FACULTY OF ENGINEERING
B.E. 4/4 (M/P) I – Semester (Old) Examination, July 2014

Subject: Finite Element Analysis

Time: 3 Hours   Max.Marks: 75

Note: Answer all questions from Part A. Answer any five questions from Part B.
PART – A (25 Marks)

1	What are local, global and natural coordinates?	2
2	Write 'D' matrix for plane strain condition.	2
3	What is Galerkin's approach?	3
4	Write the stiffness matrix of frame element (live element with 2-nodes, each node has 3 dot).	3
5	What are anisymmetric elements?	2
6	What are Gaussion points? Explain the order and their relevance.	3
7	What are convergence requirements?	3
8	Differentiate lumped mass from consistant mass.	2
9	Sketch 3D elements and show the degree of freedom.	2
10	If a shaft of dia. 10 MM of length 2 M subjected to a torque of 10,000 N-MM, find the angle of twist of G = 80 GPa.	3

PART – B (50 Marks)

11 Find the deflection, strains and stresses in the stepped bar shown in Fig. 1.
   Take E = 200 GPa.   10

$d_1 = 10\,mm$
$d_2 = 20\,mm$
$d_3 = 10\,mm$.
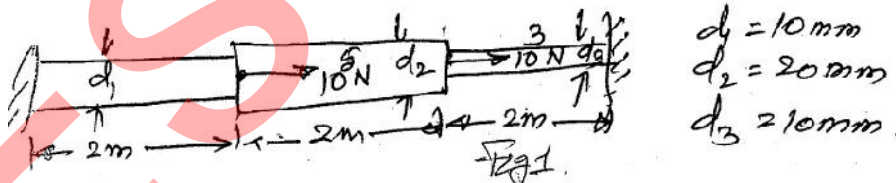
12 For the plane truss shown in Fig. 2. Find the
   i)   Global stiffness matrix
   ii) Global load vector
   If E = 300 GPA, area of cross section for each member is $10^{-6}\,M^2$.   10

.....2.