Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 7_ Astronomy

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

	Answer	Additional guidance	Mark
(i)	(1.98-1.86) = (+/-) 0.12		**(1)** **AO2**

	Answer	Additional guidance	Mark
(ii)	(velocity =) $\frac{330 \times 0.12}{1.86}$ (1) (+/-) 21.3 (m/s) (1)	ecf from 4ai accept numbers that round to 21 (m/s) award 1,2 marks for (i) and (ii) for the correct answer for (ii) even without working	**(2)** **AO2**

Q2.

Question number	Answer	Additional guidance	Mark
	$v = \frac{2 \times \pi \times R}{T}$ unit conversion (1) 10^8 km = 10^{11} m substitution (1) $v = \frac{2 \times \pi \times 1.5 \times 10^{11}}{3.2 \times 10^7}$ evaluation (1) v= 2.9 x 10^4 (m/s)	Allow values which round to 2.9 x 10^4 full marks will be awarded for correct numerical answer without working	**(3)**

Q3.

Question number	Answer	Additional guidance	Mark
	substitution (1) $\frac{3.4\ (\times 10^{29})}{2.0\ (\times 10^{30})}$ evaluation (1) 0.17	 award 1 mark for 1.7 to any incorrect power of 10 ignore any units given award full marks for the correct answer without working	**(2)**

Q4.

	Answer	Additional guidance	Mark
	rearrangement and substitution (1) (t =) $\frac{2.2 (\times 10^{12})}{1.9 (\times 10^{4})}$ evaluation (1) 1.2×10^{8} (s)	 allow numbers that round to 1.2×10^{8} e.g. 1.1579×10^{8} award full marks for correct answer without working.	**(2)** **AO2**

Q5.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	A a black hole (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	A description including three from: MP1 in a nebula (1) MP2 (particles) attracted / come together by (force of) gravity (1) MP3 pe/ke transferred to thermal/heat energy (gas begins to glow and forms protostar) (1) MP4 until {hot / pressure / dense} enough to start nuclear reaction /fusion (1)	gas / gas and dust core becomes hot / pressure increases / density increases until fusion of hydrogen starts hydrogen starts to become helium condone "hydrogen burning"	**(3)**

Question Number	Answer	Acceptable answers	Mark
(a)(iii)	A suggestion involving two from: MP1 the oldest star had not yet appeared when the {Big Bang happened / universe started}(1) MP2 the Universe is older than the oldest star MP3 star takes time to form (1) MP4 can't be certain of this time (1)	stars formed after the Big Bang the age of the oldest star is the minimum age of the Universe estimation is not the same as accurate measurement can't be sure there isn't an older star	**(2)**

Question Number		Indicative Content	Mark
QWC	*** (b)**	An explanation including some of the following points • light shifted to red end of spectrum • light waves are stretched so wavelength increases • reference to black or spectral lines moving to 'red end' (of absorption spectrum) • frequency of wave from a moving source changes • decrease in frequency means source moving away • increase in frequency means source moving towards us • red shift shows galaxies are moving away from us • greater red shift indicates galaxy moving away faster • further away galaxies give greater red shift • (nearly) all galaxies show red-shift • red shift shows decrease in frequency • blue shift shows increase in frequency • therefore galaxies are moving apart • [mention of Doppler effect] • [outline of Doppler effect]	**(6)**

Level	**0**	No rewardable content
1	**1 - 2**	• a limited explanation e.g. (light from) {galaxy / planet /object} moving away from us is shifted to red end of the spectrum OR red shift means {galaxy / planet /object) is moving away from us • the answer communicates ideas using simple language and uses limited scientific terminology e.g. correct use of change of colour and movement • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• a simple explanation involving detail of meaning of different red shifts OR involving frequency / wavelength e.g. red shift shows galaxies moving away from us. More distant galaxies give greater red shift showing they are travelling faster away. OR light from galaxies/stars moving away is shifted to red end of the spectrum because of an (apparent) {increase in the wavelength/decrease in the frequency} (of light). • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately e.g. correct use of the terms galaxy/star, frequency, wavelength • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• a detailed explanation correctly interpreting the (apparent) drop in frequency / increase in wavelength e.g. light from (most) galaxies is shifted towards the red end of the spectrum because of an {increase in the wavelength/decrease in the frequency}. This indicates that (most) galaxies are moving away from us, hence showing the Universe is expanding • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately e.g. linkages must be clear between red-shift, movement and expansion of the Universe • spelling, punctuation and grammar are used with few errors