22508

12223

3 Hours / 70 Marks

Seat No.

Instructions :
(1) All Questions are *compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   Attempt any FIVE of the following :   **10**

(a)   State any four types of structural precast elements.

(b)   State the difference between load bearing and non-load bearing precast walls panels.

(c)   State any four applications of prestressed concrete.

(d)   State advantages of precast concrete construction.

(e)   Give I.S. recommendations for percentage loss in case of post tensioning.

(f)   Mention the necessity of high strength concrete in prestressing work.

(g)   Write the concept of concordant cable.

2. **Attempt any THREE of the following :** 12

   (a) The damaged road due to earthquake is to be repaired immediately. Recommend suitable precast elements and justify the use of them.

   (b) State the requirements of structural joints. State the design consideration for design of beam column joint.

   (c) Explain composite construction and its application.

   (d) Describe any two design considerations for precast box culvert elements.

3. **Attempt any THREE of the following :** 12

   (a) Explain the procedure of the storage transportation and erection of prefabricated building elements.

   (b) Explain the ecological aspect of use of prefabricated building.

   (c) State four advantages and disadvantages of prestressed concrete.

   (d) Mention the basic difference among mild steel, high yield strength deformed steel and high tensile steel.

4. **Attempt any THREE of the following :** 12

   (a) Explain with sketch 'Hoyer's long line system of prestressing'.

   (b) Calculate the number of precast slab panels and number of beams using specifications for components as per IS 15916-2010 for the room of size 5m × 4m.

   (c) Explain the difference between pretensioning and post tensioning members.

   (d) Explain loss due to creep of concrete.

5. **Attempt any TWO of the following :** **12**

(a) List the various equipments required for the constructions of prefabricated buildings with application.

(b) Explain the various post tensioning systems based on wedge action with sketches.

(c) List the various types of loss of prestress in pretensioned and post tensioned members.

6. **Attempt any TWO of the following :** **12**

(a) A prestressed concrete beam of rectangular section 120 mm wide and 300 mm deep is prestressed by 6 wires of 6 mm diameter, provided at an eccentricity of 55 mm. The initial stress in the wire is 1150 N/mm^2. Find the loss of stress due to creep coefficient of concrete. Take $E_s = 2 \times 10^5$ N/mm^2, $E_a = 3 \times 10^4$ N/mm^2, Creep coefficient of concrete as 1.5.

(b) Determine the various stresses setup at mid Span in a pretensioned beam 250 mm $\times$ 500 mm, objected to an initial prestress of 1500 kN and a uniformly distributed super imposed load of 5 kN/m over a span of 15 m. Assume total loss of prestress as 12% and eccentricity of prestress at mid point is 100 mm.

(c) Explain the stress distribution diagram in a prestressed beam at initial and final stage i.e. before and after the prestress.

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