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BCEE-061

DIPLOMA IN CIVIL ENGINEERING

DCLE(G)

Term-End Examination

00541

June, 2015

BCEE-061 : PRESTRESSED CONCRETE

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is* ***compulsory****. Attempt any* ***four*** *questions from the remaining questions. 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) Which of the following is appropriate for the manufacture of railway sleepers ?

(i) Pretensioning

(ii) Post tensioning

(iii) Either of (i) or (ii) above

(iv) None of (i) or (ii) above

(b) What is the type of strain in tendons in prestressed members ?

(i) Tensile

(ii) Compressive

(iii) Shear

(iv) Bending

(c) Loss of prestress may take place due to

(i) Elastic shortening

(ii) Creep

(iii) Relaxation

(iv) All of the above

(d) For characteristic load, the percentage probability of not being exceeded is

(i) 50%

(ii) 75%

(iii) 90%

(iv) 95%

(e) The concept of transmission length is applicable to

(i) Pretensioned concrete

(ii) Post tensioned concrete

(iii) Both the above

(iv) None of the above

(f) Due to the use of high-strength concrete in prestressed concrete members, cross-sectional dimensions of members

(i) reduce

(ii) increase

(iii) are not subject to any change

(iv) may reduce or increase

(g) The minimum grade of concrete, to be used in post tensioned concrete, is

(i) M 30

(ii) M 40

(iii) M 50

(iv) M 60

2. (a) Write a brief note on the various applications of prestressed concrete. 7

(b) Explain why high-strength steel is needed in prestressed concrete components. 7

3. (a) Enlist the names of any two types of devices used for stretching of tendons. Explain any one type briefly. 7

(b) What is Hoyer's long line system of pretensioning ? Explain briefly. 7

4. (a) Discuss how conical wedges of Gifford-Udall system work. 7

(b) Compare pre and post-tensioning in brief. 7

5. (a) Draw a neat sketch of any one type of tendon splice. 7

(b) Write a short note on Thermo-electric prestressing. 7

6. (a) What do you understand by 'stress corrosion' ? Explain briefly. 7

(b) Explain 'hydrogen embrittlement' of tendons briefly. 7

7. (a) A simply supported beam of span 6 m is subjected to a UDL whose total value is 256 kN. The UDL is applied on full span of the beam. It is subjected to a prestressing force of 1920 kN with the tendon eccentrically located at 200 mm above the bottom fibre. Sketch the distribution of stresses at the mid-span of the beam. 7

(b) Discuss the concept of 'pressure line' briefly. 7