JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- APR- 2018

B.TECH 8TH / M.Tech II Semester

COURSE CODE: 12M1WCE231   MAX. MARKS: 25

COURSE NAME: Prestressed Concrete Design

COURSE CREDITS: 3   MAX. TIME: 1.5 Hr

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. The percentage loss of prestress due to anchorage slip of 3mm in a concrete beam of length 30m which is post tensioned by a tendon subjected to an initial stress of 1200N/mm^2 and modulus of elasticity equal to 2.1×10^5 N/mm^2.   [CO2,CO3]   **(2)**

Q2. A rectangular beam of width B and total depth D is prestressed with tendons passing from the center of the beam. For a no tension design where σ_c is the permissible stress in concrete, Find the total moment carrying capacity of the beam in terms of σ_c?   [CO1]   **(2)**

Q3. Discuss pressure line and cable line in the analysis of prestressed concrete. [CO1,CO2]   **(5)**

Q4. A pretensioned beam 250mm×360mm is prestressed with 10 bars of 8m diameter initially stressed to 1000N/mm^2. The centroid of the steel wire is located at 105mm from the soffit. Determine the maximum stress in concrete immediately after transfer allowing elastic shortening of concrete only at the level of centroid of steel. [CO2,CO3]

If however, the concrete is subjected to additional shortening due to creep and shrinkage and steel is subjected to steel relaxation of 5% find the final percentage loss of stress in the steel wires. **(7)**

Q5. A prestressed concrete beam 250mm×360mm ha a span of 12m.The beam is prestressed by steel wires of area 350mm^2 provided at a uniform eccentricity of 60mm with an initial prestress of 1250N/mm^2. Determine the percentage loss of stress in the wires   [CO2,CO3]   **(7)**

a) If the beam is a pretensioned beam

b) If the beam is post tensioned beam

E$_s$= 210kN/mm^2 and E$_c$= 35 kN/mm^2

Q6. There is loss of prestress in post tensioned members due to elastic shortening. Justify this statement.   [CO2]   **(2)**