

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- May-2017

B.Tech 8th Sem/ M.Tech 2nd Sem

COURSE CODE: 12M1WCE231

MAX. MARKS: 35

COURSE NAME: PRESTRESSED CONCRETE DESIGN

COURSE CREDITS: 03

MAX. TIME: 2 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. What is a prestressed concrete? How it is different from reinforced concrete? Explain why high strength steel and concrete are used for prestressed concrete? (5)

Q2. For continuous prestressed concrete beam [Fig (a)], the tendon has an eccentricity at A and is bent sharply at D and B and has a parabolic profile for span BC. Locate the C-line due to prestress alone. $P=1000\text{kN}$ (6)

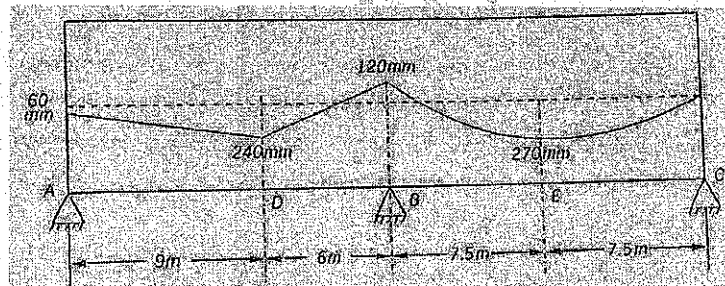


Fig (a)

Q3. Fig (b) shows the section of a prestress concrete beam of span 9m. The beam has to carry a superimposed load of 20kN/m . The prestressing force is transmitted by tendons in two cables. In each cable tendon consists of 14 wires of 5mm diameter subjected to an initial stress of 100N/mm^2 . Analysis the beam section at the center for the stresses induced before and after the application of the superimposed load. Allow 15% loss of prestress. (7)

Q4. Explain Freyssinet system of prestressing. Comment on advantages and disadvantages of this system. (5)

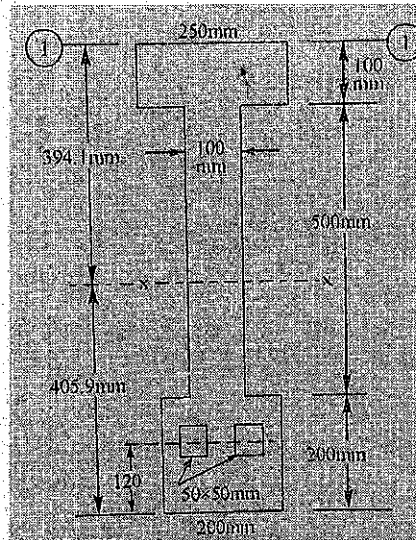


Fig (b)

Q5. A post tensioned cable of a beam 10m long is initially tensioned to a stress of 1000N/mm^2 at one end. If the tendons are curved so that the slope is 1 in 15 at each end with an effective area of 600mm^2 , calculate the loss of prestress due to friction given the following data: $\mu=0.55$, $K=0.0015/\text{m}$. during anchoring if there is a slip of 3mm at the jacking end calculate the final force in the cable and the prestressing loss of prestress due to friction and slip. (5)

Q6. Fig (c) shows the section of a prestressed concrete beam of span 15m. The beam is prestressed by 36 wires of 7mm diameter accommodated in 12 cables as shown in the Fig c. The initial prestress in the wires is 1000N/mm^2 . The beam has to carry a live load of 20kN/m . Determine the extreme fiber stresses in concrete for mid span section for the condition when losses is 15%. Density of concrete is 24kN/m^3 . (7)

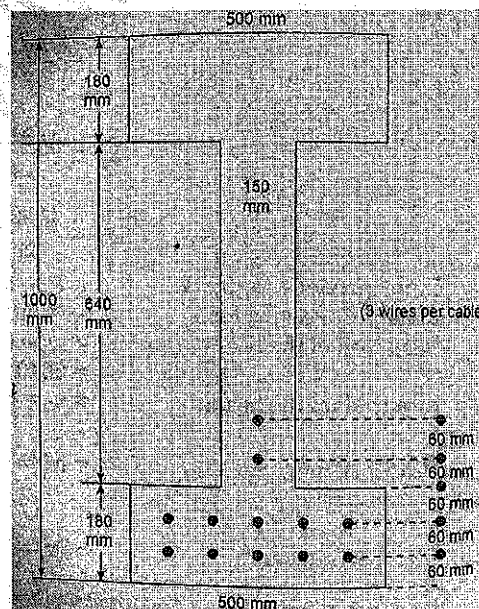


Fig (c)