



Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE
In Astronomy (1AS0)
Paper 1: Naked-Eye Astronomy

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Mark
1(a) (i)	The only correct answer is C: gibbous A is incorrect as Figure 1 shows the gibbous phase. B is incorrect as Figure 1 shows the gibbous phase. D is incorrect as Figure 1 shows the gibbous phase.	(1)

Question number	Answer	Mark
1(a) (ii)	The only correct answer is A: craters B is incorrect as feature A in Figure 1 is a crater. C is incorrect as feature A in Figure 1 is a crater. D is incorrect as feature A in Figure 1 is a crater.	(1)

Question number	Answer	Mark
1(a) (iii)	The only correct answer is B: mare A is incorrect as feature B in Figure 1 is a mare. C is incorrect as feature B in Figure 1 is a mare. D is incorrect as feature B in Figure 1 is a mare.	(1)

Question number	Answer	Mark
1(b) (i)	Meteor	(1)

Question number	Answer	Mark
1(b) (ii)	Aircraft / aeroplane / plane	(1)

Question number	Answer	Mark
1(c)	- Extended shape consistent with a comet - Cometary detail such as separate head/tail, coma, multiple tails - Cometary shape that spans almost all the space between any two adjacent compass points.	(1) (1) (1)

Question number	Answer	Mark
2(a)	The only correct answer is A: a galaxy B is incorrect as the largest body is a galaxy C is incorrect as the largest body is a galaxy D is incorrect as the largest body is a galaxy	(1)

Question number	Answer	Mark
2(b)	The only correct answer is B: Arcturus A is incorrect as it is a star in the Summer Triangle C is incorrect as it is a star in the Summer Triangle D is incorrect as it is a star in the Summer Triangle	(1)

Question number	Answer	Mark
2(c) (i)	The only correct answer is C: halving the mass of the Moon A is incorrect as it would not halve the gravitational force between the Earth and the Moon B is incorrect as it would not halve the gravitational force between the Earth and the Moon D is incorrect as it would not halve the gravitational force between the Earth and the Moon	(1)

Question number	Answer	Mark
2(c) (ii)	The only correct answer is D: halving the distance between the Sun and Jupiter A is incorrect as it would not quadruple the gravitational force between the Sun and Jupiter B is incorrect as it would not quadruple the gravitational force between the Sun and Jupiter C is incorrect as it would not quadruple the gravitational force between the Sun and Jupiter	(1)

Question number	Answer	Mark
2(d)	The only correct answer is C: on the observer's meridian A is incorrect as the star is on the observer's meridian B is incorrect as the star is on the observer's meridian D is incorrect as the star is on the observer's meridian	(1)

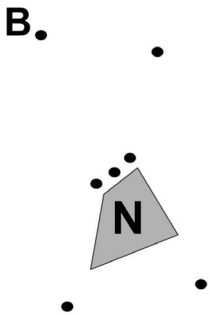
Question number	Answer	Mark
2(e) (i)	Mercury	(1)

Question number	Answer	Mark
2(e) (ii)	Venus	(1)

Question number	Answer	Additional	Mark
2(f)	11:00 / 11am / 11 o'clock	Reject: 11pm or 23:00	(1)

Question number	Answer	Mark
3(a) (i)	Recognisable 'plough' shape Approximately correct proportions of 'handle' to 'blade'. 	(1) (1)

Question number	Answer	Mark
3(a) (ii)	Arrow pointing from Merak-Dubhe (direction required).	(1)

Question number	Answer	Mark
3(b)	(i) Stars arranged with correct topology Proportions of pattern (approximately) correct  (ii) Position of Betelgeuse correctly labelled (B) (iii) Position of Orion Nebula correctly labelled (N)	(1) (1) (1) (1)

Question number	Answer	Additional Guidance	Mark
3(b) (iv)	Stars of Orion are close to the Celestial Equator. Any one from: • Calculation of altitude of Orion/Cel Eq from either of given latitudes (20° or 35°) • Stars of Orion rise above the horizon from both locations (can be (horizon) lines drawn on diagram) • Orion visible from both hemispheres.	Ignore: Stars of Orion cover a large area. Points may be established using text or diagram.	(1) (1)

Question number	Answer	Mark
4(a) (i)	(Date) B	(1)

Question number	Answer	Mark
4(a) (ii)	(Date) D	(1)

Question number	Answer	Mark
4(a) (iii)	(Date) C	(1)

Question number	Answer	Mark
4(b)	Moon completes one orbit (of Earth) each month	(1)
	Moon's orbit takes it through two possible eclipse positions	(1)
	Moon's 'tilted' orbit (usually) places it above or below plane of Earth's orbit (ecliptic).	(1)

