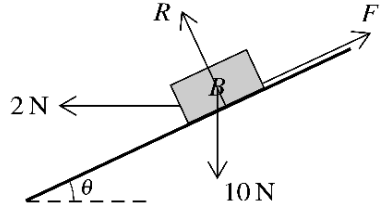
Question		Answer	Marks	AO	Guidance	
9	(a)		B1	1.2	Correct force diagram showing the weight, normal contact, and frictional contact forces only (but ignore labelling of these forces even if labelled incorrectly) but must include all arrows pointing in the correct direction – the line of action of all forces must pass through the block (or imply passing through the block) but do not need to be attached to the block	Ignore components of any of the three forces if shown – if **only** components shown then **B0**
			[1]			

Question		Answer	Marks	AO	Guidance	
9	**(b)**		**M1***	**3.3**	Resolving parallel **or** perpendicular to the plane – correct number of terms - **must** be using 10 for the weight so no marks until this value used/applied (however, see **SC** in the final **A** mark)	Allow sin/cos confusion and sign errors – **but the 2 and 10 must be resolved and the *R* and *F* should not** (if considering $\perp$ & $\parallel$)
		$R+2\sin\theta=10\cos\theta$ $F=2\cos\theta+10\sin\theta$	**A1** **A1**	**1.1** **1.1**	Condone $\leqslant$ or $\geqslant$ with F for this mark but withhold the final **A** mark	Where R is the normal contact force and F is the frictional contact force
		$2\cos\theta+10\sin\theta\leqslant 0.8(10\cos\theta-2\sin\theta)$	**M1dep***	**3.4**	Applying $F\leqslant\mu R$ or $F=\mu R$ to obtain an equation/inequality in θ only – where R and F are a linear combination of the correct number of relevant resolved terms	
		$10\cos\theta+50\sin\theta\leqslant 40\cos\theta-8\sin\theta$ $(\tan\theta\leqslant\frac{30}{58}\Rightarrow$ greatest value of) $\tan\theta$ is $\frac{15}{29}$	**A1**	**2.2a**	oe e.g. $\frac{30}{58}$ but **A0** for $\frac{6}{11.6}$ as a final answer. Allow awrt 0.517. Isw if candidates go on to work out θ. Allow $\tan\theta\leqslant\frac{15}{29}$ (oe) as a final answer	Can use equals throughout (no justification required) But **not** $\tan\theta<\frac{15}{29}$ **If using 10*g* for the weight**, then **SC M1* A1 A0 M1dep* A0** max (where the first A mark is for both equations correct using 10*g* rather than 10)
			[5]			
		Alternative for first three marks	**M1***		Resolving vertically and horizontally	**M1 conditions as above**
		$R\cos\theta+F\sin\theta=10$	**A1**			
		$F\cos\theta=2+R\sin\theta$	**A1**		**Final M1dep* and A marks as above**	