

The City School



Physics

Level II

Topic: ELECTRONICS

Q1 The filament in a cathode-ray oscilloscope (c.r.o.) emits charged particles by thermionic emission.

(a) (i) State the name of the charged particles that are emitted.

..... [1]

(ii) Explain what causes the particles to be emitted.

..... [1]

(iii) State why there must be a vacuum in the c.r.o. tube.

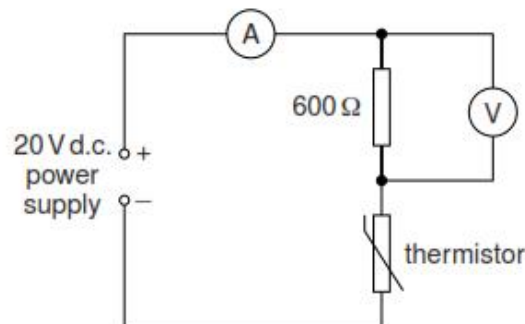
..... [1]

(b) The particles emitted have a charge of size 1.6×10^{-19} C and carry a current of 5.6×10^{-3} A between the filament and the screen of the c.r.o.

Calculate the number of particles that strike the screen every second.

number = [2]

Q2 A 600 ohm resistor and a thermistor are connected in series with an ammeter and a 20 V d.c.(direct current) power supply. A voltmeter is in parallel with the resistor. Fig.2.1 is the circuit diagram.



The ammeter reads 0.025 A.

(a) Calculate

(i) the reading on the voltmeter,

reading = [2]
(ii) the resistance of the thermistor.

resistance = [2]
(b) The temperature of the thermistor increases.

State what, if anything, happens to
(i) the resistance of the thermistor,
..... [1]

(ii) the ammeter reading and to the voltmeter reading.
ammeter reading:

voltmeter reading: [1]