Reg. No. :

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Prestressing is economical for members of

   (a) Long span   (b) Medium span   (c) Short span   (d) All the above

2. Pre-stressed concrete members usually contain what type of reinforcement?

   (a) Concentric   (b) Eccentric   (c) Parabolic   (d) None of the above

3. Ultimate moment capacity of pre-stressed concrete beam depends on

   (a) amount of tensioning   (c) Eccentricity of cables

   (b) Loss in prestress   (d) All of the above

4. The moment of resistance of a rectangular section depends upon

   (a) Ultimate strain in concrete   (b) Area of high-tensile tendons

   (c) Tensile stress in concrete   (d) Shear strain in concrete

5. In post-tensioned system, end block is the region between end of beam and the section where

   (a) no lateral stresses exist   (c) shear stress are maximum

   (b) only shear stress exist   (d) only longitudinal stresses exist

6. Deflection of prestressed concrete beam is excessive in the

   (a) Precracking stage   (b) Elastic stage

   (c) Post-cracking stage   (d) None of the above

7. Theorem of three moments is used for analysis of

   (a) Indeterminate prestressed structures   (c) both type of structures

   (b) Determinate prestressed structures   (d) All types of structures

8. Composite construction using PSC and cast in situ concrete is adopted in

   (a) Water tanks   (b) Pipes   (c) Bridges   (d) Tunnels

9. Prestressed concrete is more desirable in case of

   (a) cylindrical pipe subjected to internal fluid pressure

   (b) cylindrical pipe subjected to external fluid

   (c) cylindrical pipe subjected to equal internal and external fluid pressures
   (d) cylindrical pipe subject to end pressures

10. A partially prestressed member is one in which

   (a) tensile stresses and cracking are permitted under service loads

   (b) no tensile stresses are permitted under service loads

   (c) mild steel is used in addition to prestressing steel

   (d) tensile stresses are permitted but not cracking at service loads

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. A rectangular prestressed concrete beam 150 mm wide and 300 mm deep is used over an effective span of 10m. The cable with zero eccentricity at the supports and linearly varying to 50 mm at the centre, carries an effective prestressing force of 500 kN. Find the magnitude of the concentrated load Q located at the centre of the span for the following conditions at the centre-of-span section:

   (i) If the load counteracts the bending effect of the prestressing force (neglecting self weight of beam),   (8)

12. A pretnsioned beam of rectangular section 400 mm wide by 1000 mm overall depth is prestressed by 800 mm^2 of high tensile steel wires at an eccentricity of 300 mm. If $f_{ck} = 40$ N/mm^2, fp = 1600 N/mm^2 estimate the ultimate flexural strength of the section as per IS: 1343 code provisions..   (8)

13. Elaborate the different deflection cases with formulas in prestressing of concrete.

                                                                                                   (8)

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14. Describe the methods of computing the ultimate flexural and shear strength of composite sections. (8)

15. Explain the applications of partial prestressing. (8)

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