

*Answer any FIVE of the following**All questions carry equal marks*

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1. Discuss the components and working principle of a CNC machine with a neat sketch and list its advantages.
2. Sketch and explain the working of hydrostatic slide ways and its advantages.
3. Explain the design requirements of beds and column and importance of ATC.
4. Discuss the importance of feedback system and explain the working of an incremental encoder with a neat sketch.
5. Sketch and explain the differences between an open loop and a closed loop system with block diagrams.
6. Write a program for the part shown in figure-1 using G and M codes. Assume suitable data if necessary.

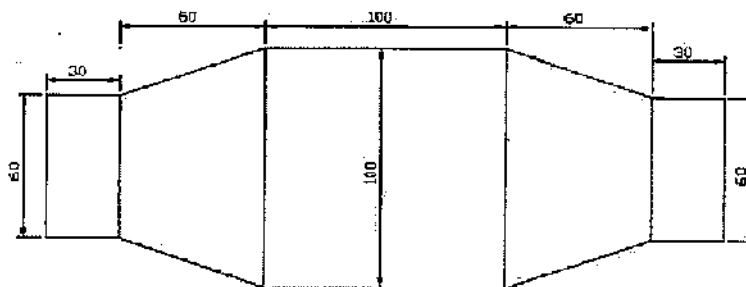


Figure 1

All dimensions are in mm.

7. Write an APT program for the part shown in figure-2. Cutter diameter is 10mm. Assume suitable data if necessary.

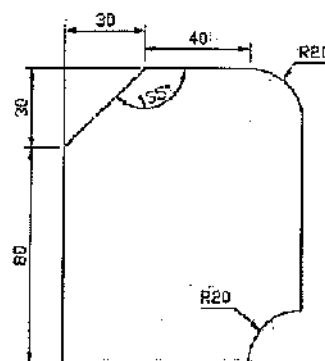


Figure 2

All dimensions are in mm.

8. Describe canned cycles and explain the working of a drilling cycle with a suitable example.

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Code No: 1PE513

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012
ADVANCES IN MANUFACTURING TECHNOLOGY
(CAD / CAM)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. What is meant by the term weldability? Discuss the weldability of aluminium and titanium alloys.
2. Describe about various types of surface coating processes and compare them with an example.
3. Explain the working principle of Abrasive jet machining process mentioning its advantages and limitations.
4. Describe the working principle of EDM with a neat diagram and discuss the influence of various process parameters that affect the performance characteristics like MRR and TRR in EDM.
5. Explain the working principle of Electron Beam Machining mentioning its advantages, limitations and applications.
6. Explain the working principle of Selective laser sintering process. What are its applications and limitations?
7. Discuss the fabrication of Nano tubes and their mechanical properties.
8. Write short notes on
 - a) Total Quality Management
 - b) Non-destructive Testing methods.

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GEOMETRIC MODELING

(CAD / CAM)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. Write and explain the DDA Line drawing algorithm.
2. What is Composite Transformation? Explain Translation, Rotation and Scaling of Composite Transformation.
3. Write a detail notes on Parametric Equations.
4. Discuss about the usage of cubic splines in Geometric Modeling.
5. How to generate a two-dimensional Bezier curve from multiple control points, explain with suitable example.
6. Write a detail notes on
 - a) Bi-cubic surfaces.
 - b) Coon's surfaces.
7. Discuss about the following.
 - a) Z-Buffer algorithm.
 - b) Warnock algorithm.
8. How Boundary representation scheme is used to create solid models, explain.

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Code No: IPEC14

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

COMPUTATIONAL METHODS

(CAD / CAM)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following**All questions carry equal marks*

- Find the solution of the system $10x_1 - 2x_2 - x_3 - x_4 = 3$, $-2x_1 + 10x_2 - x_3 - x_4 = 15$, $-x_1 - x_2 + 10x_3 - 2x_4 = 27$ and $-x_1 - x_2 - 2x_3 + 10x_4 = -9$ by Gauss-Seidel method.
- Evaluate $\int_1^3 \frac{1}{x} dx$ by Simpson's rule with 4 strips and 8 strips respectively. Determine the error by direct integration.
- Solve the boundary value problem $y''(x) = y(x)$ with $y(0) = 0$, and $y(1) = 1.1752$ by the shooting method, taking $m_0 = 0.8$ and $m_1 = 0.9$.
- Solve the Laplace equation for the square region shown in the following figure.

		1	2	
1				4
2	U_3	U_4		5
0	U_1	U_2		
		4	5	

- Solve the heat conduction equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ subject to the boundary conditions

$$U(x, 0) = \sin \pi x, 0 \leq x \leq 1$$

$$U(0, t) = u(1, t) = 0 \text{ by Crank-Nicolson method.}$$

- Solve the wave equation $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$ subject to boundary conditions $u(0, t) = u(1, t) = 0$

$$\text{and } \frac{\partial u}{\partial t}(x, 0) = 0, U(x, 0) = \sin^3 \pi x, \forall x \text{ in } 0 \leq x \leq 1.$$

- Write short note on 2D plots in MATLAB.
 - Discuss about script file in MATLAB.
- Find the value of a, b and c so that $y = a + bx + cx^2$ is the best fit to the following data.

x	0	1	2	3	4
y	1	0	3	10	21

- Fit an exponential function of the type $y = ae^{bx}$ to the following data

x	1.0	1.2	1.4	1.6
y	40.170	73.196	133.372	243.02

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

COMPUTER AIDED PROCESS PLANNING

(CAD / CAM)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) Explain various approaches to CAPP briefly.
b) What are the advantages of CAPP system?
2. Explain the information required for process planning system.
3. Explain how knowledge based system and inference engine aid CAPP system to generate a process plan.
4. With the help of block diagram explain the procedure for Retrieval CAPP system.
5. Explain how selection of machining parameters influence
 - i) Production rate
 - ii) Cost
 - iii) Surface quality.
6. Write short notes on
 - i) Computer programming languages for CAPP.
 - ii) Criteria for selection of CAPP system.
7. a) Explain inputs required for Material Requirement Planning (MRP).
b) Explain how pull system of production control is achieved using Kanbans.
8. a) What is the need for simulation? Explain different types of simulations.
b) Explain with an example how Activity Cycle Diagram (ACD) is developed for simulation.

