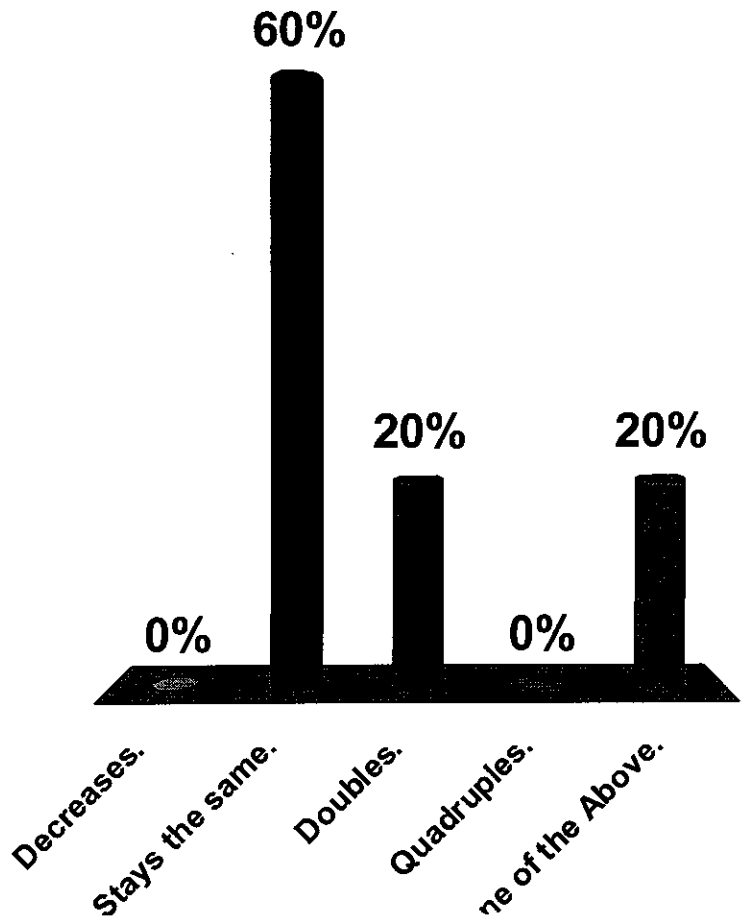
2-19-07@

If the speed of a body in uniform circular motion doubles, the force, $|\mathbf{F}_{cent}|$, required to keep it in circular motion:

1. Decreases.
2. Stays the same.
3. Doubles.
✔4. Quadruples.
5. None of the Above.



If the speed doubles, the force must quadruple; as follows.

Since $|\mathbf{F}_{cent}| = m\mathbf{v}^2/R$,

doubling **v** -> 2**v** replaces the right hand side by:

$m(2\mathbf{v})^2/R = 4\,(m\mathbf{v}^2/R)$, and (by NII) the new force must be

$$|\mathbf{F}^{NEW}_{cent}| = 4\,|\mathbf{F}_{cent}|.$$

Therefore, the correct answer is #4: The force quadruples.