22508

12425

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 two name of materials used in precast concrete.

(b) State any four non-structural precast elements.

(c) Define modules and modular co-ordination.

(d) List structural precast elements.

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

(f) Suggest application of pre-stressed concrete.

(g) List types of pre-stressing steel.

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

(a) State any four advantages and four disadvantages of precast concrete members.

(b) Justify the need of different types of tests on precast concrete.

(c) Describe with sketch any two joints in door and window frame.

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

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

(a) Differentiate between mixed and composite construction with four points.

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

(c) Explain the principle of prestressing the given concrete element.

(d) Explain any one method of prefab system in detail.

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

(a) Calculate the number of precast slab panels and number of beams using specifications for components as per I.S. 15916 – 2010 for the room of size 3 m × 4 m.

(b) Explain losses due to creep of concrete.

(c) A beam of span 20 m is to be pre-stressed. Suggest the suitable cable profile with reasons.

(d) Explain 'Hoyer's long line system of pre-stressing with sketch.

(e) Suggest merits and demerits for post-tensioning.

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

(a) Explain loss of prestress due to friction and length effect. State 2 remedial measures to avoid them.

(b) Describe the procedure of storage, transportation and erection of a given precast element.

(c) Discuss merits and demerits of pre-tensioning.

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

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

(b) A pre-tensioned concrete beam 150 mm wide and 300 mm deep is pre-stressed by straight wires carrying an initial force of 200 kN at an eccentricity of 55 mm. Calculate the percentage loss of prestress due to elastic deformation of concrete.

Take area of wire = 188 mm^2

E_s = 210 GPa and E_c = 35 GPa.

(c) A rectangular concrete beam of size 200 × 300 mm deep is pre-stressed by means of 15 wires of 6 mm diameter located at 75 mm from the bottom of the beam. Calculate the stresses at the extreme fibres of the mid span section it prestressing is 800 MPa and live load is 5 kN/M. Take span = 5 m and density of concrete is 24 kN/m^3. Sketch stress distribution diagram.
