

- 7 Some data for the work function energy  $\Phi$  and the threshold frequency  $f_0$  of some metal surfaces are given in Fig. 7.1.

For  
Examiner's  
Use

metal	$\Phi/10^{-19}\text{ J}$	$f_0/10^{14}\text{ Hz}$
sodium	3.8	5.8
zinc	5.8	8.8
platinum	9.0	

Fig. 7.1

- (a) (i) State what is meant by the *threshold frequency*.

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

- (ii) Calculate the threshold frequency for platinum.

threshold frequency = ..... Hz [2]

- (b) Electromagnetic radiation having a continuous spectrum of wavelengths between 300 nm and 600 nm is incident, in turn, on each of the metals listed in Fig. 7.1. Determine which metals, if any, will give rise to the emission of electrons.

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

- (c) When light of a particular intensity and frequency is incident on a metal surface, electrons are emitted. State and explain the effect, if any, on the rate of emission of electrons from this surface for light of the same intensity and higher frequency.

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 .....  
 .....  
 ..... [3]