

Dr. Sanyal

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- MAY- 2019

B.TECH 8TH Sem / M.Tech 2nd Sem

COURSE CODE: 12M1WCE231

MAX. MARKS: 35

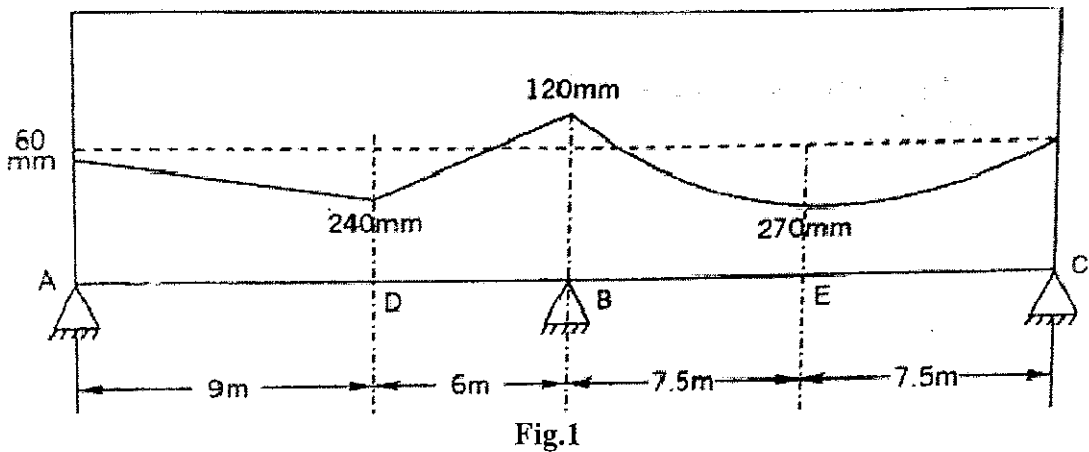
COURSE NAME: Prestressed Concrete Design

COURSE CREDITS: 3

MAX. TIME: 2 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume any suitable data if needed.

Q1. Locate the C-Line due to prestress alone for a continuous prestress concrete beam as shown in Fig 1. The Tendon has an eccentricity at A and bent sharply at D and B and has a parabolic profile for the span BC. Prestressing force is 1000kN. [7, CO-5]



Q2. Determine the profile (equation of cable) of a load balancing cable for a cantilever of prestressed concrete of length l and carrying udl load of w per unit run over the entire length. P is prestressing force. If the cantilever is 8m long and carries dead load of 8kN/m and live load of 25kN/m then find the prestressing force for the cable by load balancing method by balancing full dead load and half live load. The beam is 750mm deep. $e = 1/25^{\text{th}}$ of the length [6, CO-2]

Q3. Give reasons for the following

[10, CO1-CO3]

- Why mild steel is not used in prestressing?
- Why high strength concrete should be used in prestressed concrete?
- How prestressed concrete is different from conventional RCC?
- What are the factors influencing deflections?
- Prediction of long term deflections in PSC

PTO.....

Q4. Deduce an equation to find the short term deflection due to prestressing force alone for a beam as shown in the Fig 2. [4, CO4]

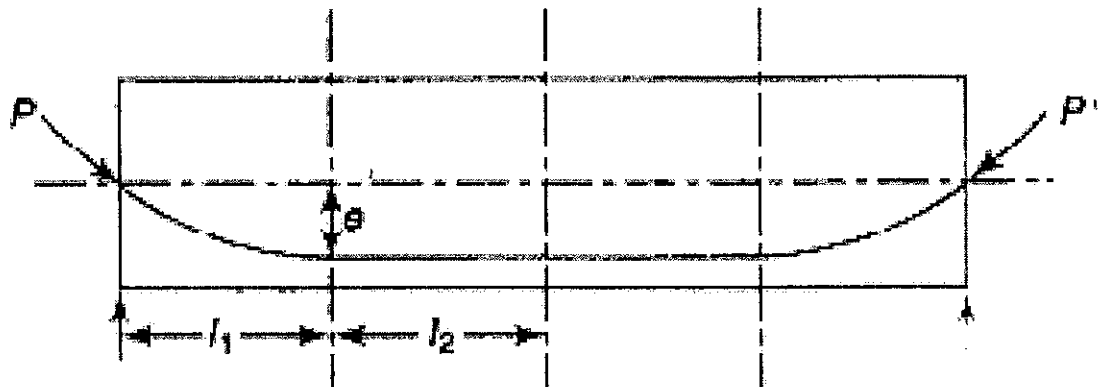


Fig. 2

Q5. A rectangular concrete beam of cross section $150\text{mm} \times 300\text{mm}$ is simply supported over a span of 8m and is prestressed by means of a symmetrical parabolic cable at a distance of 75mm from the bottom of the beam at mid span and 125mm from the top of the beam at supports sections. If the force in the cable is 350kN and modulus of elasticity is 38kN/mm^2 , calculate [4, CO4]

- The deflection at mid span when the beam is supporting its own weight.
- The concentrated load which must be applied at mid-span to restore it to the level of support.

Q6. In a post tensioned prestressed beam of rectangular section 250mm is to be designed for an imposed load of 12kN/m uniformly distributed over a span of 12m . The stress in concrete not to exceed 17 kN/mm^2 in compression and 1.4 kN/mm^2 in tension at any time and loss of prestress may be assumed to be 15% . Calculate [4, CO3]

- Minimum possible depth of the beam
- For the section provided find the minimum prestressing force required and corresponding eccentricity.