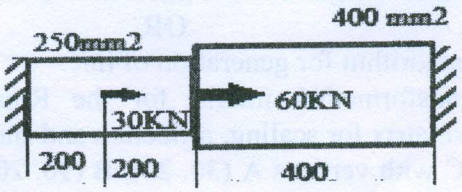
**(B)** A tapered bar is as shown in below figure. Model the bar by considering it as made of 3 elements and determine the deflections in each of the element. Also find out the stresses in each element. Consider modulus of Elasticity as 200Gpa. **[5]**




**OR**

**(A)** Explain the penalty approach used in FEM. **[5]**

**(B)** Consider the bar as shown in figure. Determine the nodal displacements element stresses and reactions, if the temperature rises by 60°C. Assume modulus of elasticity for the complete bar as 200 GPa and coefficient of thermal expansion as 12 X 10-6. **[5]**




**Que:6** **(A)** What is 'adequate design' and 'optimum design'? Explain with suitable example. **[5]**

**(B)** How optimization problem are classified? **[5]**

**OR**

**(A)** State the various optimization techniques. **[5]**

**(B)** Explain the Lagrange multiplier method through on example. **[5]**

**All the Best**