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BCEE-061

01928

DIPLOMA IN CIVIL ENGINEERING
DCLE(G)

Term-End Examination

June, 2013

BCEE-061 : PRESTRESSED CONCRETE

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions including question No.**1** which is **compulsory.** Use of calculator is* **permitted**. *Assume any missing data suitably.*

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1. Choose the most appropriate answer from the options given in each case : **2x7=14**

(a) If '2A' is the cross sectional area of a prestressed concrete beam which is subjected to a concentric prestressing force of 2P, the compressive stress induced in the beam is to be :

(i) A/P (ii) P/A

(iii) 2P/A (iv) P/2A

(b) Reinforcement providing prestress is called :

(i) splice

(ii) anchorage

(iii) end block

(iv) tendon

(c) Out of the following, which one is time dependent ?

(i) Elastic shortening

(ii) Creep of concrete

(iii) Relaxation of steel

(iv) both (ii) and (iii) above

(d) Anchorages are required in :

(i) pre-tensioned concrete

(ii) Reinforced cement concrete

(iii) Post - tensioned concrete

(iv) None of the above

(e) Fully prestressed members are included in :

(i) Type 1 (ii) Type 2

(iii) Type 3 (iv) None of the above

(f) Indian standard code dealing with prestressed concrete is :

(i) IS 1383 (ii) IS 1434

(iii) IS 1343 (iv) IS 4313

(g) A residual strain having a value of 300×10^{-6} is specified for loss due to :

(i) creep

(ii) shrinkage

(iii) anchorage slip

(iv) friction

2. (a) Describe various steps in the construction of a post - tensioned concrete beam briefly, giving sketches. 7

(b) Explain Hoyer's long line method of pre - tensioning. 7

3. (a) Describe any one system of post - tensioning. 7

(b) A prestressed concrete beam supports a live load of 1.2 kN/m over a simply supported span of 8m. The cross sectional size of beam is 100 mm by 250 mm (depth) with the shape being as rectangular. The beam is prestressed with a straight cable provided at an eccentricity of 40 mm. Find the magnitude of the prestressing force so that stresses at bottom fibre of central span section of beam due to self and live loads are balanced by the prestressing force. 7

4. (a) Enlist various types of losses of prestress in pre-tensioned concrete members. Discuss any one briefly. 7

(b) What is a 'Pressure line' ? Explain briefly with a neat sketch. 7

5. (a) What do you understand by Limit states ? Write names of some of such states. 7

(b) Discuss the concept of 'Load balancing' briefly. 7

6. (a) Explain why small sized prestressed concrete members are pre - tensioned, not post - tensioned. 7

(b) Discuss briefly why anchorages are needed in post - tensioned concrete members. 7

7. Write short notes on ***any two*** of the following : **2x7=14**

(a) Advantages of prestressed concrete

(b) Need of strong concrete for prestressed concrete

(c) Prestressed poles