Introduction to Astronomy

User's Guide Problem set #2

(Ten marks for question including one mark for presentation)

(a) From Durham on a particular night at 20:00 the bright star, Vega, is observed just above the North point on the horizon. When will Vega be observed due North again? *[1 mark]*

(b) You wish to observe the strange object *Sigma-957* which has a position of *RA* = $13^h\ 16^m$, *Dec* = –21° 47′. If an RA of 12^h is on the meridian at midnight on 21st March,

(i) At what time (approximately) is *Sigma-957* on the meridian on 21st March? *[1 mark]*

(ii) At what date (approximately) is *Sigma-957* on the meridian at midnight? *[1 mark]*

(iii) As observed from Durham (latitude=+54° 46′), what is the maximum altitude that *Sigma-957* reaches, i.e. when it crosses the meridian in the South? *[1 mark]*

(iv) As observed from the Very Large Telescope at Paranal Observatory in Chile (latitude= –24° 37′), what is the maximum altitude that *Sigma-957* reaches?
[1 mark]

(c) On a particular date Mercury is at maximum western elongation, Venus is at maximum eastern elongation, Mars is at opposition and the Moon is 3 days old, i.e. 3x 24h after the date of the New Moon. Draw a labelled diagram, showing the relative positions of the Sun, Earth, Moon and the three planets as viewed from a point high above the Earth's North Pole looking orthogonally down on the plane of the Solar System. Mark the locations that are seen East and West of the Sun. *[4 marks]*