

- 15 A student carried out an experiment during which light of different frequencies was shone onto a metal surface to produce photoelectrons.

The student measured the maximum kinetic energy of the emitted photoelectrons as the frequency of light was altered.

The relationship between the maximum kinetic energy of the photoelectrons and the frequency of the light incident on the metal surface is given by:

$$E_{k(\max)} = hf - \phi$$

where

$E_{k(\max)}$ = maximum kinetic energy of the photoelectrons

f = frequency of light used

h = Planck's constant

ϕ = a constant dependent on the metal used.

How could the student best analyse the data to determine a value for Planck's constant?

- ✓ (A) Plot $E_{k(\max)}$ against f and find the gradient of the line of best fit.
 (B) Plot $E_{k(\max)}$ against ϕ and find the gradient of the line of best fit.
 (C) Plot $E_{k(\max)}$ against f and find the intercept of the line of best fit.
 (D) Plot $E_{k(\max)}$ against ϕ and find the intercept of the line of best fit.

Question 15 : % answers correct by band range

