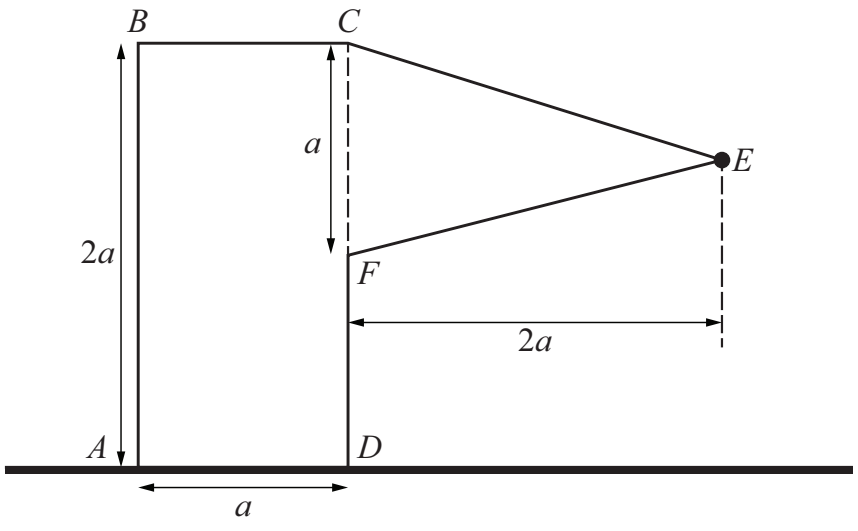
4



An object consists of a uniform lamina with a particle attached. The uniform lamina *ABCEFD* of mass m is formed from a rectangle *ABCD* and an isosceles triangle *CEF*, where *F* is the midpoint of *CD*. The rectangle has sides $AB = 2a$ and $AD = a$. The triangle *CEF* has base a and height $2a$. The particle of mass km is attached to the lamina at *E*. The object rests in a vertical plane with its edge *AD* on horizontal ground (see diagram).

Given that the object is on the point of toppling in its vertical plane about the vertex *D*, find the value of k. [4]