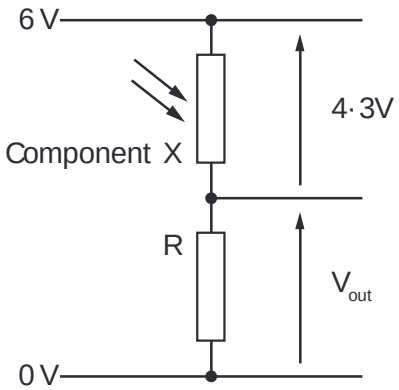
15. A weather monitoring station (as shown in the photograph to the right) is used to collect data.

Light levels are measured using the sensing sub-system shown in the diagram below.



(a) State the full name of Component X. 1

Component X and the fixed resistor R are connected in series.

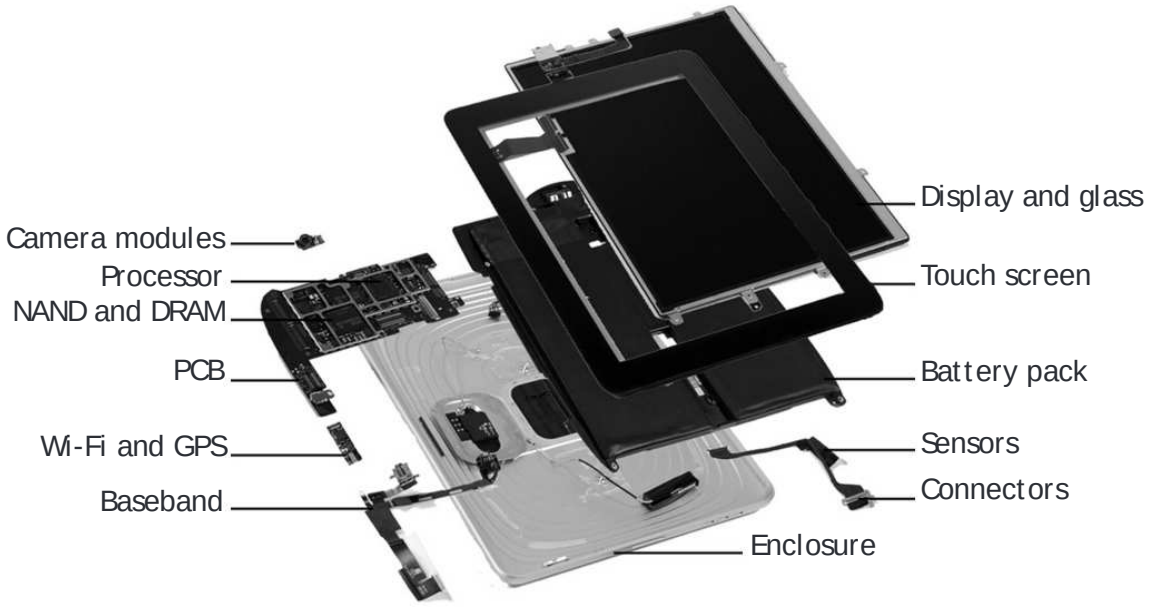
(b) State the name given to this arrangement. 1

(c) Calculate the value of the V_{out}. 1

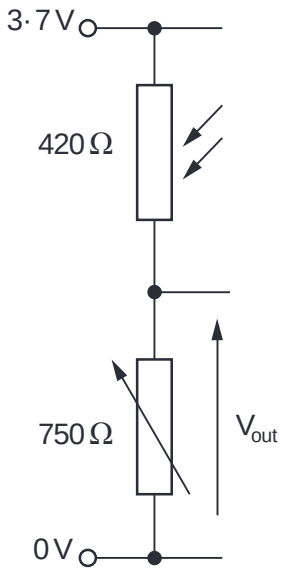
Component X is found to have a resistance of 1.5 kΩ.

(d) (i) Calculate the resistance of R. 3

14. An electronic engineer is working on the circuitry for a tablet computer.



To sense light levels the following circuit is used.



(a) Draw, on the diagram above, the symbol for a voltmeter connected to measure V_{out}. 2

MARKS | DO NOT WRITE IN THIS MARGIN

14. (continued)

(b) Calculate V_{out}. 3

Show all working and final unit.

The light level changes and V_{out} becomes 3 V.

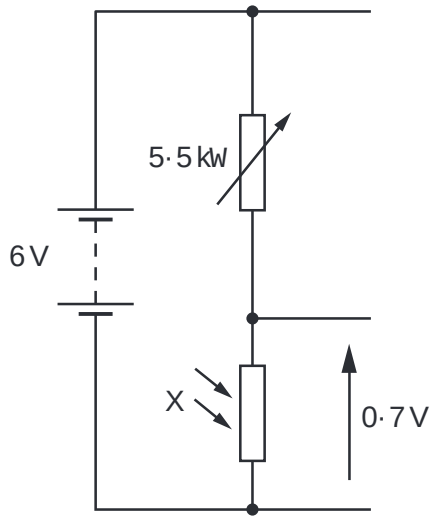
(c) Calculate the power used by the 750 Ω variable resistor. 2

Show all working and final unit.

[Turn over

12. (continue□)

The sensing sub-system used in the operation of the bicycle light is shown below.



(d) Calculate the resistance of component X. 4

Show all working and final unit.

[Turn over