**Semester (8), HW No. (2), Design of Reinforced Concrete (3), 28/4/2025**

**QUESTION 1.** A two-span continuous prestressed concrete beam ABC (AB = BC = 15 m) has a uniform cross-section with a width of 250 mm and depth of 600 mm. A cable carrying an effective prestressing force of 500 kN is parallel to the axis of the beam and located at an eccentricity of 200 mm:

(a) Determine the secondary and resultant moment developed at the mid-support section B.

(b) If the beam supports an imposed load of 2.4 kN/m, calculate the resultant stresses developed at the top and bottom of the beam at B. Also locate the resultant line of thrust through the beam AB.

**QUESTION 2.** An unsymmetrical I-section beam is to support an imposed load of 2kN/m over a simple span of 8m. The section details are as shown below. An effective pre-stressing force at mid-span section is 100 kN applied at 50mm from the soffit (bottom) of the beam: **a.** Calculate the stresses at mid-span section of the beam for the following conditions: **i)**The stresses at transfer. **ii)** The service stresses. **b.**If the effective pre-stressing force is increased to 500 kN, and the modulus of rupture of concrete is 6.5 N/mm2, and the live load is 2 kN/m, calculate the safety factor against cracking.

A drawing of a letter

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**Submit on Monday 5/5/2025.**