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25226

3 Hours / 70 Marks

Seat No.

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- 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) Enlist four structural pre-cast elements.
 - b) Enlist the various types of concrete. (Any four)
 - c) Define modules and modular co-ordination.
 - d) Define pre-stressed concrete and state types of pre-stressing steel.
 - e) State the advantages and disadvantages of pre-stressed concrete with respect to other construction material.
 - f) Sketch the profiles for eccentric straight and parabolic cables.
 - g) Explain any four assumptions in analysis of pre-stressed concrete beams.

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- 2. Attempt any THREE of the following : 12**
- a) State the necessity / importance of pre-cast concrete.
 - b) Draw the typical cross-section of pre-cast door and window frames showing reinforcement.
 - c) Describe key features of pre-cast concrete box culvert.
 - d) What are the important tests to check quality of pre-cast systems? Explain any one of them in detail.
- 3. Attempt any THREE of the following : 12**
- a) Explain the procedure of the storage transportation and erection of pre-fabricated building element.
 - b) Differentiate between mixed and composite construction. (Any four points)
 - c) Differentiate between pre-stressed concrete and reinforced concrete.
 - d) State the situation in which wire, cable and tendon are used with justification.
- 4. Attempt any THREE of the following : 12**
- a) Calculate the number of pre-cast slab panels using specifications for components as per IS 15916–2010 for the room of size $3\text{m} \times 4\text{m}$.
 - b) Describe the process of applying pre-stressing force at different loading stages.
 - c) State the IS recommendations for % losses in case of pre and post-tensioning.
 - d) Explain in brief cable profile in simply supported rectangular beam section.
 - e) State the merits and demerits of post tensioning.

5. Attempt any TWO of the following : 12

- a) Write the functions, applications, advantages and disadvantages of :
 - i) Load-Bearing pre-cast wall panels.
 - ii) Non-load-Bearing pre-cast wall panels.
- b) Describe Hoyer system of pre-tensioning with diagram.
- c) State with justification the situations in which Freyssinet, Magnel Blaton and Gifford udall systems are applied.

6. Attempt any TWO of the following : 12

- a) What type of pre-stressing steel is used in pre-stressed concrete describe any two in details.
 - b) Describe with neat sketches about the following cable profiles in simply supported rectangular beam section.
 - i) Straight tendon
 - ii) Parabolic tendon
 - c) Describe the following losses of pre-stress after tensioning :
 - i) Loss due to creep of concrete
 - ii) Loss due to elastic deformation of concrete.
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