**Test No. (2), Prestressed Concrete, Semester (8), 12/5/2025.**

**Answer ALL Questions Allowed Time: Two Hours**

* **QUESTION 1.** A rectangular concrete beam of cross-section 120 mm wide and 300 mm deep is prestressed by a straight cable carrying an effective force of 200 kN at an eccentricity of 50 mm. a) Calculate the stresses due to the prestress. b) If the modulus of rupture of concrete is 6 N/mm2, and the load factor against cracking is 1.6, calculate the imposed load that can be supported by the beam over a span of 5 m. c)Assuming the self-weight of concrete as 24 kN/m3: Calculate the resultant stress at the bottom due to prestress and loads (DL & IL). Use the IL you calculated in item (b) above.
* **QUESTION 2.** A continuous prestressed concrete beam ABC (AB = BC = 12 m) has a uniform rectangular cross-section with a width of 100 mm and depth of 300 mm, is simply supported at A & C. The cable carrying an effective prestressing force of 400 kN is parallel to the axis of the beam and located at 100 mm from the soffit (bottom). (a) Determine the secondary and resultant moment at the central support B. (b) If the stress at the top of the beam resulting from prestress & loadings is 22.7 N/mm2. Calculate: i) the imposed load on the beam, and ii) the resulting stress at the bottom. Assume density of concrete as 24 kN/m3. (c) Locate the resultant line of thrust through beam AB.

**ملحوظة هامة:**

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