b) Determine shape functions for following:
   i) Bar element
   ii) Beam element.

6. a) For the spring system shown fig. 1 below, k_1 = 100 N/mm, k_2 = 200 N/mm, k_3 = 100 N/mm, P = 500 N, Find: (i) the global stiffness matrix, (ii) displacements of nodes 2 and 3, (iii) the reaction forces at nodes 1 and 4, (iv) the force in the spring 2.

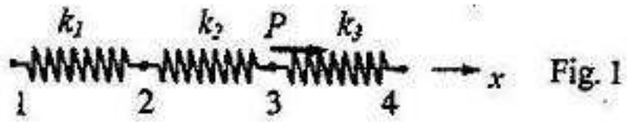

Fig. 1

b) A cantilever beam is loaded with point load at end and Uniform distributed load throughout the beam of length L m. Explain how will you proceed with the solution using FEM?

7. a) A simple plane truss is made of two identical bars (with E, A and L), and loaded as shown in the fig. 2. Find : i) displacement of node 2; ii) stress in each bar.

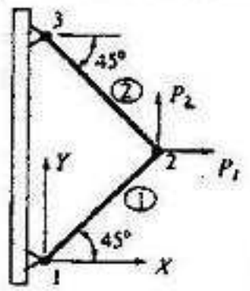

Fig. 2

b) What are the differences between computer integrated manufacturing and Flexible Manufacturing System?

8. Write short notes on following (any two)
   i) Errors in FEA
   ii) Mesh Refinement
   iii) Generalized Jacobi method.

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Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MMCM - 202

M.E./M.Tech., II Semester

Examination, June 2014

FMS And FEA

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five.
ii) Each questions carry equal marks.

1. a) Discuss how concurrent engineering accelerates product development?
   b) Describe the physical sub-system of an FMS? Describe the advantage of FMS over conventional manufacturing system?

2. a) Define FMS. What are the objectives of FMS?
   b) What are the components of FMS? List the applications of FMSs.

3. a) Explain Product Data Management (PDM). Mention the different levels of data modeling.
   b) Discuss the layout configuration of FMS with neat diagram? Write the advantages and disadvantages of FMS?

4. a) List and briefly describe the general steps of FEM.
   b) Describe different stresses and equilibrium conditions for the structural problems.

5. a) What is the need of finite element analysis for solving the engineering problems? Explain its significance in solving different solid mechanics problems.