

22508

11920

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) 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 precast non-structural components that can be used for speedy construction.
- (c) Define modules and modular co-ordination.
- (d) Define prestressed concrete and state types of prestressing steel.
- (e) What is basic principle of prestressed concrete ?
- (f) List the various types of loss of prestress in pretensioned prestressed member.
- (g) State cable profile in simply supported rectangular beam section.

- 2. Attempt any THREE of the following :** **12**
- (a) State any four advantages and four disadvantages of precast concrete.
 - (b) Describe any two design considerations for precast canal lining.
 - (c) Describe with sketch any two joints in door and window frame.
 - (d) Explain determination of water absorption of paver block and state acceptable limit as per IS.
- 3. Attempt any THREE of the following :** **12**
- (a) Explain the procedure of the storage, transportation and erection of pre-fabricated building elements.
 - (b) Explain any one method of pertrab system.
 - (c) Justify the necessity of use of high grade materials in prestressed concrete.
 - (d) State the advantages and disadvantages of prestressed concrete.
- 4. Attempt any THREE of the following :** **12**
- (a) Calculate the number of precast slab panels using specifications for components as per IS 15916 – 2010 for a room size 4 m x 5 m.
 - (b) Explain loss of prestress due to friction and slip of anchorage and state two remedial measures to avoid them.
 - (c) Illustrate cable profiles for eccentric straight and parabolic cables with sketches.
 - (d) Explain the effect of eccentric straight and parabolic cables on stresses at mid span and at support with formulae.
 - (e) A concrete beam supports concentrated load at centre on the simply supported span. Suggest a suitable cable profile.

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

- (a) Depict the effect of prefabricated building on the surrounding environment with respect to noise pollution, stacking at elements and transportation.
- (b) Explain Freyssinet system of prestressing with respect to process and application with sketches.
- (c) For what types of structures do you recommend post tensioning ?

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

- (a) A concrete beam is post tensioned by a cable carrying an initial stress of 1200 N/mm^2 . The slip at jacking end was observed to be 5 mm. The modulus of elasticity of steel is 210 kN/mm^2 . Estimate percentage loss of stress due to anchorage slip if the length of bema is (i) 25 m, (ii) 5 m
 - (b) A pre-tensioned concrete beam of rectangular cross section, 180 mm wide and 300 mm deep, is prestressed by nine high tensile wires of 7 mm diameter located at 100 mm from the soffit of beam. If the wires are tensioned to a stress of 1200 N/mm^2 , calculate the percentage of loss of stress due to elastic deformation assuming modulus of elasticity of concrete and steel are 31.5 kN/mm^2 and 210 kN/mm^2 respectively.
 - (c) A rectangular concrete beam of size $200 \times 300 \text{ mm}$ deep is prestressed 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 if 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.
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