Question number	Answer	Mark
4(c) (i)	(To naked eye) Moon appears (close to) full for several days	(1)
	'Appearance' of first crescent lasts a much shorter time	(1)
	Greater precision in date obtained (accept 'more accurate'). ["Easier to see" (crescent Moon) scores 1 .]	(1)

Question number	Answer	Mark
4(c) (ii)	Date linked to (motion/position/phase of) Moon / lunar month	(1)
	Lunar month/(phase) cycle: not the same length as calendar months OR: not a whole number in a calendar year.	(1)

Question number	Answer	Mark
5(a)	Difference between Mean and Apparent solar time (accept correct EoT equation)	(1)
	Any one from: Caused by eccentricity of Earth's orbit Caused by inclination of Earth's orbit Annual variation of...	(1)

Question number	Answer	Mark
5(b) (i)	7:24 7:25 (both required, in correct order)	(1)

Question number	Answer	Additional Guidance	Mark
5(b) (ii)	Lowest/shortest amount of daylight/sunlight (in the year)	Accept: winter solstice	(1)

Question number	Answer	Mark
5(b) (iii)	Day length increases/Sun sets later (after solstice)	(1)
	Equation of Time decreasing...	(1)
	...more quickly than daylight length increasing.	(1)

Question number	Answer	Mark
5(c) (i)	(Position) D	(1)

Question number	Answer	Mark
5(c) (ii)	(Position) A	(1)

Question number	Answer	Mark
5(c) (iii)	(Position) B	(1)

Question number	Answer	Mark
6(a) (i)	<i>Suitable size</i> – covers more than half the graph sheet both vertically and horizontally.	(1)
	<i>Both axes correctly labelled</i> – ‘Date’ on horizontal axis and ‘Azimuth ($^{\circ}$)’ (Accept: ‘Azimuth ($^{\circ}$)’) on vertical axis.	(1)
	<i>Correctly plotted points with smooth curve/line of best fit</i>	(1)

Question number	Answer	Mark
6(a) (ii)	Answer between $76^{\circ} 30'$ and 77° (inclusive).	(1)

Question number	Answer	Mark
6(b)	Marking instructions Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Indicative content guidance The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: • Tunnel is straight so possible for Sun to shine through it • Azimuth of Sun on 9th April is similar to angle of tunnel • Tunnel points roughly E NE/WSW – close to direction of spring sunrise/set • During year, Sun rises at all angles between NE and SE • Sun must shine through at sunset on another (autumn) day • Sun must shine through tunnel either twice or no times each year. • Small changes in azimuth each day/tunnel is quite wide so Sun should shine through on several days (around 9th April).	(6)

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	• Basic interpretation and evaluation of the data/information may be attempted but will be limited and narrow in scope. (AO3) • The response will contain basic information with little linkage between points made. Lines of reasoning may be attempted but are incomplete or lack clarity. A conclusion may be attempted but lacks support. (AO3)
Level 2	3-4	• Interpretation and evaluation of the data/information that Attempts to synthesise and integrate relevant knowledge. (AO3) • The response shows some linkages and lines of reasoning with some structure, leading to a conclusion that is partially supported. (AO3)
Level 3	5-6	• Comprehensive interpretation and evaluation of the data/information that demonstrates the skills of synthesising and integrating relevant knowledge throughout the response. (AO3) • The response shows a well-developed, sustained line of scientific reasoning which is clear, coherent and logically structured, leading to a supported conclusion. (AO3)

Question number	Answer	Mark
7(a)	Any two from: - faint hazy band(s) of light - contains a large number of stars - crossed by dark patches - stretches across (large area of) sky.	(2)

Question number	Answer	Mark
7(b) (i)	10 th November	(1)

Question number	Answer	Additional Guidance	Mark
7(b) (ii)	Indicates position of objects relative to horizon/meridian.	Accept: 'shows which objects are above horizon' / "shows objects' altitude/azimuth'	(1)
	Takes account of observer's location/date/time.		(1)

Question number	Answer	Mark
7(c)	Marking instructions Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Indicative content guidance The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: - Red safelight to preserve dark adaptation - Observing site away from street/house lights - Faint object being observed - Need to avoid view being blocked by large hills shown - Star charts available for accurate positioning of sketches - Repeat observations	(6)

