

Name of the Student: _____

Max. Marks : 24 Marks

Time : 24 Minutes

Mark Schemes

Q1.

Question Number	Answer	Mark
	<p>The only correct answer is B</p> <p><i>A is not correct because V, X and Z are all on the main sequence</i></p> <p><i>C is not correct because Z is on the main sequence and the sun will become a white dwarf, which is position Y</i></p> <p><i>D is not correct because Z, X and V are all on the main sequence</i></p>	1

Q2.

Question Number	Answers	Mark
	<p>The only correct answer is C</p> <p><i>A is incorrect because luminosity must have the units of power</i></p> <p><i>B is incorrect because luminosity must have the units of power</i></p> <p><i>D is incorrect because luminosity must have the units of power</i></p>	1

Q3.

Question Number	Answers	Mark
	<p>The only correct answer is B</p> <p><i>A is incorrect because a red giant star has larger surface area but a lower surface temperature than the Sun</i></p> <p><i>C is incorrect because a red giant star has larger surface area but a lower surface temperature than the Sun</i></p> <p><i>D is incorrect because a red giant star has larger surface area but a lower surface temperature than the Sun</i></p>	1

Q4.

Question Number	Answer	Mark
	C	1

Q5.

Question Number	Answer	Mark
	D	1

Q6.

Question Number	Acceptable answer	Additional guidance	Mark
	C	The only correct answer is C: main sequence – red giant – white dwarf A is not correct because it is white dwarf – red giant – main sequence B is not correct because it moves along the main sequence from large to small D is not correct because it moves along the main sequence from small to large	1

Q7.

Question Number	Answer	Mark
	A	1

Q8.

Question Number	Answer	Mark
	D	1

Q9.

Question Number	Answer	Mark
	B – (point on graph with luminosity $\neq L_{\odot}$)	1
	Incorrect Answers: A – luminosity $\neq L_{\odot}$ C – luminosity $\neq L_{\odot}$ D – luminosity $\neq L_{\odot}$	

Q10.

Question Number	Acceptable answer	Additional guidance	Mark
	B	The only correct answer is B because the y axis is luminosity and the x axis shows temperature decreasing A is not the correct answer because the y axis is luminosity but the x axis shows temperature increasing C is not the correct answer because the x axis is luminosity and the y axis is luminosity D is not the correct answer because the x axis is luminosity and the y axis is luminosity	1

Q11.

Question Number	Acceptable answers	Additional guidance	Mark
	B		1

Q12.

Question Number	Answer	Mark
	D – $\frac{(656.3 - 654.9)}{654.9} \times 3 \times 10^8 \text{ m s}^{-1}$	1
	Incorrect Answers: correct method: $\frac{\text{change in wavelength}}{\text{wavelength in laboratory}} \times \text{speed of light}$ A – uses $\frac{\text{wavelength from star}}{\text{wavelength in laboratory}} \times \text{speed of light}$ B – uses $\frac{\text{wavelength in laboratory}}{\text{change in wavelength}} \times \text{speed of light}$ C – uses $\frac{\text{wavelength in laboratory}}{\text{wavelength from star}} \times \text{speed of light}$	

Q13.

Question Number	Answer	Additional guidance	Mark
	D	(4V)	(1)

Q14.

Question Number	Acceptable answer	Additional guidance	Mark
	C	The only correct answer is C because the correct method for a nearby star is parallax, for a nearby galaxy is standard candle and for a very distant galaxy is red shift A is not correct because only the nearby star method is correct B is not correct because only the nearby galaxy method is correct D is not correct because none of the methods are correct	1

Q15.

Question Number	Answer	Mark
	D	1

Q16.

Question Number	Acceptable answers	Additional guidance	Mark
	D		1

Q17.

Question Number	Answer	Mark
	A	1

Q18.

Question Number	Answer	Mark
	A	1

Q19.

Question Number	Answer	Mark
	B	1

Q20.

Question Number	Answer	Mark
	A	1

Q21.

Question Number	Answer	Mark
	<p>The only correct answer is D because there is relative motion of the objects away from each other so the wavelength is increased by the Doppler effect so the observed frequency is decreased</p> <p>A there is relative motion of the objects towards each other so the wavelength is decreased by the Doppler effect so the observed frequency is increased</p> <p>B there is no relative motion for the objects so there is no observed change in wavelength or frequency</p> <p>C there is relative motion of the objects towards each other so the wavelength is decreased by the Doppler effect so the observed frequency is increased</p>	1

Q22.

Question Number	Acceptable answers	Additional guidance	Mark
	<p>The only correct answer is B A is not correct as the luminosity of P must be less than Q C is not correct as P is closer than Q D is not correct as P is closer than Q</p>		1

Q23.

Question Number	Answer	Mark
	C	1

Q24.

Question Number	Answer	Mark
	D	1