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Mark Scheme (Results)
Summer 2010

GCSE

GCSE Astronomy (1627)

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Question Number	Answer	Mark
1(a)	The Plough	**1**

Question Number	Answer	Mark
1(b)	Polaris	**1**

Question Number	Answer	Mark
1(c)	North	**1**

Question Number	Acceptable Answers	Reject	Mark
1 (d)	Ursa Major Great Bear	Ursa Minor Little Bear Bear Big Dipper	1

Question Number	Answer	Mark
2(a)	The Sun	**1**

Question Number	Answer	Mark
2(b)	The Moon	**1**

Question Number	Answer	Mark
2(c)	full	**1**

Question Number	Answer	Mark
2(d)	4 minutes	**1**

Question Number	Answer	Mark
2(e)	corona	**1**

Question Number	Answer	Mark
3(i)	radio (waves)	**1**

Question Number	Answer	Mark
3(ii)	radio (waves)	**1**

Question Number	Answer	Mark
3(iii)	X-rays	**1**

Question Number	Answer	Mark
3(iv)	Radio (waves)	**1**

Question Number	Answer	Mark
3(v)	X-rays	**1**

Question Number	Answer	Mark
4(a)	Any one of: • cooler/darker regions on 'surface' of Sun • regions of strong magnetic fields	**1**

Question Number	Answer	Mark
4(b)	• dark central umbra (labelled) • lighter penumbra (labelled) surrounding umbra	**1** **1** **(2)**

Question Number	Answer	Mark
4(c)	• Brief description of method (projection/pinhole camera/special filters)	**1**

Question Number	Answer	Mark
4(d)	• Sketch showing an arc of gas extending from photosphere/chromosphere.	**1**

Question Number	Answer	Mark
5(a)	Galileo Galilei	**1**

Question Number	Answer	Mark
5(b)	Uranus	**1**

Question Number	Answer	Mark
5(c)	Venus	**1**

Question Number	Answer	Mark
5(d)	Oort Cloud	**1**

Question Number	Answer	Mark
6(a)	Any one of the following differences: • Pluto's orbit more elliptical/elongated (than Neptune's)/greater eccentricity (of Pluto's) • Plane of Pluto's orbit is far more inclined to ecliptic • Inclination of Pluto's orbit higher	**(1)**

Question Number	Answer	Mark
6(b)	Any two of the following reasons: • Pluto did not match pattern (4 rocky planets followed by 4 gas giants)/low density ice/rock • Many objects similar to Pluto were discovered beyond Neptune • Pluto is very small • Pluto has not cleared its orbit • Any of responses to 6(a) not included	**(2)**

Question Number	Answer	Mark
6 (c)	Any two of the following points, up to a maximum of two marks: • discovered photographically • …since 'object' had moved • discovered by Clyde Tombaugh • some mention of Lowell Observatory • position of planet predicted (incorrectly!) (2 x 1) QWC mark – sensible order and good spelling/grammar	**2** **1** **(3)**

Question Number	Answer	Mark
7(a) (i)	sea /seas / mare / maria	**1**
7(a) (ii)	any two of: • large (excavated) basins • filled with lava • volcanic activity	**2** **(3)**

Question Number	Answer	Mark
7(b) (i)	dividing line between day and night/light and dark	**1**
7(b) (ii)	any two of: • contrast / relief enhanced • due to low/shallow angle of the Sun • allows crater heights to be determined	**2** **(3)**

Question Number	Answer	Mark
8(a)	June	**1**

Question Number	Answer	Mark
8(b)	The Sun lies on the celestial equator	**1**

Question Number	Answer	Mark
8(c)	Any two of the following points, up to a maximum of two marks: • Earth's northern hemisphere is tilted towards the Sun • Sun is generally higher in the sky / above the horizon longer (2 x 1) Correctly labelled, relevant diagram 1 QWC mark - terminology, capital letters	**2** **1** **1** **(4)**

