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## EIGHTH SEMESTER

B.E. (CE)

MID SEMESTER EXAMINATION **MARCH 2005**

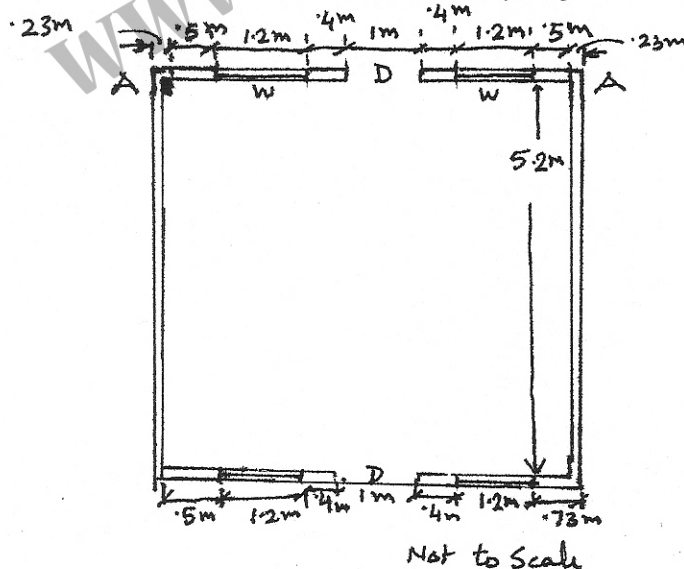
### CE-412 EARTHQUAKE TECHNOLOGY

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.  
Assume suitable data if missing.

- 1 Define various types of Magnitudes known to you. (3)
- 2 Discuss earthquake resistant design philosophy. (3)
- 3 Explain in detail the effect of earthquake when Intensity assigned to place A is VIII and to place B is IX as per IS code. (6)
- 4 Find out the stresses in the piers of following single storey building in wall AA only The design seismic coefficient may be assumed as 0.12. Roof slab thickness = 15 cm. No parapet is there and roof is not projected out of plan. Wall thickness is 23 cm and storey height is 3.5 m. (8)



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### CE-412 STRESS ANALYSIS

Time: 1 Hour 30 Minutes

Max. Marks : 20

**Note :** Answer Q.No.1 and **TWO** from the remaining.  
Assume suitable missing data, if any.

1 Answer any **FOUR** from the following :

- [a] Prove that  $\sigma_{ij} = \sigma_{ji}$
- [b] Show that  $\sigma_n^3 - I_1\sigma_n^2 + I_2\sigma_n + I_3 = 0$  where  $\sigma_n$  - Principal stress,  $I_1$ ,  $I_2$  and  $I_3$  are stress invariants
- [c] What is a Double refracting material
- [d] Derive stress-optic law.
- [e] Define Isoclinics and Isochromatics
- [f] Discuss Polarization of light.

(4x2=8)

2 Determine magnitude and direction of principal stress from the following stress-Tensor.

$$\sigma_{ij} = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 5 & 1 \\ 4 & 1 & 6 \end{bmatrix} \text{ N/mm}^2$$

3 Discuss the effect of stressed model in a plane-polariscope.

(6)

4 Prove that  $\nabla^2(\sigma_x + \sigma_y) = 0$  with usual notations.

(6)

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**MID SEMESTER EXAMINATION MARCH 2005**

**CE-413 DESIGN OF PRESTRESSED  
CONCRETE AND TIMBER STRUCTURES**

*Time: 1 Hour 30 Minutes*

*Max. Marks : 20*

**Note :** Answer **ALL** questions.  
IS 1343 code is NOT permitted.  
Assume suitable missing data, if any.

- 1 A prestressed concrete beam supports an imposed load of 5 KN/m over an effective span of 10 m. The section of the beam is rectangular with a width of 200 mm and a depth of 600 mm. Find the effective prestressing force in the cable, if it is parabolic with an eccentricity of 150 mm at the centre and zero at the ends, for the following conditions.
  - [a] If the bending effect of the imposed load is to be balanced by that of the prestressing force. Neglect the self weight of the beam.
  - [b] If the resultant stress due to self weight, imposed load and prestressing force is zero at the soffit of the beam for the mid span section. Take the density of concrete as 24 KN/m<sup>3</sup>. (4+4)
- 2 What are different principles of anchoring the tendons in post tensioning? (2)
- 3 Explain Hoyer's long line system of pre tensioning. (2)
- 4 What is meant by 'Pressure Line'? (2)
- 5 Discuss the concept of Load balancing. (2)
- 6 Discuss the loss of prestress due to elastic shortening of concrete. (2)
- 7 Discuss any one type of loss of prestress which occurs only in post-tensioned construction. (2)