Question number	Scheme	Marks
1		
1(a)	Use of $P=Fv$ $\left(D=\dfrac{20\,000}{\lambda}\right)$	M1
	Equation of motion $D-1200g\sin\theta-26\lambda=1200a$	M1
	$\dfrac{20000}{\lambda}-1200g\dfrac{1}{14}-26\lambda=1200(0.75)$ $\left(26\lambda^2+1740\lambda-20000=0\right)$	A1
	$\lambda=10\ \Rightarrow\ R=260$*	A1*
		(4)
	ALTERNATIVE using *R*	
	Use of $P=Fv$ $\left(D=\dfrac{20\,000}{\lambda}\right)$ and R=26λ to give $D=\dfrac{20000}{\frac{R}{26}}=\dfrac{520\,000}{R}$	M1
	Equation of motion $D-1200g\sin\theta-R=1200a$	M1
	$\dfrac{520\,000}{R}-1200g\times\dfrac{1}{14}-R=1200a$ $\left(R^2+1740R-520\,000=0\right)$	A1
	R=260*	A1*
1(b)	Equation of motion	M1
	$D'+1200g\sin\theta-260=1200(1.8)$	A1
	$\dfrac{P}{12}+\dfrac{1200g}{14}-260=1200(1.8)$	A1
	$P=19000$	A1
		(4)
		(8)

	Notes for question	
(a)		
M1	Use of $P = Fv$, $\left(D = \frac{20\,000}{\lambda} \right)$	
M1	Equation of motion. Dimensionally correct, correct number of terms, condone sin/cos confusion and sign errors. Trig and *D* do not need to be replaced. Allow *R* for 26λ	
A1	Correct unsimplified equation in λ only or λ and *g*.	
A1*	Given answer obtained from correct working. Must see λ=10 A0 if *R*=260 appears without seeing λ=10	
	ALTERNATIVE	
M1	Use of $P = Fv$ and and R=26λ to form expression for *D*.	
M1	Equation of motion. Dimensionally correct, correct number of terms, condone sin/cos confusion and sign errors. Trig and *D* do not need to be replaced	
A1	Correct unsimplified equation in *R* only or *R* and *g*.	
A1*	Correct answer obtained from correct working,	
(b)		
M1	Equation of motion. Dimensionally correct, correct number of terms, condone sin/cos confusion and sign errors.	
A1	A correct unsimplified equation of motion. Trig does not need to be replaced but does for final A mark.	
A1	Replace trig in equation of motion and use $\frac{P}{12}$ to produce a correct unsimplified equation in *P* only.	
A1	Correct answer, 2/3sf only. Accept *P* = 19 000 only	