5 A battery of electromotive force (e.m.f.) 12 V and negligible internal resistance is connected to a uniform resistance wire XY, a fixed resistor, and a variable resistor, as shown in Fig. 5.1.

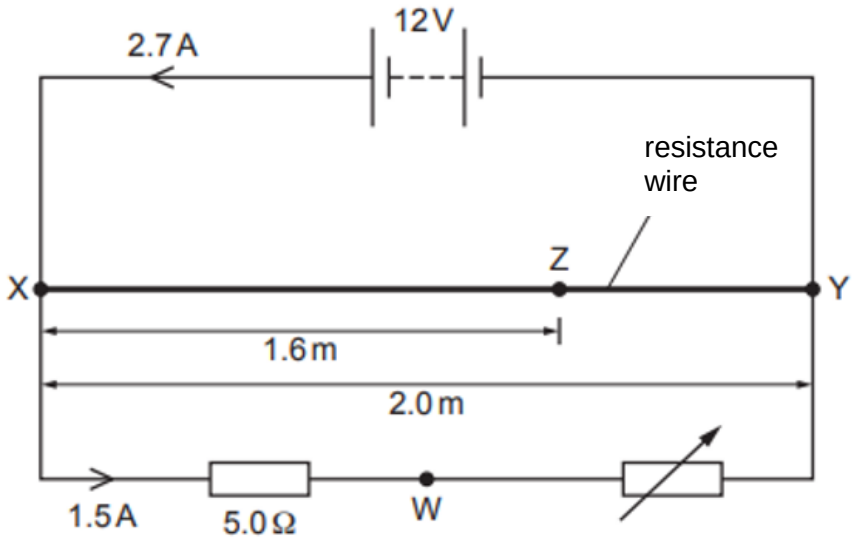

Fig. 5.1

The fixed resistor has a resistance of 5.0 Ω. The current in the battery is 2.7 A and the current in the fixed resistor is 1.5 A.

(a) Calculate the current in the resistance wire.

current = ……..…….... A [1]

(b) Determine the resistance of the variable resistor.

resistance = ……..……... Ω [1]

(c) Wire XY has a length of 2.0 m. Point Z on the wire is at a distance of 1.6 m from point X.

Determine the potential difference between points W and Z.

potential difference = …….. V [2]

(d) The resistance of the variable resistor is now increased.

State and explain whether the total power produced by the battery decreases, increases or stays the same.

……...

……...

……...

……...

…… [3]

[Total: 7]