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FACULTY OF ENGINEERING & TECHNOLOGY

B.E(Civil)Year Examination June– 2015

Structural Mechanics

(Revised)

[Time: Three *Hours*] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

i) Answer any three questions from each section

ii) Assume suitable data wherever necessary.

SECTION A

Q.1 a) Explain plane strain and plain stress condition and derive stress- strain relationship for the same. 07

b) The stress components at a point in a body subjected to two dimensional state of stress are given by 07

$6_x = 2x^2y + 3xy$

$6_y = 2x^3 + 5xy^2$

$Z_{xy} = 4x^2y^2$

Determine whether given state of stress is in equilibrium or not at point (-2,3)

Q.2 State the assumptions in Kirchoffs thin plate theory and drive the governing differential equation of plate subjected to lateral load. 13

Q.3 Drive the equation of a circular plate for deflection carrying point load at its centre 13

Q.4 a) Drive strain compatibility equations for an element of elastic body in three dimensional state of stress. Explain the importance of these equations. 07

b) Explain various boundary conditions for rectangular plates. 06

Q.5 Find the transverse deflection w for the simply supported circular plate with hole of radius a subjected to shearing forces along the inner boundaries. Hence find expressions for M_r *and* m_Q 13

SECTION-B

Q.6 a) Differentiates between membrane theory and bending theory of shells. 05

b) Explain in brief Degree of kinematic indeterminacy. 04

c) Distinguish between flexibility and stiffness matrix methods of analysis of structure. 05

Q.7 Using membrane theory, derive the equations of equilibrium for shell of revolation. 13

Q.8 Analysis the frame shown in fig.1 by stiffness method. Draw BWD 13

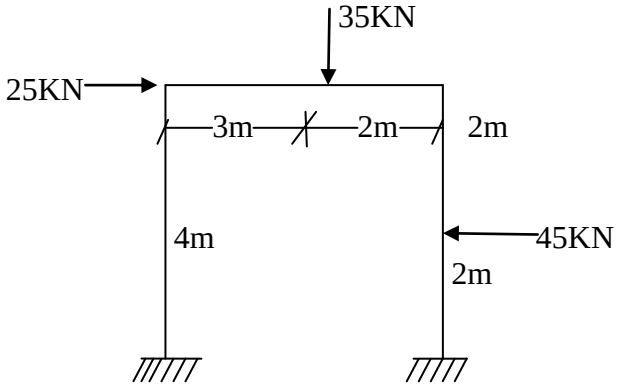

Fig 1

Q.9 a) Which method of following is advantageous and how? 06

i) Flexibility method

ii) Stiffness method

b) Explain stepwise procedure of finite Element Analysis 07

Q.10 Analyze the beam showed fig. 2 by stiffness matrix method. 13

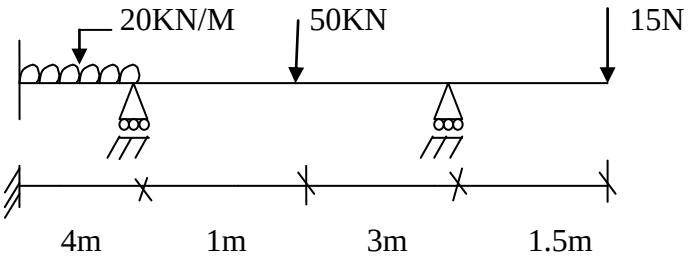

Fig 2