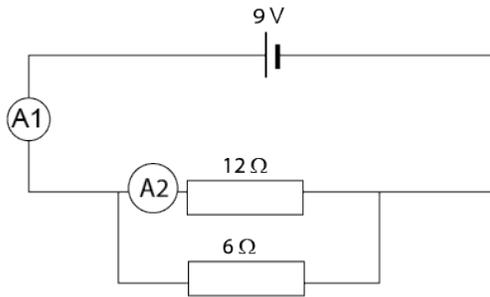


Prelim Revision

- 1 a) Calculate the resistance of the parallel circuit.



b) What is the voltage across the two resistors?

c) Calculate the reading on A1

d) Calculate the reading on A2.

e) Calculate the power developed in each resistor.

d) Calculate the total charge that flows round the circuit in 180 s.

2. A rocket has a mass of 500 kg and is accelerating at 4.0 ms^{-2} .

i) Calculate the unbalanced force on the rocket.

ii) Calculate the weight of the rocket.

iii) Use these two answers to calculate the upwards force on the rocket.

iv) Use Newton's third law to explain how a rocket rises.

3. What is meant by the activity of a radioactive source?

4. A radioactive source has an activity of 600 MBq and a half life of four hours. Calculate its activity after one day.

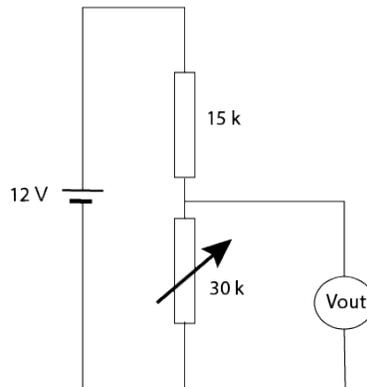
5. i) 200 g of organic matter receives an absorbed dose of $50 \mu\text{Gy}$. Calculate the energy the matter receives?

ii) If the radiation was alpha with a weighting factor of 20, calculate the dose equivalent.

6. The diagram shows an input device that will provide a variable output as the variable resistor is changed.

(A)

i) Calculate the potential difference across the variable resistor below.

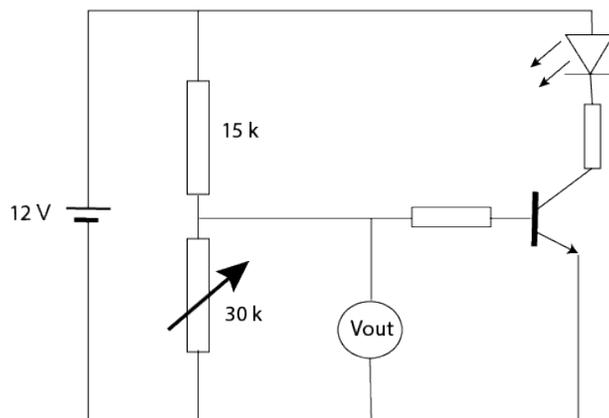


The potential difference across the lower branch resistor is the output signal that will be processed by a process device.

ii) State and explain what happens to the voltmeter reading as the resistance of the variable resistance increases.

(B)

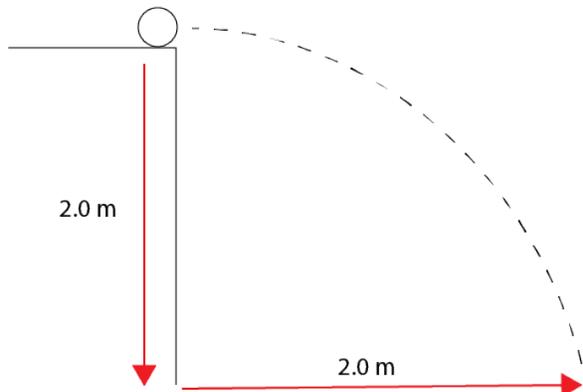
The input device is now connected to a process device as shown.



- i) Name the device and state its function
- ii) Will the LED be on or off if the variable resistor is set at 30 k. Explain why?

7. i) List the members of the electromagnetic spectrum from the longest wavelength to the least.
ii) Calculate the frequency of blue light if its wavelength is 460 nm.

8. A projectile is launched from the edge of a bench. The ball takes 0.64 seconds to hit the floor



- i) Calculate the horizontal velocity of the ball.
ii) Calculate the average vertical velocity of the ball.
iii) Calculate the final vertical velocity of the ball.
iv) Suppose the cliff is made higher but no other change is made, which of the above answers, if any, will change. Explain your answer.
9. Draw a free body diagram for a parachutist falling ...
i) At a constant velocity with the parachute yet to open.
ii) At a constant velocity with the parachute fully open.