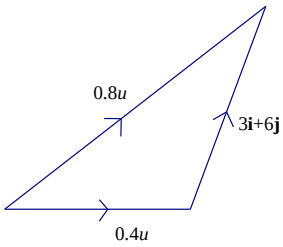
Question Number	Scheme	Marks
3		
	Components of final momentum: **i** direction $0.4u+3$ **j** direction 6	M1
	Use of Pythagoras' theorem: $(0.4u+3)^2+6^2=(0.8u)^2$	M1
	$(4u^2-20u-375=0)$	A1
	Solve a 3 term quadratic for *v*: $(2u+15)(2u-25)=0$	M1
	$u=\frac{25}{2}(=12.5)$	A1
		(5)
3alt 1	Modulus and direction of impulse	M1
	Use of cosine rule: $(0.8u)^2=(0.4u)^2+45-2\times0.4u\times3\sqrt{5}\times-\frac{1}{\sqrt{5}}$	M1
	$(4u^2-20u-375=0)$	A1
	Solve a 3 term quadratic for *v*: $(2u+15)(2u-25)=0$	M1
	$u=\frac{25}{2}(=12.5)$	A1
		(5)
3alt 2	Components of final velocity: **i** direction $u+7.5$ **j** direction 15	M1
	Use of Pythagoras' theorem: $(u+7.5)^2+15^2=(2u)^2$	M1
	$(u^2-5u-93.75=0)$	A1
	Solve a 3 term quadratic for *v*: $(u+7.5)(u-12.5)=0$	M1
	$u=12.5$	A1
		(5)
		Total 5

Notes	
M1	Attempt components of final momentum. Must have 0.4 with *u* and no mass with 3/6. Condone sign errors
M1	Use Pythagoras theorem to find magnitude of final momentum
A1	A correct equation reached.
M1	Solve a 3 term quadratic. Implied by correct answer to correct equation, but if either equation or answer is wrong, then clear method must be shown. (Correct use of formula or factorising with correct products for their equation).
A1	Must specify 12.5

Notes on Question 3 Alt 1	
M1	Find magnitude and direction of impulse $\lvert I\rvert = 3\sqrt{5} \quad \theta = \tan^{-1} 2$
M1	Use cosine rule to form equation in u.
A1	Correct equation (unsimplified)
M1	Solve a 3 term quadratic. Implied by correct answer to correct equation, but if either equation or answer is wrong, then clear method must be shown. (Correct use of formula or factorising with correct products for their equation).
A1	Must specify 12.5

Notes on Question 3 Alt 2	
M1	Attempt to find components of final velocity. Condone sign errors. Must have divided 3/6 by 0.4
M1	Use Pythagoras theorem to find magnitude of final velocity
A1	A correct equation reached.
M1	Solve a 3 term quadratic. Implied by correct answer to correct equation, but if either equation or answer is wrong, then clear method must be shown. (Correct use of formula or factorising with correct products for their equation).
A1	Must specify 12.5