ESO 202A/204: Mechanics of Solids (2016-17 II Semester)
Assignment No. – 10

10.1 Determine the equation of the elastic curve for the beam shown in Fig. 10.1 due to an imposed small vertical displacement, Δ, at the end. The beam has length, L, and constant flexural rigidity, EI. Hint: start with fourth order differential equation.

10.2 Find reaction at support B (Fig. 10.2) using superposition method.

10.3 The cantilever beam, AB, shown in Fig. 10.3 has a bracket, BCD, attached to its free end. A force, P, acts at the end of the bracket. Find the ratio a/L, so that i) the vertical deflection, ii) angle of rotation of beam at point, B, will be zero. Use the method of superposition.

10.4 A 0.75 m long cantilever of contact flexural rigidity, EI = 30 kN-m^2, initially has a gap of 0.5 mm between its end and the spring with k = 1800 kN/m. If a force of 450 N is applied to the cantilever as shown in Fig. 10.4, how much of this force will be carried by the spring? Use the method of superposition.

10.5 Fig. 10.5 shows two beams AB and BC, each of flexural rigidity EI, which are hinged at B. The beam AB is hinged at A and supported on roller at D, whereas the beam BC is supported on roller at H. Determine the vertical deflection under the load, P, by using the method of superposition.

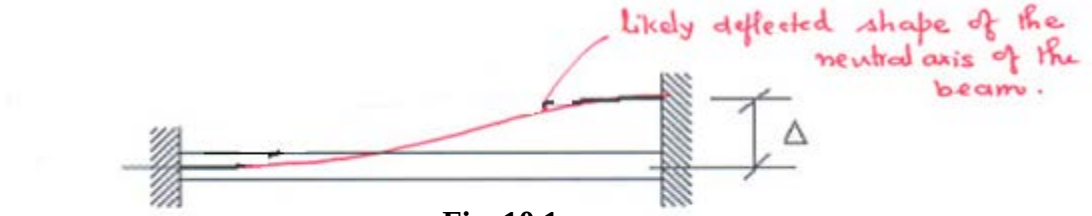

Fig. 10.1

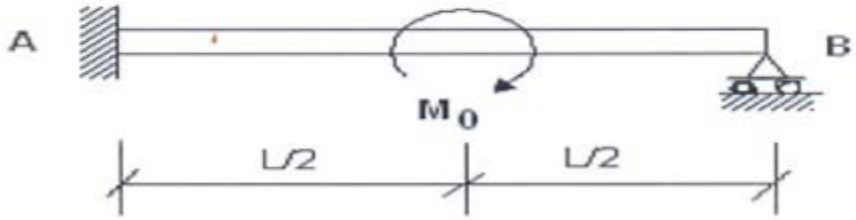

Fig. 10.2

ESO 202A/204: Mechanics of Solids (2016-17 II Semester)
Assignment No. – 10

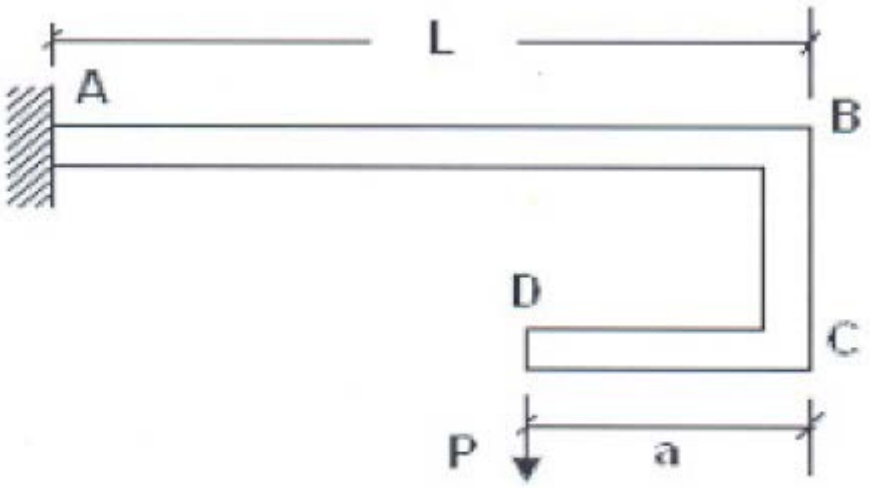

Fig. 10.3

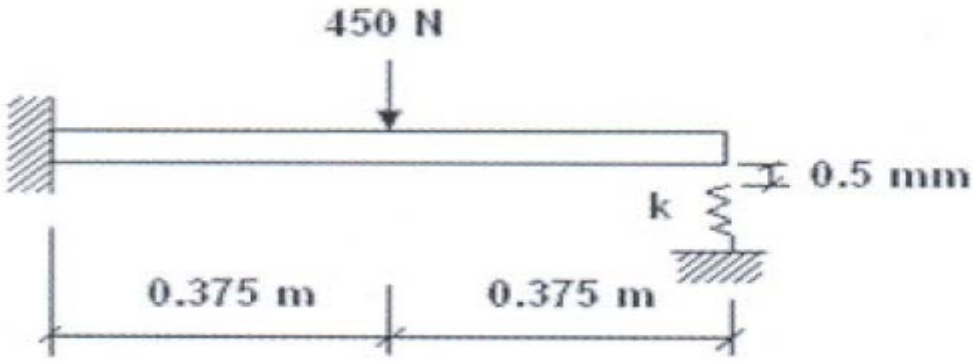

Fig. 10.4

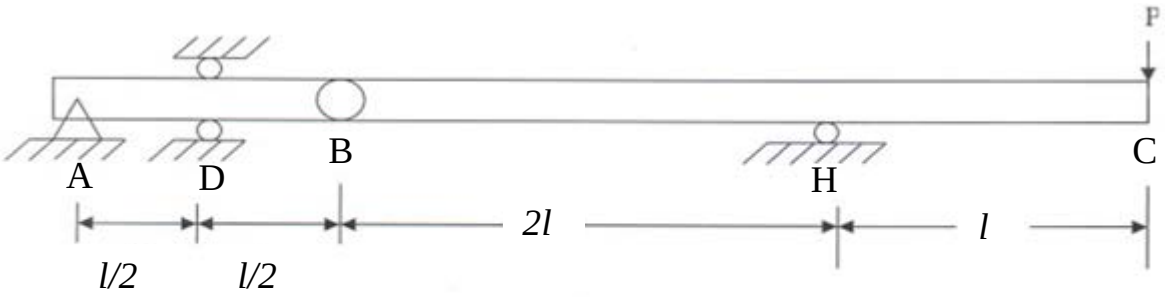

Fig. 10.5