Data Analysis questions - points

1. Minima

Max 25 points

Correct determination of the approximate elements by
- using double the difference of successive minima **[2]**
- using the average of several pairs of minima **[2]**
- correct calculation **[1]**

Correct calculation of the points for the O-C diagram
- correct calculation of epochs **[3]**
- correct calculation of (O-C) **[3]**

either Correctly drawn diagram
- Each correct axis **[1+1]**
- Correctly and carefully drawn points **[2]**

Correct calculation of the period correction and giving the corrected elements
- Using cumulative error / no. of epochs to correct period **[1]**
- correct cumulative O-C error **[1]**
- correct no. of epochs **[1]**
- correct period correction result **[1]**

or calculation of period correction from the table of O-C without drawing O-C diagram **[4]**

corrected elements **[1]**
error estimate for elements **[1]**

Incorrect significant figures in final ephemeris: **-2**

Calculation of JD for 1 Sept 2011 **[1]**
Correct calculation of the ephemeris for the given night **[3]**

Missing the second and third minima of the night **-1 each**

2. Weighing a galaxy

Max 25 points

estimation of horizontal scale (pixel/Å)	1
calculation of $\Delta\lambda$ distance between lines	1
calculation of scale in Å/pixel	1
estimation of scale error	1
Vertical scale	
Calculation of distance from galactic centre or rescaling from ”/pixel to pc/pixel	2
Estimation of disc inclination based on pictures of galaxy :	
measuring the vertical and horizontal size of galaxy image	2
calculating the inclination of galactic disc	1
calculating the error of inclination estimation	1
estimations of position of line in pixels	1
calculations of Doppler shift in Å	1
calculations of radial velocity using proper formula and constants	1
calculations of velocity for inclination	1
proper draw the rotation curve:	
if picture will show: -‘solid body’ rotation in bulge	1
- two arms (blue and read shifted)	1
- symmetry between arms	1
- more then 10 point per arm	1
- fluctuation of “constant level”	1
calculation of mass of bulge of galaxy based on Kepler's law	
- using the proper formula	2
- using the proper place (end of the bulge) for bulge mass determination	2
- estimation of error base of scale and inclination error	2