Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

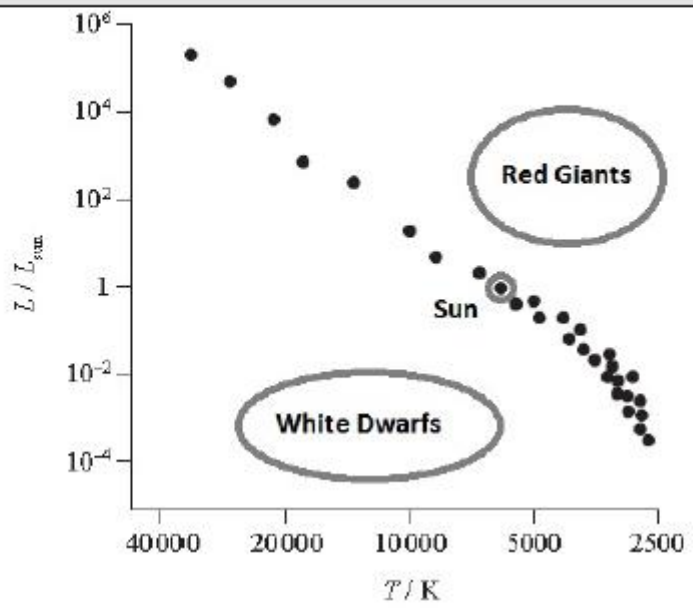
Question Number	Answer	Mark
	Galaxies are receding (1) **Or** galaxies are moving away (from us and from each other) (1) **The** greater the distance the greater the velocity (1) The universe is expanding	3
	Total for question	**3**

Q2.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• Use of $L = 4\pi r^2 \sigma T^4$ (1) • Use of $I = \frac{L}{4\pi d^2}$ (1) • $I = 1.37$ (kW m^{-2}) (1) • This is less than 2 (kW m^{-2}) and so the claim is false. (1)	Example of calculation: $L = 4\pi(6.96\times10^{8}\text{m})^2\times5.67\times10^{-8}\text{W}$ r $L = 3.88 \times 10^{26}$ W $I = \frac{3.88\times10^{26}\text{W}}{4\pi(1.50\times10^{11}\text{m})^2} = 1372$ W m^{-2}	4

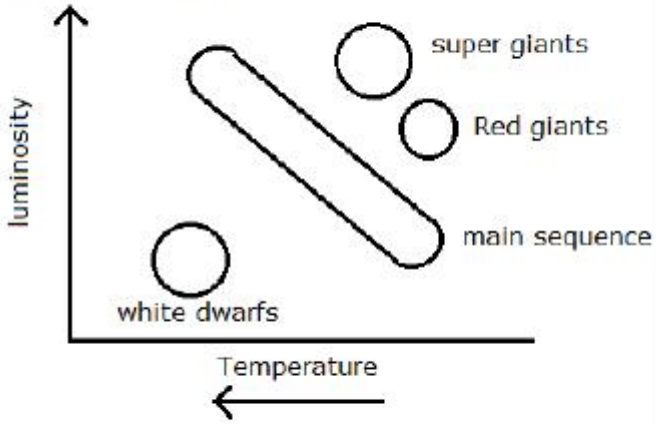
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Q3.

Question Number	Answer	Mark
		
(i)	Sun's position identified [single point identified] **(1)**	
(ii)	White dwarf region **(1)** Red giant region **(1)**	3
*(iii)	(QWC – Work must be clear and organised in a logical manner using technical wording where appropriate) White dwarf stars have: high temperature T (because λ_{max} is small) **(1)** low luminosity L **(1)** $L = \sigma A T^4$ linked to a determination of the surface area **(1)**	3

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Q4.

Question Number	Acceptable answers	Additional guidance	Mark
	• *y* axis: luminosity (1) (/ luminosity of Sun) • *x* axis: (surface) temperature, with indication of decreasing temperature (1) • 2 or 3 correct regions (1) • 4 correct regions (1)	Example of graph:  	**(4)**

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