Vector Functions and Space Curves

Question

The vector function $\vec{r}(t) = \cos(t)\vec{j} + \sin(t)\vec{k}$ parameterizes the intersection of two surfaces in space. Which of the following surfaces could form the pair?

I. the plane $x = 0$

II. the circular cylinder $y^2 + z^2 = 1$

III. the sphere $x^2 + y^2 + z^2 = 1$

IV. the hyperbolic cylinder $y^2 - z^2 = 1$

A. The pairs (I,II) and (I,III) only.

B. The pair (I,II) only.

C. The pairs (I,II) and (I,III) and (I,IV) only.

D. The pairs (I,II) and (I,III) and (II,III) only.

E. There is not enough information to decide.