

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

Question Number	Answer	Mark
	A	1

Q2.

Question Number	Answer	Mark
	D	1

Q3.

Question Number	Answer	Mark
	B – $545 \div 838\,000$	1
	Incorrect Answers: Correct method: $\text{mass} = \text{energy transfer} \div \text{latent heat of vaporisation}$ A – uses $\text{energy transfer} \div \text{latent heat of fusion}$ C – uses $\text{latent heat of fusion} \div \text{energy transfer}$ D – uses $\text{latent heat of vaporisation} \div \text{energy transfer}$	

Q4.

Question Number	Answer	Mark
	B	1

Q5.

Question Number	Answer	Mark
	B	1

Q6.

Question Number	Answer	Mark
	B	1

Q7.

Question Number	Answer	Mark
	D	1

Q8.

Question Number	Answer	Mark
	B	1

Q9.

Question Number	Answer	Additional guidance	Mark
	A	$(5.1 \times 10^{-6} \text{ m})$	(1)

Q10.

Question Number	Answers	Mark
	<p>The only correct answer is C</p> <p><i>A is incorrect because the mean kinetic energy is constant at constant temperature</i></p> <p><i>B is incorrect because collisions between molecules do not increase the force on the walls of the container</i></p> <p><i>D is incorrect because the momentum change depends upon the root mean square speed of the molecules</i></p>	1

Q11.

Question Number	Acceptable answers	Additional guidance	Mark
	<p>The only correct answer is D because pressure is proportional to absolute temperature and inversely proportional to volume, so the effect of the volume change is to increase the pressure by $3/2$ and the effect of the temperature change is to increase the pressure by $6/5$, and $18/10 = 9/5$</p> <p>A is not correct because a pressure of $5/9 p$ would depend on pressure being proportional to volume and inversely proportional to absolute temperature rather than being proportional to absolute temperature and inversely proportional to volume</p> <p>B is not correct because this assumes that pressure is proportional to both volume and absolute temperature, giving an answer of $4/5 p$, instead of assuming that pressure is proportional to absolute temperature and inversely proportional to volume</p> <p>C is not correct because this assumes that pressure is inversely proportional to both volume and absolute temperature, giving an answer of $5/4 p$, instead of assuming that pressure is proportional to absolute temperature and inversely proportional to volume</p>		1

Q12.

Question Number	Answer	Mark
	D	1

Q13.

Question Number	Answer	Mark
	B	1

Q14.

Question Number	Acceptable answer	Additional guidance	Mark
	C	<p>The only correct answer is C: luminosity is proportional to temperature⁴ which means a 16-fold increase, and luminosity is proportional to area, which is proportional to diameter², and so means a 4-fold decrease, so there is a 4-fold increase overall</p> <p>A is not the correct answer because this only accounts for the decrease due to decreasing diameter</p> <p>B is not the correct answer because this is the answer obtained if the power applied to temperature is 2 instead of 4</p> <p>D is not the correct answer because the effect of area is not included</p>	1

Q15.

Question Number	Answer	Mark
	C	1

Q16.

Question Number	Answer	Mark
	D - 8L	1
	<p>Incorrect Answers:</p> <p>Correct method: $\div 2$ for area change and $\times 24$ for temperature change</p> <p>A – only applies $\div 2$ for area change</p> <p>B – applies $\div 2$ for area change and $\times 2$ for temperature change</p> <p>C – applies $\div 1/2$ for area change and $\times 2$ for temperature change</p> <p>Or applies $\div 2$ for area change and $\times (2 \times 4)$ for temperature change</p>	

Q17.

Question Number	Answer	Mark
	C	1

Q18.

Question Number	Answer	Mark
	A	1