H.T.No. | | | | | | | | | | |

Code No: CE1541 **GEC-R14**

IV B. Tech I Semester Regular Examinations, November 2017

ADVANCED STRUCTURAL ANALYSIS

(Civil Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. Define Plasticity.
2. Explain the boundary conditions to be satisfied in plane stress system.
3. Explain St. Venant's principle.
4. What are the various types of prescribed loading? Give example.
5. What is meant by viscous damping? Give example.
6. What are the various types of harmonic excitation?

PART-B

4 × 12 = 48M

1. State of stress at point is given by stress tensor as $\begin{pmatrix} 10 & -10 & -30 \\ 30 & -20 & 30 \\ -10 & 10 & -110 \end{pmatrix}$.

   Calculate the stress invariants and the magnitude and direction of principal stress. (12M)

2. Derive the equations of equilibrium for 3D stress. (12M)

3. Derive the general equations of stresses in polar co-ordinates. (12M)

4. Derive equation of motion of the frame shown in figures A & B mentioned below. The mass (M) lumped at beam and assume frame is mass less and neglect damping. Comment on effect of base fixity by comparing two equations of motion. (12M)

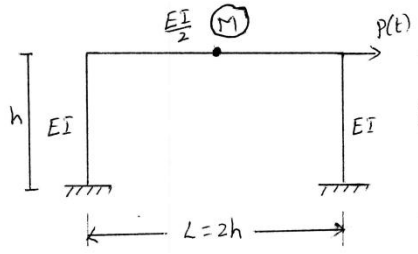

Figure - A

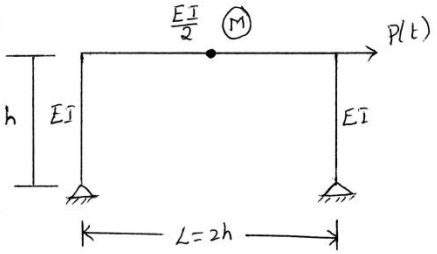

Figure - B

5. a) Derive equation of motion for viscous damping. (8M)

   b) Explain the concept of Rayleigh damping. (4M)

6. Determine the response of an undamped single degree of freedom system subjected to harmonic force $PSin\omega t$. (12M)

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