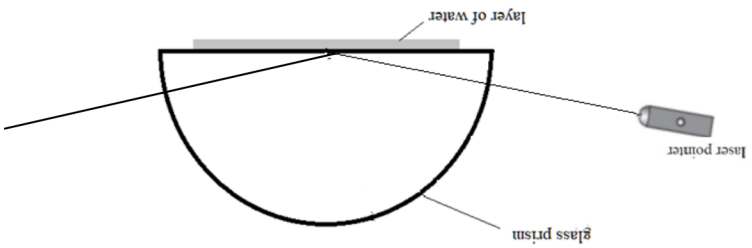
Question Number	Answer		Mark
18(a)	**MAX 4** A wavefront is a line on which all points are in phase	**(1)**	
	The wavefronts are parallel to the boundary (between air and glass) **Or** The wavefronts are perpendicular to the normal **Or** Light is (travelling) along the normal **Or** Light is (travelling) perpendicular to the (surface of the) glass block	**(1)**	
	So all of the (points on the) wavefront enter the glass at the same time	**(1)**	
	The wave slows down (as it enters the glass block)	**(1)**	
	But the whole wavefront travels the same distance in the same time (so the ray does not change direction)	**(1)**	**4**
18(b)	Use of $n_1 \sin\theta_1 = n_2 \sin\theta_2$	**(1)**	
	Substitution of $\theta_2 = 90^o$	**(1)**	
	$c = 62$ (°)	**(1)**	**3**
	<u>Example of calculation</u> $1.51 \times \sin c = 1.33 \times \sin 90^0$ $c = 61.7^o$		
18(c)	Ray reflects off glass / water interface with no refracted ray	**(1)**	
	Angle of reflection = Angle of incidence (by eye)	**(1)**	
	Ray is undeviated at glass / air interface	**(1)**	**3**
	<u>Example</u>  		

18(d)	(Some of) the light (travelling from the glass) is refracted/transmitted into the fingers/ridges/skin **(1)** Dark areas where fingers/ridges/skin is in contact with glass **(1)** (Some of) the light (travelling from the glass) is reflected from the air/valley **(1)** Light areas where air is in contact with glass. **(1)**	**4**
	Total for question 18	**14**