

Code No: D0408**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****M.Tech II - Semester Regular Examinations September, 2010****DESIGN OPTIMIZATION****(CAD/CAM)****Time: 3hours****Max. Marks: 60****Answer any five questions
All questions carry equal marks**

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1. Find the diameter of an open cylindrical can that will have the maximum volume for a given surface area S .
- 2.(a) Distinguish between adequate and optimum design.
(b) What are objective function contours? Explain.
- 3.(a) State the possible convergence criteria that can be used in direct search methods.
(b) Indicate the number of one-dimensional steps required for the minimization of the function $f = x_1^2 + x_2^2 - 2x_1 - 4x_2 + 5$ according to Random search method.
- 4.(a) What is the purpose of mutation? How is it implemented in Genetic Algorithms?
(b) How is the stochastic return function handled in stochastic dynamic programming? Explain.
5. An open cylindrical vessel is to be constructed to transport 80 m^3 of grain from a warehouse to a factory. The sheet metal used for the bottom costs Rs.4000, and that for the sides costs Rs.1000 per m^2 . If it costs Rs.50 for each round trip of the vessel, find the dimensions of the vessel for minimizing the transportation cost. Assume that the vessel has no salvage upon completion of the operation.
- 6.(a) Write a note on the optimum design of helical springs.
(b) How do you design a torsion shaft for minimum cost? Explain briefly.
7. What are the vibration absorbers normally used? Explain their applications in mechanisms.
8. Write short notes on
 - (a) Dynamics applications for two degree freedom systems.
 - (b) Principles of optimum design.