DIPLOMA IN CIVIL ENGINEERING
DCLE(G)

00745 **Term-End Examination**
December, 2014

BCEE-061 : PRESTRESSED CONCRETE

Time : 2 hours   *Maximum Marks : 70*

*Note : Question no. 1 is **compulsory**. Attempt any **four** questions from the remaining. Use of calculator is allowed. Assume required data suitably, if found missing.*

1. Choose the most appropriate answer from the given options.   *7×2=14*

    (a) Stresses in tendons are
        (i) Compressive stresses
        (ii) Tensile stresses
        (iii) Shear stresses
        (iv) Bending stresses

    (b) Hoyer's long line method is used for
        (i) Pre-tensioning
        (ii) Post-tensioning
        (iii) Both the above
        (iv) None of the above

(c) Anchorages are required for
   (i) Pre-tensioned elements
   (ii) Post-tensioned elements
   (iii) Reinforced concrete elements
   (iv) None of the above

(d) A case in which tensile stresses are completely eliminated comes under
   (i) Moderate prestressing
   (ii) Limited prestressing
   (iii) Partial prestressing
   (iv) Full prestressing

(e) Which of the following can have either bonded or unbonded tendons :
   (i) Pre-tensioned elements
   (ii) Post-tensioned elements
   (iii) Both the above types of elements
   (iv) None of the above

(f) A time dependent effect in concrete responsible for loss of prestress is
   (i) Elastic shortening of concrete
   (ii) Creep
   (iii) Friction in duct
   (iv) Slip of anchorage

(g) Indian Standard Code of Practice for prestressed concrete elements is

   (i) IS : 1343-1985

   (ii) IS : 1353-1980

   (iii) IS : 1343-1980

   (iv) IS : 456-2002

2. (a) Write any three advantages of prestressed concrete. 7

   (b) Briefly explain, why concrete of a good strength is needed in prestressed concrete elements. 7

3. (a) Draw a neat sketch showing Hoyer's long line system. 7

   (b) What do you understand by a splice ? Explain the use of a splice in prestressed concrete member. 7

4. (a) Briefly explain the loss of prestress due to relaxation of steel. 7

   (b) A simply supported prestressed concrete beam of rectangular cross-section 400 mm × 600 mm is loaded with a uniformly distributed load. The UDL is applied on full span of the beam and its total value is 256 kN. The span of the beam is 6 m. Sketch the distribution of stresses of mid-span of the beam, if a prestressing force of 1920 kN is concentrically applied. 7

5. (a) What do you understand by a "pressure line" ? Explain briefly. 7

   (b) Explain briefly the concept of Load balancing. 7

6. (a) Show the typical crack patterns of bonded and unbonded prestressed concrete beam members with neat sketches. 7

   (b) What do you understand by Limit states of collapse and serviceability ? Explain briefly. 7

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

   (a) Prestressed concrete pipes

   (b) Durability of concrete

   (c) Post-tensioning systems

   (d) Devices used for tensioning tendons

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