8 **(a)** State what is meant by the work function energy of a metal.

.....

.....

..... [2]

(b) Ultraviolet radiation of frequency 1.36×10^{15} Hz is incident, in a vacuum, on a metal surface. The power of the radiation incident on the surface is 8.36 mW. Photoelectrons are emitted with a maximum kinetic energy of 3.09×10^{-19} J.

(i) Determine the number of photons incident on the surface per unit time.

number per unit time = ... s^{-1} [2]

(ii) Calculate the work function energy Φ of the metal.

Φ = ... J [2]

(c) The frequency of the radiation incident on the surface in **(b)** is increased while the power remains constant.

State and explain the effect of this change on:

(i) the maximum kinetic energy of the photoelectrons

.....

.....

..... [2]

(ii) the rate of emission of photoelectrons.

.....

.....

..... [2]

[Total: 10]