Question Number	Answer	Mark
9(a) (i) **9(a) (ii)**	Elliptical / E Spiral / S / Sa / Sb / Sc	**1** **1** **(2)**

Question Number	Answer	Mark
9(b)	Nearby cluster of (a small number of) galaxies	**1**

Question Number	Answer	Mark
9(c)	Any two of the following differences up to a maximum of two marks: • Quasars have high redshifts/are much more distant • Quasars emit radio waves/X-rays • Quasars appear star-like (not 'extended') • highly (most) luminous • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
10(a)	Apollo	**1**

Question Number	Answer	Mark
10(b)	No air/atmosphere (on the Moon)… …so not scattering of light (by atoms/molecules/particles)	**1** **1** **(2)**

Question Number	Answer	Mark
10(c)	384 000 (km) 2 OR (if forgot to halve) 768 000 (km) 1 Ignore missing unit but penalise (-1) if incorrect unit	**2** **(2)**

Question Number	Answer	Mark
10(d)	Any two of the following purposes up to a maximum of two marks: • Collection/return of rock samples • Deploy scientific experiments of lunar surface • Study Moonquakes • Study the solar wind • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
10(e)	Chemical energy stored in fuel… …is converted to (gravitational) potential energy / kinetic energy (to overcome escape velocity)	**1** **1** **(2)**

Question Number	Answer	Mark
11(a)	Two bands/doughnut shaped rings of <u>charged</u> particles… …above the Earth's atmosphere/above equator	**1** **1** **(2)**

Question Number	Answer	Mark
11(b) (i)	<u>charged</u> (1) particles from the Sun	**1**
11(b) (ii)	Sun's corona	**1** **(2)**

Question Number	Answer	Mark
11(c)	coloured streamers/light/curtains in the sky High latitudes/above the Arctic/Antarctic circle	**1** **1** **(2)**

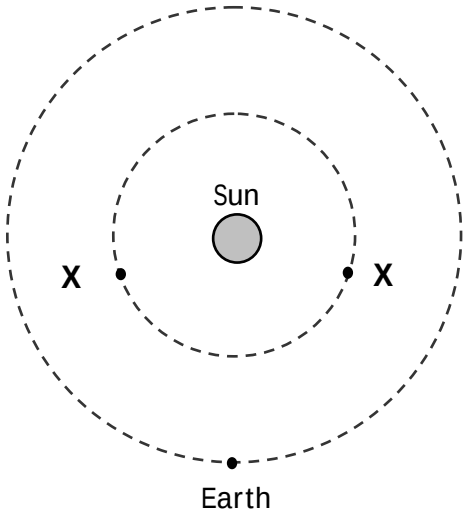
Question Number	Answer	Mark
12(a) (i)	Any two of: • relatively old/twice as old as the Sun • compact/rel. close together • about 100 000 stars (10^5 OR 10^6) • redder / cooler stars • etc. (2 x 1)	**2**

Question Number	Answer	Mark
12(a) (ii)	galactic halo/spherical distribution centred on galactic centre	**1**

Question Number	Answer	Mark
12(b) (i)	Any two of the following examples up to a maximum of two marks: • relatively young stars • gravitationally close together • few hundred stars • lots of gas/dust still present • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
12(b) (ii)	in the spiral arms / disc (of our galaxy)	**1**

Question Number	Answer	Mark
13(a)	Mercury and Venus (must have both)	**1**

Question Number	Answer	Mark
13(b) (i)	 **X** shown on inner orbit close to either position 1 **X** shown so that Earth – X – Sun makes 90 degrees 1	**(2)**

Question Number	Answer	Mark
13(c)	Transit	**1**

Question Number	Answer	Mark
13(d)	6.7 AU 2 or 5.7 AU 1 (concession) Must have unit (AU) or lose 1 mark	**2**

