composed of 6 wir 7 mm diameter, has an eccentricity of 50 m the center and zero at the supports.

Neglecting all losses, he central deflection of the beam due to combine ct of self weight, pressure and Live load of 2 kN/ 20

8. (a) What are the difl ways of improving the shear resistance of str l concrete members by pre stressing techni(10

(b) What is servicea limit state ? Discuss briefly the IS 1343 cc commendation regarding serviceability lir te. 10

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M.Tech. (Specialisation in Civil Engg. Structure Design) 1st Semester Examination, December–2017

PRE-STRESSED CONCRETE DESIGN

Paper-MTSD-103

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt any **five** questions. All questions carry equal marks. Assume suitable data if not provided. Use of relevant code is allowed.*

1. (a) What is pre-stressed concrete. Explain advantages and disadvantages of pre-stressed concrete over normal concrete. 10

(b) A pre-stressed concrete beam of section 120 mm wide and 300 mm deep is used an effective span of 6 meter to support a uniformly distributed load of 4 Kn/M which includes the self weight of the beam. The beam is pre stressed by a straight cable carrying a force of 180 KN and located at an eccentricity of 50 mm. Determine the location of thrust line in the beam and plot its position quarter and central span section. 10

2. (a) Explain the difference between load carrying Mechanism of reinforced and pre-stressed concrete beam section with sketch. 8

(b) A Pre-str concrete beam 120 mm wide and 300 mm d s pre-stressed by a cable which has an eccen of 100 mm at the centre of span section.T an of the beam is 6 meters. If the beam sup two concentrated loads of 10 kN each at t ird span points. Determine the magnitud he pre-stressing force in cable for load bala for combination of self weight and live load. 12

3. (a) Distingui tween Cable Line and Pressure Line with h in a typical pre-stressed concrete beam. 10

(b) Write a b ote on materials for pre-stressed concrete. 10

4. (a) Explain v etch the IS 1343 code method of computin ioment of resisting of rectangular section. 8

(b) A concret n of rectangular cross section 350 mm by 7 m deep supports a uniformly distribute of 20 kN/m in addition to its self weight. S a suitable cable profile and the pre stres force having an eccentricity of 200 at the e of the span to support the dead and live lo 12

5. (a) A post tensioned beam with unbounded tendons is of rectangular section 400 mm wide with an effective depth of 800 mm. The cross-sectional areas of the pre-stressing steel is 2840 mm^2. The effective pressure in steel after all the losses is 900 N/mm^2. The effective span of the beam is 14 m. if fck=40 N/mm^2, estimate the moment of resistance of the section using IS 1343 recommendation. 12

(b) List and explain various types of losses in pre tensioned and post tensioned members. 8

6. A rectangular concrete beam 360 mm deep and 200 mm wide is pre-stressed by means of fifteen 5 mm wires located 25 mm from the top of the beam. If the wires are initially tensioned to a stress of 840 N/mm^2. calculate the percentage loss of stress immediately after transfer, allowing for the loss of stress due to elastic deformation of concrete only. Es = 210kN/mm^2, Ec= 31.5 kN/mm^2. 20

7 A concrete beam with a cross-sectional area of 32X 103 MM^2 and radius of gyration of 72 mm is pre-stressed by a parabolic cable carrying an effective stress of 1000N/mm^2. The span of beam is 8 m. the cable,