

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI(OLD) – EXAMINATION – SUMMER 2019

Subject Code:161903

Date:10/05/2019

Subject Name: Computer Aided Design

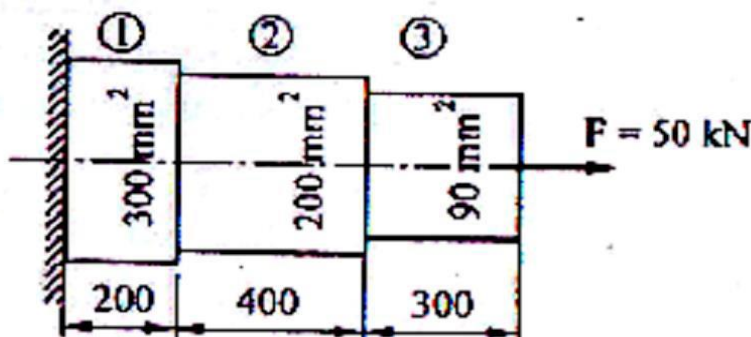
Time:10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

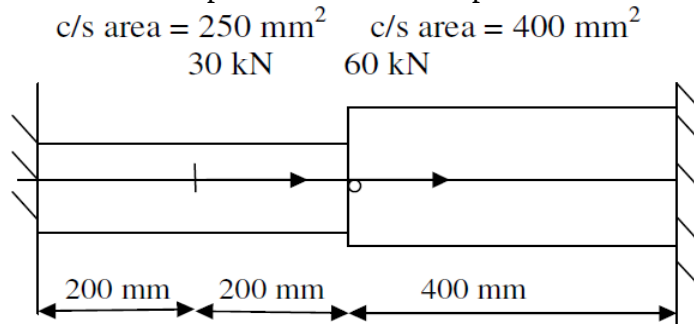
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Distinguish Between Conventional Design and Computer Aided Design system with CAD architecture **07**
- (b) A triangle ABC having coordinates A(15,15), B(25,25) and C(15,35) is rotated by 30° clockwise about the vertex B. Determine the new vertex positions after rotation. **07**
- Q.2** (a) Explain Bresenham's algorithm for generation of line **07**
- (b) What is a geometric transformation? Define and explain the following with respect to 2-D transformations (any three) **07**
- (i) Translation (ii) rotation (iii) scaling (iv) reflection
- OR**
- (b) What is graphic standard? Explain different CAD standards **07**
- Q.3** (a) What is feature based modelling? Discuss various steps involved in creation of models using features. **07**
- (b) A Bezier curve is to be constructed using control points P0(35, 30), P1(25, 0), P2(15, 25) and P3(5,10). The Bezier curve is anchored at P0 and P3. Find the equation of the Bezier curve and plot the curve for $u = 0, 0.2, 0.4, 0.6, 0.8$ and 1. **07**
- OR**
- Q.3** (a) Derive the parametric equation in matrix form for Hermite Cubic spline. **07**
- (b) Enlist the various methods of geometric modelling. Discuss wire frame modelling in detail. **07**
- Q.4** (a) Explain the various steps required to solve mechanical problem using finite element analysis. **07**
- (b) An axial stepped bar as shown in figure is subjected to an axial pull of 50 kN. If the material of the bar is uniform and has a modulus of elasticity as 200 GPa. Determine the displacement and stresses of each of the section. **07**



OR

- Q.4 (a)** Figure below shows the bar with dimensions and loads. Determine the nodal displacements, element stresses, if the temperature rises by 60 °C. **07**
Assume the modules of elasticity for the complete bar as 200 GPa and coefficient thermal expansion as 12×10^{-6} per °C.



- (b)** Discuss Johnson method of optimum design. **07**
- Q.5 (a)** Briefly discuss about B-spline curve and Bezier curve. **07**
- (b)** Explain 2-D and 3-D elements used in finite element analysis. **07**
- OR**
- Q.5 (a)** Explain following with respect to design optimization **07**
(1) Design vector
(2) Objective function
(3) Constraint
- (b)** List various approaches used for creating solid models. Discuss about Constructive solid modelling (C-Rep) and Boundary representation (B-Rep) approaches. **07**