Question Number	Answer	Mark
14(a)	Any two of the following advantages up to a maximum of two marks: • clearer/less turbulent air so clearer images • far away from light/chemical pollution • above weather • IR observations possible • drier air • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
14(b)	4 1	**1**

Question Number	Answer	Mark
14(c)	Any two of the following advantages up to a maximum of two marks: • higher/better resolution • shorter observing times • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
14(d)	Any two of the following disadvantages up to a maximum of two marks: • difficult/impossible to repair • limited lifetime • possibility of meteoroid strike/ionising radiation • etc. (2 x 1)	**(2)**

Question Number	Answer	Mark
14(e)	Spacecraft/instruments emit infra-red unless cooled / causes background 'noise'	**1**

Question Number	Answer	Mark
15(a)	6	**1**

Question Number	Answer	Mark
15(b)	25 2 Allow 1 mark for 5 (times)	**2**

Question Number	Answer	Mark
15(c) (i)	Jupiter	**1**
15(c) (ii)	Largest mass/pull of gravity DO NOT ACCEPT size (ignore)	**1** **(2)**

Question Number	Answer	Mark
16(a)	Relative brightness/α brightest, then β etc.	**1**

Question Number	Answer	Mark
16(b) (i)	2.5	**1**
16(b) (ii)	40	**1** **(2)**

Question Number	Answer	Mark
16(c) (i)	True brightness of star (vague statement) 1 Equal to apparent magnitude at 10 pc (formal definition) 2	**2**

Question Number	Answer	Mark
16(c) (ii)	α 1	
16(c) (iii)	both are equally bright but α has smaller apparent magnitude so brighter 1	**2**

Question Number	Answer	Mark
17(a)	Any three of the following labelled features up to a maximum of three marks: • nucleus • coma • gas tail • dust tail (3 x 1)	**(3)**

Question Number	Answer	Mark
17(b)	Any two of the following differences up to a maximum of two marks: • 'open' orbit for comet ('closed' for planet) • much longer orbital period • comets orbit the Sun in any plane (not close to ecliptic) • comets can orbit in either sense (allow direction!) • etc. (2 x 1) REJECT not circular	**(2)**

Question Number	Answer	Mark
17(c)	fluorescence/glowing/excitation 1 reflection (of sunlight) 1	**(2)**

Question Number	Answer	Mark
18(a) (i)	Axes labelled 1 Sketch showing repeated 1 …sharp rise and slow decline 1	**3**

Question Number	Answer	Mark
18(a) (ii)	Star is expanding and contracting / pulsating / vibrating / changing size (on a regular basis) 1	**1**

Question Number	Answer	Mark
18(b)	Sketch showing sharp rise 1 …and slow decline 1 Ignore any axes (tested in 18 (a) (i)	**2**

Question Number	Answer	Mark
19(a)	Wavelengths of light from galaxies/stars is longer/redder/Doppler-shifted (due to motion away from us).	**1**

Question Number	Answer	Mark
19(b)	Any two of the following reasons up to a maximum of two marks: • allows us to determine recession velocities of galaxies • provides evidence for an expanding Universe • allows cosmologists to study the Universe at different epochs (2 x 1) QWC mark – logical order; relevance to cosmology 1	**(3)**

Question Number	Answer	Mark
19(c)	Matter in the Universe that does not emit light/is undetected/has gravitational force/is invisible/not 'ordinary'	**1**

Question Number	Answer	Mark
19(d)	Any two of the following reasons up to a maximum of two marks: • allows us to determine the mass of the Universe • allows us to predict the fate of the Universe (whether it will continue to expand etc.) • explaining galactic rotation (2 x 1)	**(2)**

Question Number	Answer	Mark
20(a)	15 (degrees)	**1**

Question Number	Answer	Mark
20(b)	B down from A 1 B to the right of A 1	**2**

Question Number	Answer	Mark
20(c)	C down (twice as far) from A 1 C twice as far away from A 1	**2**

Question Number	Answer	Mark
20(d)	19:16 2 or 18:44 1	**2**

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