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**DIPLOMA IN CIVIL ENGINEERING**  
**DCLE(G)**

**Term-End Examination**

**December, 2012**

**BCEE-061 : PRESTRESSED CONCRETE**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : Attempt Five questions including question No.1 which is compulsory. Use of scientific 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. 7x2=14
- (a) For pre-tensioned concrete members, minimum grade of concrete specified by the code is :
- (i) M 25
  - (ii) M 30
  - (iii) M 40
  - (iv) M 50
- (b) Nature of stresses induced in prestressed concrete members is :
- (i) tensile
  - (ii) compressive
  - (iii) shear
  - (iv) torsional

- (c) Load balancing :
  - (i) means balancing externally applied loads with prestresses.
  - (ii) is not connected to prestressed concrete members.
  - (iii) balances support reactions with external loads.
  - (iv) none of the above is correct.
- (d) Only axial compression shall be produced due to :
  - (i) axial prestressing only.
  - (ii) axial as well as eccentric prestressing.
  - (iii) eccentric prestressing only.
  - (iv) none of axial and eccentric prestressing.
- (e) More number of cracks are expected :
  - (i) in pre-tensioned members.
  - (ii) in post-tensioned members.
  - (iii) in steel members.
  - (iv) unbonded post-tensioned structures.
- (f) For a UDL, tendon profile should be :
  - (i) parabolic.
  - (ii) triangular.
  - (iii) trapezoidal.
  - (iv) circular.
- (g) Loss of prestress occurs in :
  - (i) steel structures.
  - (ii) concrete structures.
  - (iii) prestressed concrete structures.
  - (iv) masonry structures.

2. (a) Explain why a minimum grade of concrete is specified by the code for prestressed concrete. 2x7=14
- (b) A rectangular concrete beam, 100 mm wide by 250 mm deep, spanning over 8m is prestressed by a straight cable carrying an effective prestressing force of 250 kN located at an eccentricity of 40 mm. The beam supports a live load of 1.2 kN/m. Calculate the resultant stress distribution for the central cross section of the beam. Take density of concrete as 24kN/m<sup>3</sup>.
3. (a) What is the use of tendon splices? Discuss briefly. 7
- (b) Discuss loss of prestress due to elastic deformation of concrete. 7
4. (a) What do you understand by supplementary anchorage devices used in pre-tensioned concrete? Give sketches. 7
- (b) Define 'Pressure line'. How is it drawn ? 7
5. (a) Discuss why loss of prestress due to friction is considered only for post-tensioned members. 7
- (b) Describe various types of failures in prestressed concrete members briefly. 7

6. (a) Explain design procedure of rectangular prestressed concrete beam members. 7
- (b) Write a detailed note on various types of anchorage systems used in post-tensioned concrete, giving sketches. 7
7. Write short notes on *any four* of the following :  $4 \times 3\frac{1}{2} = 14$
- (a) Thermo-electric prestressing
- (b) Limit states
- (c) Prestressed concrete poles
- (d) Relaxation of stress in steel.
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