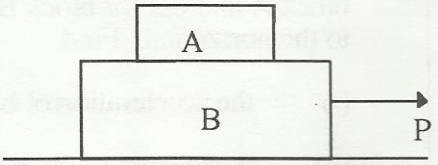
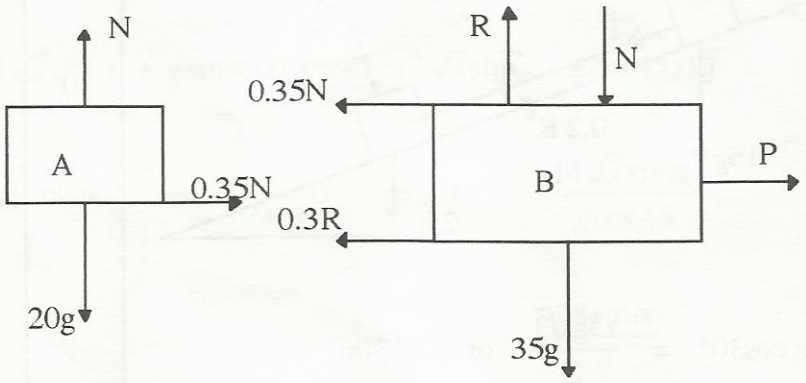
1998

4 (b) The two blocks shown in the diagram are at rest on a horizontal surface when a force P is applied to block B. Blocks A and B have masses 20 kg and 35 kg, respectively. The coefficient of friction between the two blocks is 0.35 and the coefficient of friction between the horizontal surface and block B is 0.3.



Determine the maximum force P, before A slips on B.



frictional force 5

Block A vert. $N = 20g$ 5

horiz Force = mass x acceleration

$0.35(20g) = 20\,a$

$\Rightarrow \quad a = 0.35g$

Block B vert. $R = N + 35g$ 5

horiz Force = mass x acceleration

$P - 0.35(N) - 0.3(R) = 35\,a$

$P - 0.35(20g) - 0.3(20g + 35g) = 35(0.35g)$

$\Rightarrow \quad P = 35.75g$ or 350.35 N 5

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