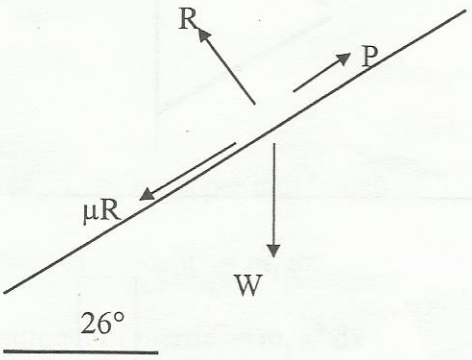
1999

7 (a) A particle of weight W rests on a rough plane inclined at 26° to the horizontal. P is the least force, acting up along the plane needed to move the particle up the plane. Prove that if P is less than W then the angle of friction is less than 32°.



5

$\mu = \tan\lambda$ 5

$P = \mu R + W \sin 26°$ 5

$= \tan\lambda\ (W \cos 26°) + W \sin 26°$

$P < W$

$\tan\lambda\ (W \cos 26°) + W \sin 26° < W$ 5

$\sin\lambda \cos 26° + \cos\lambda \sin 26° < \cos\lambda$

$\sin(\lambda + 26) < \cos\lambda$ ← NOTE

$\sin(\lambda + 26) < \sin(90 - \lambda)$ ✓

$\lambda + 26 < 90 - \lambda$

$\lambda < 32°$ 5