

Question 3:

	Astrometric method	(2 points)
	Spectroscopic method	(2 points)
	# of planets detected	(2points)
Planet detection (10 points)	Comparison to planets in our system	(2points)
	Selection effect (easier ones detected first)	(2points)

	Lower limit (0.05 from observation)	(3 points)
Estimate of $f_p$ (10 points)	Upper limit (1; disks are common)	(3 points)
	Decision on binaries	(3 points)
	Result (0.05-1)	(1 point)

Question 4:

Habitable zone (suitable temperature range, translation to distance range, etc)  
(~ 6 points)

Continuously habitable zone (definition, distance range from computations, etc)  
(~ 6 points)

Negative feedback of the greenhouse effect (description and your opinion on it)  
(~ 6 points)

Result for  $n_p$  (~0.1-3 or larger if consider other solvents or moons)  
(~ 2 points)

Points are flexible depending on explanations. Excellent explanation for one part can compensate those that are not so good.

Question 5:

Heavy elements	(3 points)
Main sequence	(3 points)
Lifetime >5 billion years	(4 points)
Low mass limit (synchronous rotation; flares; etc)	(5 points)
Binaries (stable orbits etc)	(5 points)

For each requirement, roughly half points go to the explanation and half to the fraction of stars that satisfy or are removed from the requirement.