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	• Basic interpretation and evaluation of the data/information may be attempted but will be limited and narrow in scope. (AO3) • The response will contain basic information with little linkage between points made. Lines of reasoning may be attempted but are incomplete or lack clarity. A conclusion may be attempted but lacks support. (AO3)
Level 2	3-4	• Interpretation and evaluation of the data/information that Attempts to synthesise and integrate relevant knowledge. (AO3) • The response shows some linkages and lines of reasoning with some structure, leading to a conclusion that is partially supported. (AO3)
Level 3	5-6	• Comprehensive interpretation and evaluation of the data/information that demonstrates the skills of synthesising and integrating relevant knowledge throughout the response. (AO3) • The response shows a well -developed, sustained line of scientific reasoning which is clear, coherent and logically structured, leading to a supported conclusion. (AO3)

Question number	Answer	Mark
8(a)	Right-angled triangle between E, M and S (at quarter Moon phase)... ...with Moon at right angle Measurement of angle between Moon and Sun (from Earth) Trigonometry/scale drawing to find ratio of E-S/E-M sides. <i>(Marks can be established by text or labelled diagram)</i>	(1) (1) (1) (1)

Question number	Answer	Mark
8(b) (i)	2 394 000 (km) (accept 2 400 000 (km)) Any two from: Doubling of Earth's radius (12 600km) Multiplication by 10 or 19 / use of 190	(3) (2)

Question number	Answer	Mark
8(b) (ii)	98(.4) (%) (or figure consistent with their (i)) Any one from: Calculation of error: $(150\,000\,000 - 2\,394\,000) = 147\,606\,000$ (km) Division by 150 000 000(km)	(2) (1)

Question number	Answer	Additional Guidance	Mark
8(b) (iii)	Sequence of (different) measurements/observations needed (to find E-S distance) (Small) errors in each measurement combined/compounded in final E-S distance.	Reject: in ancient times measurements were inaccurate / no modern technology/ no telescopes were available.	(1) (1)

Question number	Answer	Mark
9(a)	<u>Altitude = 56°</u> Any two from: <i>Calculation of co-latitude ($90^\circ - 34^\circ$)</i> <i>Sun on Celestial Equator</i> <i>Declination of Sun = 0°</i> <u>Azimuth = 0°</u> (accept '(due) North')	(3) (2) (1)

Question number	Answer	Mark
9(b)	<u>151°</u> ($151\frac{1}{4}^\circ$) Any one from: Correct calculation of local <i>mean</i> time in Sydney (using Equation of Time): <u>11:58</u> Correct calculation of apparent solar time in Greenwich (using Equation of Time): <u>01:55</u> Any one from: Dividing their time difference (mins) by 4 Correct calculation of time difference between Sydney and Greenwich (12:00-01:55 or 11:58-01:53): 10h 5min or 605mins East (E)	(3) (1) (1) (1)

Question number	Answer	Mark
9(c)	-52° 42' (52° 42' or 52° 42'S score 2) 37° 18' scores (2) Or Calculation of altitude of SCP from Sydney (34°) Subtraction of altitude of SCP (34°) from altitude of Canopus (71°18') Allow: -15° 18' (15° 18' or 15° 18'S score 2) Or: Calculation of altitude of Celestial Equator from Sydney (56°) Subtraction of (northern) altitude of Canopus (71°18') from altitude of Celestial Equator (56°)	(3) (2) (1) (1) (3) (1) (1)

Question number	Answer	Mark
10(a)	The only correct answer is A: diurnal B is incorrect as the motion is diurnal C is incorrect as the motion is diurnal D is incorrect as the motion is diurnal	(1)

Question number	Answer	Mark
10(b)	Backwards motion/loops (of planets) Any one from: • apparent motion for observers on Earth • relative to stars • over a few weeks/months • caused by different orbital speeds of planets. (allow 'over-/under-taking').	(1) (1)

Question number	Answer	Mark
10(c) (i)	Any two from: • Because T and r are not proportional/Kepler's Third Law • Calculation of actual sidereal period of Mars (1.9 years) • Mars moves more slowly <u>in/along its orbit</u> than Earth • Due to weaker gravity (at its greater distance from the Sun).	(2)

Question number	Answer	Mark
10(c) (ii)	<u>5.2</u> (years) (5.196) Any two from: Use of T^2/r^3 3^3 or 27	(3) (2)

Question number	Answer	Mark
10(c) (iii)	<u>8.2</u> (solar masses) (Accept 8.3) 0.12 scores 2 or any two from: Use of T^2/r^3 for one of the planets Calculation of 0.12 Calculation of average of values of T^2/r^3 for all three planets. Calculation of reciprocal of (their value for) T^2/r^3.	(3) (2)