Date: 23/12/2016. Student Exam No._____

GANPAT UNIVERSITY

M. Tech. Semester-IMechanicalEngineering (Advance Manufacturing System)

Regular Examination Nov-Dec 2016

3ME104 Computer Aided Engineering

Time: 3 Hours **Total Marks:60**

Instructions: 1. This Question paper has two sections. Attempt each section in separate answer book.
2. Figures on right indicate marks.
3. Be precise and to the point in answering the descriptive questions.
4. Assume suitable data if necessary.

Section - I

Que. – 1 **Attempt all questions.**

(a) What is scan conversion? Draw a flow chart to scan converted slop method of line. **[03]**

(b) How memory of graphics is calculated? Explain with suitable example. **[04]**

(c) Write program for scan converted ellipse. **[04]**

OR

Que. – 1 **Attempt all questions.**

(a) End point of line are (12, 10) and (20, 16). Find pixels by using DDA algorithm. **[03]**

(b) Write a program for scan converted circle by Mid-point algorithm. **[04]**

(c) Derive equations of decision variables for bresnharm's line algorithm. **[04]**

Que. – 2 **Attempt all questions.**

(a) Define terms "refresh rate" and "frame buffer". **[03]**

(b) The position vector of triangle ABC are A (1 4), B (2 5) & C (3 6). Reflect the triangle about line L is y=(x+2)/2 and find out new position vector. **[04]**

(c) Write a Matlab program for rotation about any point by 30^0. **[03]**

OR

Que. – 2 **Attempt all questions.**

(a) What is difference between entities and features? **[03]**

(b) Show that transformation matrix for reflection about the line Y= X is equivalent to reflection relative to X axis followed by an anticlockwise rotation of 90^0. **[04]**

(c) Write a Matlab program for reflection about Y=0.5X+4. **[03]**

Que. – 3 **Attempt ANY THREE questions** **[09]**

(a) Explain utilization of CAD in Advancement of Engineering with suitable examples.

(b) Derive composite matrix for object mirror about any arbitrary plane in space.

(c) Explain GKS computer graphics standard.

(d) Explain Graphics standard STEP.

Section - II

Que. – 4 **Attempt all questions.**

(a) Justify that truss element is two dimensional element even it is same as bar element. **[05]**

(b) What are the different types of 1D, 2D and 3D element used in FEA? Explain with applications. **[05]**

OR

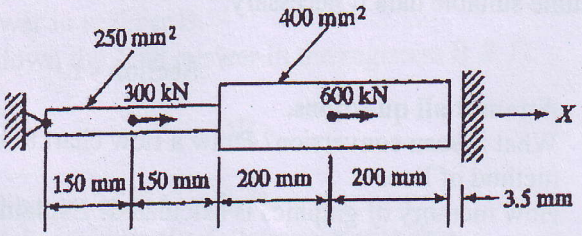
Que. – 4 **Attempt all questions.**

(a) Derive element thermal load vector for truss element. **[05]**

(b) Write short note on automatic mesh generation with an example. **[05]**

Que. – 5 **Attempt all questions.**

(a) Determine stress and support reaction for problem of bar as shown in figure 1. **[07]**



$E = 200 \times 10^9$ N/m²

Figure 1

(b) **Explain the penalty approach used in FEA.** **[04]**

OR

Que. – 5 **Attempt all questions.**

(a) The loaded bar shown in figure 2. Determine the nodal displacements, element stresses and reactions, if the temperature rises by 60^0 C. Assume modulus of elasticity for the complete bar as 200 GPa and coefficient of thermal expansion as 12×10^{-6} per ^{0}C. **[07]**

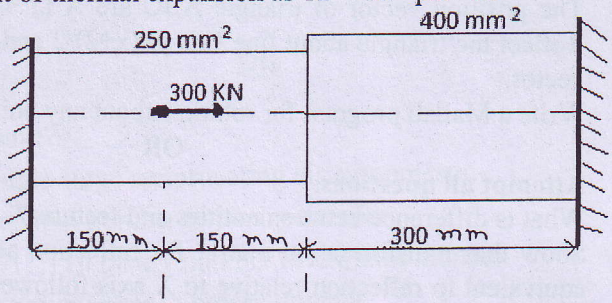


Figure 2

(b) Derive shape function used for bar element from strain energy principle **[04]**

Que. – 6 **Attempt all questions** **[09]**

(a) List various CAD softwares available in the market. Discuss the points to be considered for purchasing CAD software.

(b) Explain the concepts of FEM. Discuss the different steps involved in FEA in detailed.

(c) Discuss in brief Boolean operation in constructive solid modeling technique

END OF PAPER