

Roll No

MMPD - 105**M.E./M.Tech., I Semester**

Examination, June 2013

Computer Aided Engineering and Optimization*Time : Three Hours**Maximum Marks : 70*

Note: Answer any five questions. All questions carry equal mark. Assume suitable data not given. Draw rough, neat, proportionate sketches and give examples to support your answers.

1. Define DEGREE OF FREEDOM. Explain a mechanical system with mass, damper and spring. Write down the practical application of F.E.A in new design.
2. How to do meshing? Explain 1-2-3d elements, length of elements, force, stiffness and displacement matrix giving applications.
3. Explain the effect of mesh density and biasing in critical region. What do you mean by duplicate node and shell norm explain in detail.
4. Explain the term design for manufacturing aspects in the product development. How to make use of morphing techniques in F.E.A.
5. The number of Aeroplanes landings at an airport in a minute (X) and their probabilities are given by

X_i	0	1	2	3	4	5	6
$P_x(X_i)$	0.02	0.15	0.22	0.26	0.17	0.14	0.04

Find the mean and standard deviation of X.

6. A small machine tools manufacturing company entered into a contract to supply 80 drilling machine at the end of the first month and 120 at the end of the second month. The unit cost of manufacturing a drilling machine in any month is given by ₹ $(50x+0.2x^2)$ [₹ $(50x+0.2x^2)$ where x denotes the number of drilling machines manufactured in that month. If the company manufactures more units than needed in the first month, there is an inventory carrying cost of ₹ 400 for each unit carried to the next month. Find the number of drilling machines to be manufactured in each month to minimize the total cost. Assume that the company has enough facilities to manufacture upto 200* drilling machines per month (two hundred*) and there is no initial inventory. Solve the problem as FINAL VALUE PROBLEM.
7. What is the NORMALITY CONDITION in a geometric programming problem. What is the special case of geometric programming problem. When an optimization problem becomes a classical optimization technique.
8. Write short note on any three of the following :
 - a) Positive, negative or indefiniteness of a square matrix.
 - b) Perturbation method used as a convergence check.
 - c) Climatic conditions and design abuses.
 - d) Brick meshing and quality checks.
 - e) Comparison between tria and quad. (QUAD) elements.
 - f) FEM solution for single rod element.
 - g) Types of analysis in C.A.E.
 - h) Optimization/Cost cutting
 - i) Failure Analysis.
