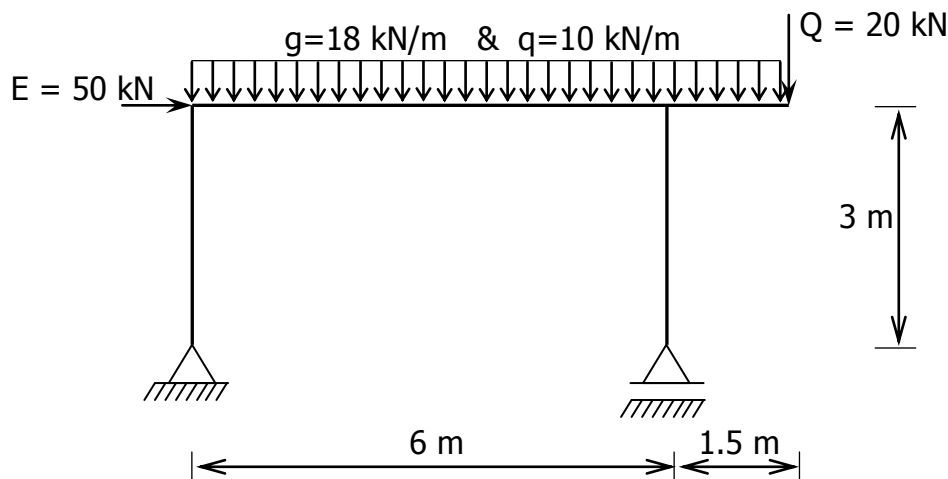# CE 382 HOMEWORK 2[1]

1. The standard cylinder test results of two different ready-mix concrete companies are provided below. Calculate the mean strength, standard deviation, coefficient of variation, characteristic strength, and class of concrete for both companies. Draw the concrete strength distribution curves and comment on your results.

Company I: 16.2, 18.0, 18.9, 20.4, 20.8, 21.2, 22.4, 22.6, 23.7, 24.1, 24.6, 24.9, 25.2, 25.5, 25.8, 26.2, 26.6, 27.0, 27.4, 27.5, 27.9, 28.0, 28.2, 28.8, 29.1, 29.4, 29.7, 30.3, 30.4, 30.8, 31.0, 31.6, 32.2, 32.4, 32.7, 33.3, 33.9, 34.5, 34.7, 35.1, 36.1, 36.6, 37.0, 37.9, 39.2, 41.4 MPa

Company II: 17.7, 18.1, 18.8, 19.6, 20.0, 20.2, 20.7, 20.9, 21.1, 21.3, 21.8, 22.2, 22.4, 22.4, 22.6, 22.7, 22.8, 22.9, 23.1, 23.3, 23.4, 23.8, 23.9, 24.0, 24.2, 24.5, 24.6, 24.7, 24.8, 24.9, 25.3, 25.4, 25.8, 26.0, 26.2, 26.5, 26.8, 26.9, 27.1, 27.2, 27.4, 27.5, 27.9, 28.3, 28.9, 29.5 MPa

2. A simple supported one bay - one story frame is given in the figure below. The uniformly distributed dead and live loads on the beam and overhang are $g = 18$ kN/m and $q = 10$ kN/m, respectively. There is a point live load of $Q = 20$ kN at the tip of the overhang. Additionally, a lateral earthquake loading of $E = 50$ kN hits on to the structure as shown. Considering all possible load combinations and live load arrangements, calculate the design moments and design shear forces of all columns and beams.