A particle of mass $m$ moves in a circle of radius $R$ under the influence of the attractive central force

$$F = -\frac{K}{r^2}e^{-r/a}$$

$K$, $a$ are constants and $r$ is the radial distance from the origin.

(a) What quantities are conserved? Express any that you find in terms of the given parameters.

(b) Determine under what conditions the circular orbit is stable.

(c) Compute the frequency of small oscillations about a stable circular orbit, in terms of the given parameters and conserved quantities.