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Code No: 1PE511

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

FINITE ELEMENT ANALYSIS

(CAD / CAM)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

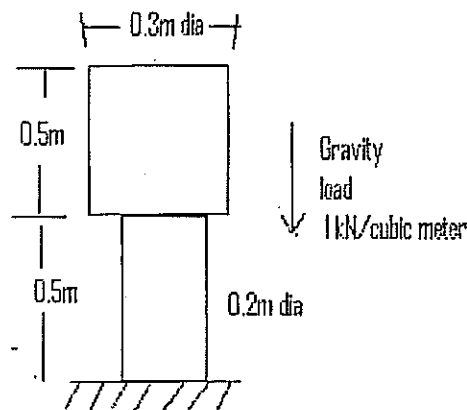
Answer any FIVE of the following
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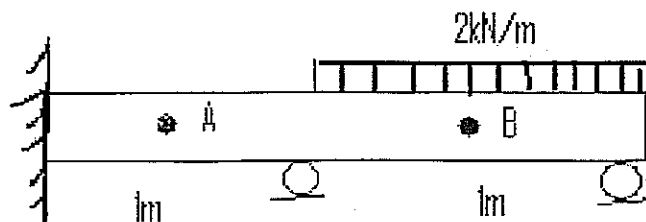
1. a) Explain various variational methods in Finite Element Analysis. [5M]
b) Discuss various types of boundary conditions with suitable examples. Also enumerate how boundary conditions are treated in solving finite element equation. [7M]

2. Vertical stepped bar is shown below :

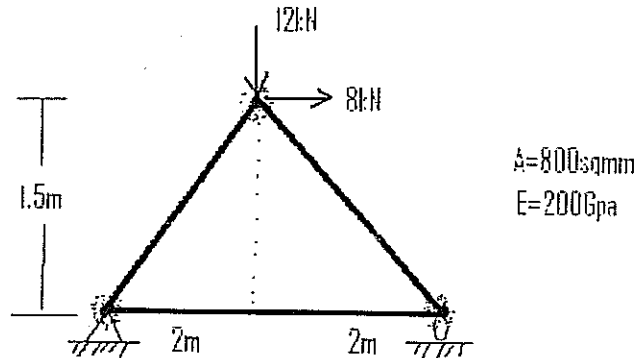
Find free end deflection when the gravity load acts on it. Other geometry is also given. Use two linear bar elements. Take Young's modulus : **210Gpa**. Also find the reaction forces and the stresses induced in each step. [12M]



3. Using two equal size beam elements, find the deflections at points A and B in beam shown in the following figure. Take Young's Modulus $E=210\text{Gpa}$ and cross section inertia $I=3 \times 10^{-4} \text{ m}^4$. Beam is subjected to a uniform distributed load vertically downward as shown. [12M]

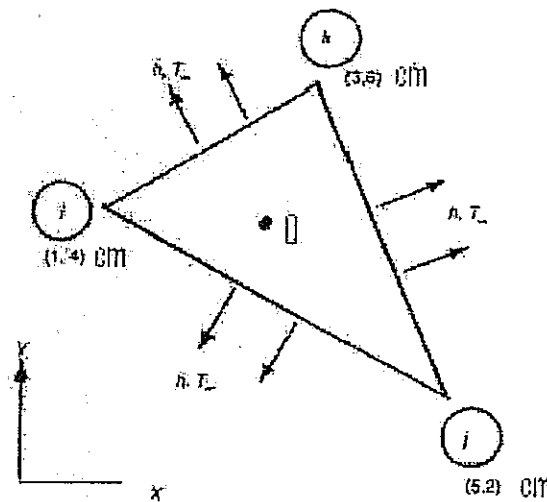


4. A three member truss structure is shown below. Left bottom support is fixed and right bottom support is supported by a roller. Find Deformation of each member and stresses induced in each truss member. [12M]



5. The (x, y) coordinates of the nodes of a triangular element of thickness **0.2cm** are shown in the following figure. Convection takes place from all three edges of the element. If internal heat generation is $Q=200\text{W/cm}^3$. Convective heat transfer coefficient $h=150\text{W/cm}^2\text{-}^\circ\text{C}$, thermal conductivity $k=100\text{W/cm-}^\circ\text{C}$, and ambient temperature $T_a=30^\circ\text{C}$, Determine the following.

- a) Various Element matrices [6 M]
 b) Various Element load vectors. [6 M]



6. a) Derive shape functions for a four noded quadrilateral element in intrinsic coordinate system. [6 M]
 b) Numerically integrate $\iint xy^2 dx dy$ with the x and y ranges as [-1, 1]. [6 M]
7. Derive strain displacement matrix [B] for axi-symmetric triangular element. [12M]
8. With finite element approach, find Eigen value and Eigen vector for an axial bar having length **L**, Young's modulus **E** and mass **m**. Idealize the bar as two elements. [12M]

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