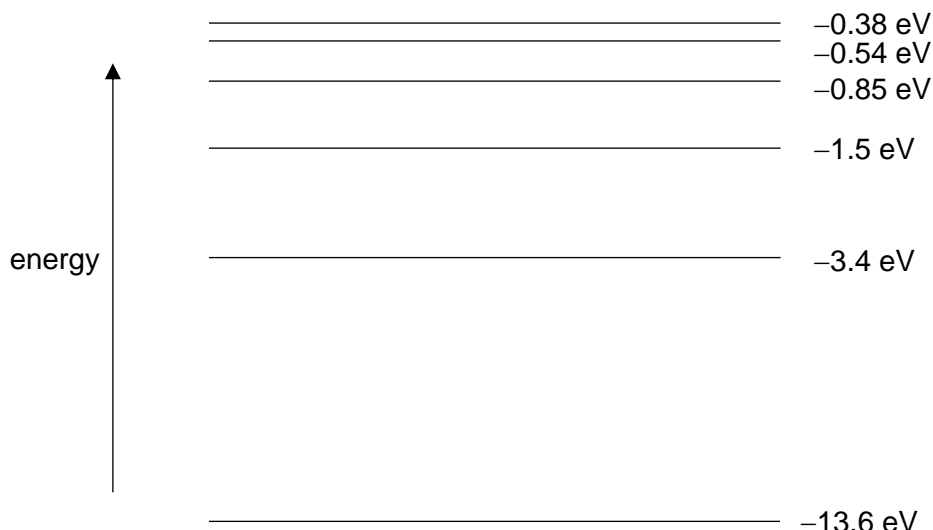


- 7 (a) Distinguish between the appearance of emission and absorption line spectra.

.....  
 .....[2]

- (b) The lowest six discrete energy levels for a hydrogen atom are shown in Fig. 7.1, where the ground state is  $-13.6$  eV.



**Fig. 7.1** (not to scale)

- (i) The spectrum produced by hydrogen is a line spectrum. Use Fig. 7.1 to explain why the spectrum is a line spectrum rather than a continuous spectrum.

.....  
 .....  
 .....  
 .....[2]

- (ii) Describe one way by which an electron in gaseous hydrogen can be raised from a ground state to the  $-0.54$  eV energy level.

.....  
 .....  
 .....[1]

- (iii) State the total number of different wavelengths that may be emitted as the electron de-excites from the  $-0.54$  eV energy level.

number = .....[1]

- (iv) Electromagnetic radiation is emitted when an electron falls to the ground state from the  $-0.54$  eV energy level.

Calculate the wavelength of this radiation. Suggest the type of radiation emitted.

wavelength = ..... m

type of radiation = .....

[2]

[Total: 8]