Mark Scheme

Q1.

Question number	Answer	Mark
	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): Vega is circumpolar/will be visible all night and Arcturus is not circumpolar/will not be visible all night (1) as 90° – 55°57′ = 34°03′ < declination of Vega 38°45′ (Vega's declination is greater than the co-latitude of Edinburgh/declination of Vega + latitude of Edinburgh > 90°) (1) whereas 90° – 55° 57′ = 34°03′ > declination of Arcturus 19°10′ (Arcturus's declination is less than the co-latitude of Edinburgh/declination of Arcturus + latitude of Edinburgh < 90°) (1)	**(3)**

Q2.

Question number	Answer	Mark
	54° 45′ *Up to **1** 'working' marks available for incorrect answers:* • Cel Eq is 38° 15′ above southern horizon in Oxford • Aldebaran's declination will put it a further 16° 30′ above the horizon.	**(2)**

Q3.

Question number	Answer	Mark
	Rises and sets / Travels East to West Through Alice's overhead point/zenith *Insufficient:* 'highest point'	(1) (1)

Q4.

Question number	Answer	Additional guidance	Mark
(i)	Altitude of Polaris = latitude (to nearest degree) = 56° (1) Polaris is the North Star hence azimuth = 0° (due North) (1)	Accept 360° for azimuth	(2)

Question number	Answer	Additional guidance	Mark
(ii)	Working: Celestial equator has meridian altitude of 90 – 55°57′ = 34°03′ (1) + Vega's declination of 38°45′ = 72°48′ (1)	Award full marks for correct numerical answer without working	(2)

Question number	Answer	Additional guidance	Mark
(iii)	Local Sidereal Time (in Edinburgh) = RA of meridian = 18 h 30 min (1) Greenwich is 3°15″ east of Edinburgh which adds 3°15″ × 4 = 13 min (1) hence Greenwich ST = LST + adjustment for longitude of Edinburgh = 18 h 30 min + 13 min = 18 h 43 min (1)	Award full marks for correct numerical answer without working	(3)

Q5.

Question number	Answer	Mark
(i)	An explanation that combines identification – knowledge (1 mark) and reasoning/justification – understanding (1 mark): (Light pollution) makes the sky brighter/reduces contrast (1) so fainter stars (in the constellation) are not seen (1)	(2)

Question number	Answer	Additional guidance	Mark
(ii)	An explanation that combines identification – knowledge (1 mark) and reasoning/justification – understanding (1 mark): {Dark adjustment/adaption of human eye/the aperture of the eye is larger} (1) which {allows more light in/makes the eye more sensitive to light} from faint stars (1)	Reject: sky getting darker/stars 'coming out'	(2)

Q6.

Question number	Answer	Acceptable Answers	Marks
	Neither star would set from Egypt/both are circumpolar High declination of stars Declinations greater than co-latitude of Egypt (established by statement, diagram or inequality, e.g. 72° (or 74°) > 60° (90° – 30°)	*Accept:* High declination	1 1 1

Q7.

Question number	Answer	Acceptable Answers	Marks
(i)	**C** 50° **The only correct answer is C** A is not correct because it is not equal to the observer's latitude B is not correct because it is not equal to the observer's latitude D is not correct because it is not equal to the observer's latitude		1

(ii)	**B** 40° **The only correct answer is B** A is not correct because it is not equal to the observer's co-latitude C is not correct because it is not equal to the observer's co-latitude D is not correct because it is not equal to the observer's co-latitude		1

Q8.

Question number	Answer	Mark
	*Any **2** of the following points, established by diagram or otherwise:* • RA of observer's meridian is 10h 42m • First Point of Aries is 10h 42m from meridian • Aldebaran is 6h 6m from meridian • RA of Aldebaran = 10h 42m - 6h 6m • i.e. 4h 36m from First Point of Aries. Diagram supporting on of the above.	**(2)** **(1)**

Q9.

Question number	Answer	Mark
	*Any **1** of:* • Altitude of Celestial Equator on meridian is 90° – 42° = 48° • Altitude of Aldebaran (64° 30′) therefore = Dec + 48° • *Establishing NCP as 42° above northern horizon and Aldebaran's co-declination as 138° – 64° 30′ = 73° 30′.* *Labelled diagram illustrating one of the above.*	**(1)** **(1)**