JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE UP EXAMINATION- APRIL 2018

B.Tech 8th Sem

COURSE CODE: 12M1WCE231 MAX. MARKS: **25**

COURSE NAME: PRESTRESSED CONCRETE DESIGN

COURSE CREDITS: 03 MAX. TIME: **1Hrs 30 Min**

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

Q1. A concrete beam 120mm×300mm deep is prestressed by a straight cable carrying an effective force of 180kN at an eccentricity of 50mm. The beam spanning over 6m supports a total udl of 4kN/m which included the self weight of the beam. The initial stress in the tendons is 1000N/mm^2. Determine the percentage increase of stress in the tendons due to the loading on the beam. E_s= 210 kN/mm^2 and E_c= 35 kN/mm^2 **(5)**

Q2. A rectangular concrete beam 100mm×250mm deep, spanning over 8m is prestressed by a straight cable carrying an effective prestressing force of 250kN located at an eccentricity of 40mm. the beam supports a live load of 1.2kN/m. **(5)**

a) Calculate the resultant stress distribution for the central cross section of the beam. The density of concrete may be taken as 24kN/m^3.

b) Find the magnitude of prestressing force with an eccentricity of 40mm which can balance the stresses due to dead and live loads at the bottom fiber of the central section of the beam.

Q3. Explain the principle of post tensioning. For what types of structures do you recommend post tensioning? **(5)**

Q4. List the various types of loss of prestress in pretensioned and post tensioned members. How do you compute the loss of stress due to elastic deformation of concrete? **(5)**

Q5. A prestressed concrete girder is post tensioned using a cable concentric at supports and having an eccentricity of 400mm at the center of the span. The effective span of the girder is 25m. The initial force in the cable is 400kN at the jacking end A. Determine the loss of force in the cable due to friction and wave effect and the effective force in the cable at the farther end B. Assume μ= 0.30 and K= 0.0043/m **(5)**