



A uniform smooth disc with centre O and radius a is fixed at the point D on a horizontal surface. A uniform rod of length $3a$ and weight W rests on the disc with its end A in contact with a rough vertical wall. The rod and the disc lie in a vertical plane that is perpendicular to the wall. The wall meets the horizontal surface at the point E such that $AE = a$ and $ED = \frac{5}{4}a$. A particle of weight kW is hung from the rod at B (see diagram). The coefficient of friction between the rod and the wall is $\frac{1}{8}$ and the system is in limiting equilibrium. Find the value of k . [8]