

Answer on Question#40948, Physics, Mechanics - Kinematics - Dynamics Question: For a biological sample in a 1.0-m radius centrifuge to have a centripetal acceleration of 25g, ($g = 9.8 \text{ m/s}^2$) its speed must be:
A. 11 m/s B. 16 m/s C. 50 m/s D. 122 m/s E. 245 m/s
Solution. The formula for centripetal acceleration is

$$a = \frac{v^2}{r}$$

So, if we want it to be equal to $25g$,

$$25g = \frac{v^2}{r}$$

and velocity is

$$v = \sqrt{25gr} = 5\sqrt{gr} = 5\sqrt{9.8 \cdot 1} \approx 16 \text{ m/s}$$