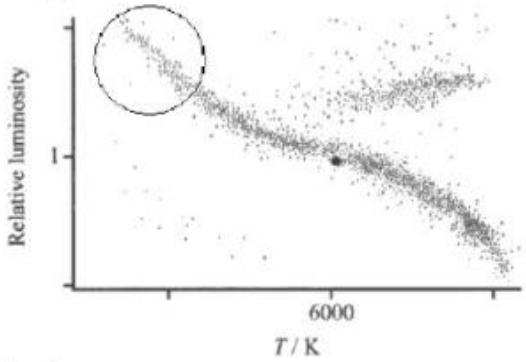
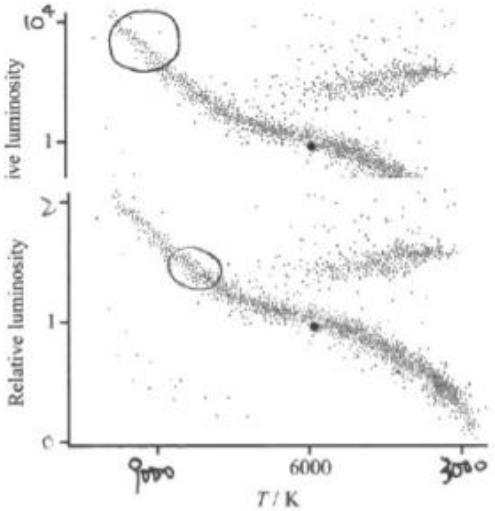
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

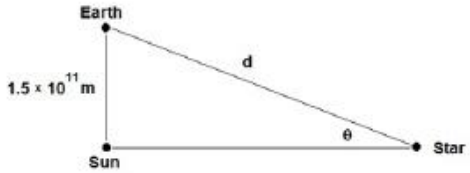
Mark Schemes

Q1.

Question Number	Answer		Mark
(a)	Luminosity scale: Log scale [$10^3 \rightarrow 10^6$ (top) and $10^{-3} \rightarrow 10^{-6}$ (bottom)]	**(1)**	
	Temperature scale: reverse log/power scale [e.g. 12,000 (left) and 3000 (right)]	**(1)**	**2**
(b)(i)	(Fusion of) hydrogen into helium [accept symbols]	**(1)**	**1**
(b)(ii)	Circle around stars top left of main sequence [included in the area indicated below]	**(1)**	
			
	Max 2		
	They have the highest temperatures **Or** they are the most luminous [accept brightest]	**(1)**	
	(Because) they fuse H (into He) at the highest/higher rate	**(1)**	
	(Because) they have the largest/larger gravitational forces	**(1)**	**3**
	[Max 1 mark if no comparative]		
		Both scale marks and correct area identified Neither scale mark and area too low	

	Total for question	**6**

Q2.

Question Number	Answer		Mark
(a)	**Max 6**		
	The young star cluster consists (mainly) of main sequence stars	(1)	
	The old star cluster has a truncated main sequence	(1)	
	The old star cluster has lost its heaviest main sequence stars	(1)	
	The old star cluster has (many) red giant stars	(1)	
	The old star cluster has (some) white dwarf stars	(1)	
	Massive main sequence stars are the first stars (to deplete sufficient hydrogen in their core) to evolve into red giant stars.	(1)	
	Some red giant stars have evolved into white dwarf stars in the old cluster	(1)	**6**
(b)(i)	Star A is closer to Earth than Star B	(1)	**1**
(b)(ii)			
	Use of appropriate trigonometric relationship	(1)	
	$d = 4.0 \times 10^{16}$ m	(1)	**2**
	Example of calculation: $\sin\theta = \frac{1.5\times10^{11}\text{ m}}{d}$ $d = 4.01 \times 10^{16}$ m		
(c)	$\lambda_{max} = 1.0 \times 10^{-6}$ m	(1)	
	Use of $\lambda_{max} T = 2.9 \times 10^{-3}$	(1)	
	$T = 2900$ K	(1)	**3**
	Example of calculation: $T = 2.9 \times 10^{-3}$ m K/1.0×10^{-6} m = 2900 K		
	Total for question		**12**