

- 6 (a) Using energy transformations, describe the *electromotive force (e.m.f.)* of a battery and the *potential difference (p.d.)* across a resistor.

e.m.f.:

.....

p.d.:

.....[2]

- (b) A battery of e.m.f. 6.0V and negligible internal resistance is connected to a network of resistors and a voltmeter, as shown in Fig. 6.1.

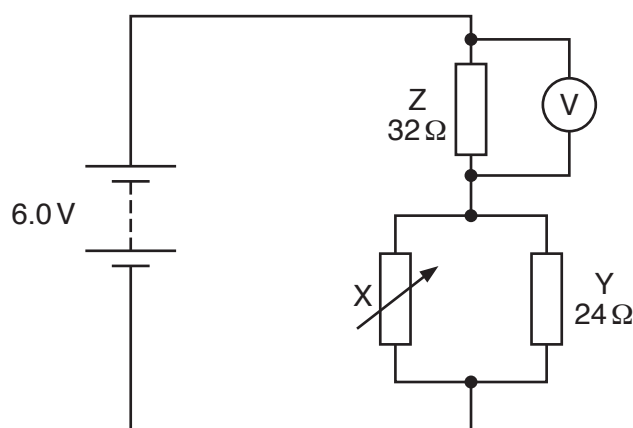


Fig. 6.1

Resistor Y has a resistance of $24\ \Omega$ and resistor Z has a resistance of $32\ \Omega$.

- (i) The resistance R_x of the variable resistor X is adjusted until the voltmeter reads 4.8 V.

Calculate:

1. the current in resistor Z

current = A [1]

2. the total power provided by the battery

power = W [2]

3. the number of conduction electrons that move through the battery in a time interval of 25 s

number = [2]

4. the total resistance of X and Y connected in parallel

total resistance = Ω [2]

5. the resistance R_X .

$R_X = \dots\dots\dots \Omega$ [2]

- (ii) The resistance R_X is now decreased.

State and explain the change, if any, to the reading on the voltmeter.

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

[Total: 13]