Amended P7 Higher Mark scheme (June 2011)

1.



2. When waves pass through a narrow gap or past an obstacle they spread out.

Known as diffraction.

Radio spread out round the hill.

Because radio have long wavelengths so diffract easily.

Microwaves need a smaller gap.

Wavelength of microwaves are smaller

Microwaves not diffracted round the hill.

3.



4.





5(a) ray through centre of lens continues straight to intersect bottom ray (1)  
top ray bends in lens then continues as straight line to intercept of  
central and bottom ray (1)  
image labelled at intercept of two rays (1)  
 3

no mark for a ray if it is continued in more than one direction

(b) (i) re-arrangement f = 1 ÷ P or f = 1 ÷ 20 (1)  
0.05 (1) 2

correct numerical answer (2)

(ii) correct substitution: m = 0.5 ÷ 0.01 (1)  
50 (1) 2

correct numerical answer (2)  
if units given in answer, maximum 1 mark

(iii) magnification = 1 / no/little magnification (1) 1

ora  
**ignore** comments about focus or blurring

(c) (i) (concave/curved) mirror 1

**accept** parabolic mirror

(ii) parallel light rays (1)  
reflected to a focus from a curved mirror (1) 2

judge parallel lines by eye - this mark is independent of whatever the reflecting/refracting object is (11)

6. any **four** from:

project identified/named(1)

**accept** any international named large telescope, satellites, space probes and large particle accelerators  
**accept** Hubble telescope  
**do not accept** organisations e.g. NASA and European Space Agency (ESA) as projects

description of purpose of project (1)

**accept** any statement about what the project does

explanation relating to cost (1)  
explanation relating to pooling/sharing (1)  
expertise/(experienced) scientists (1)  
explanation relating to political factors (1) 4

the explanation marks are high demand marks and should not be awarded for vague/weak answers  
**ignore** sharing data idea  
**ignore** sharing locations idea

communication: answer is presented in a clear and ordered manner (1) 1

candidate’s response must address the question  
must be understandable on first reading  
must consist of at least two sentences

7.



8. Each element, when given energy, can produce its own set of coloured emission lines in a spectrum. That element will also absorb wavelengths corresponding to those spectral lines from a continuous spectrum. By examining the absorption spectra from a star, these can be used to calculate the wavelengths of the absorption lines and the matched to the absorption spectra of different elements.

The elements in the star can then be identified.