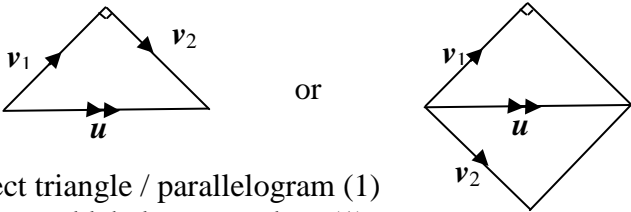


Question			Answers / Explanatory notes	Marks available
3	(a)	(i)	[One in which] no <u>kinetic</u> energy is lost.	1
		(ii)	$\frac{1}{2}mu^2 = \frac{1}{2}mv_1^2 + \frac{1}{2}mv_2^2$ (1) cancel the $\frac{1}{2}m$'s (1)	2
	(b)		 correct triangle / parallelogram (1) arrows and labels u , v_1 and v_2 . (1) rt angle (1)	3
	(c)		D_1 increases $\rightarrow y$ increases (1) D_2 increases $\rightarrow y$ increases (1) d increases $\rightarrow y$ decreases (1) [accept d cannot change!] ϕ increases $\rightarrow y$ increases (1)	4
	(d)	(i)	λ is smaller [for blue] (1) θ is smaller [so more resolution] (1) <div style="border: 1px solid black; padding: 2px; display: inline-block;">accept converse</div>	2
		(ii)	If I increases W increases [or converse] (1), so θ decreases [and hence improved resolution] (1)	2
	(e)		$W = 0.002$ m (1) [from passage] $\lambda = 4.9 \times 10^{-7}$ m (1)	2
	(f)		More diffraction [when W decreases]	1
	(g)		$\phi = 0$ (1) $D_1 = D_2 = \sqrt{0.9^2 + 0.9^2}$ (1) [= 1.27 m] $\theta = \frac{0.02 \times 0.0525 \times 1}{1.27 \times 1.27} = 0.66$ mrad (1)	3
				[20]