Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Electricity

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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

A power of 100 kW at a potential difference of 10 kV is transmitted to a load resistor through cables of total resistance 5.0 Ω.

What is the power loss in the cables?

A 50 W ⬭

B 0.5 kW ⬭

C 100 kW ⬭

D 20 MW ⬭

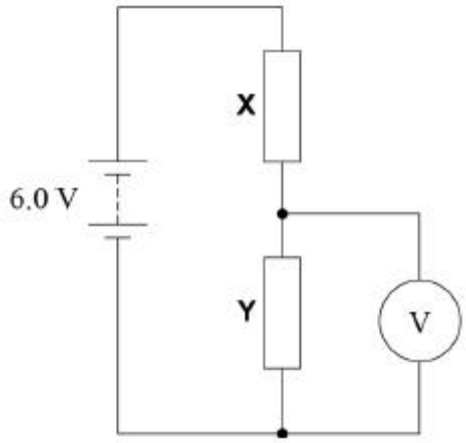
(Total 1 mark)

Q2.

Resistors **X** and **Y** are connected in series with a 6.0 V battery of negligible internal resistance.

X has resistance R and **Y** has resistance $\frac{R}{2}$.

A voltmeter of resistance R is connected across **Y**.



What is the reading on the voltmeter?

A 0.0 V ⬭

B 1.5 V ⬭

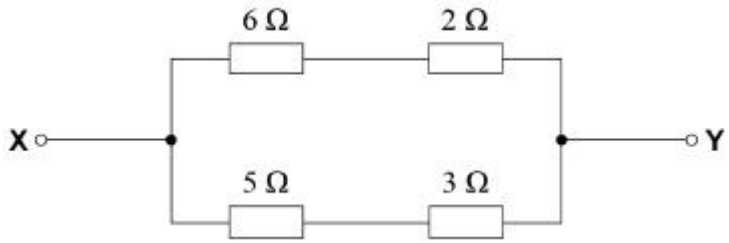
C 3.0 V ⬭

D 4.5 V ⬭

(Total 1 mark)

Q3.

In the circuit shown, a potential difference of 3.0 V is applied across **XY**.



What is the current in the 5 Ω resistor?

A 0.38 A ⬭

B 0.60 A ⬭

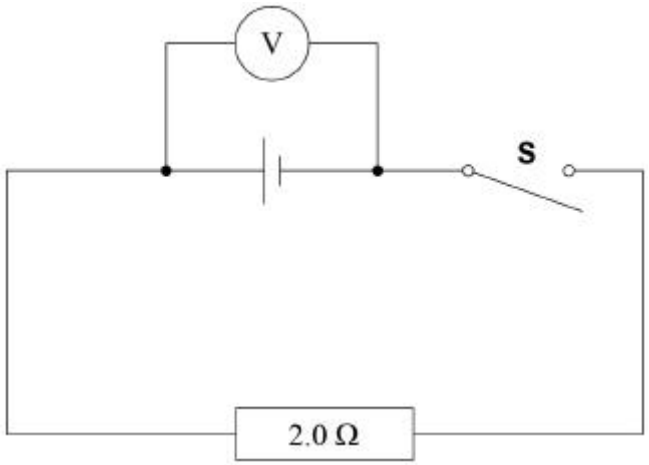
C 0.75 A ⬭

D 2.7 A ⬭

(Total 1 mark)

Q4.

The reading on the voltmeter halves when switch **S** is closed.



What is the internal resistance of the cell?

A 0.50 Ω ⬭

B 1.0 Ω ⬭

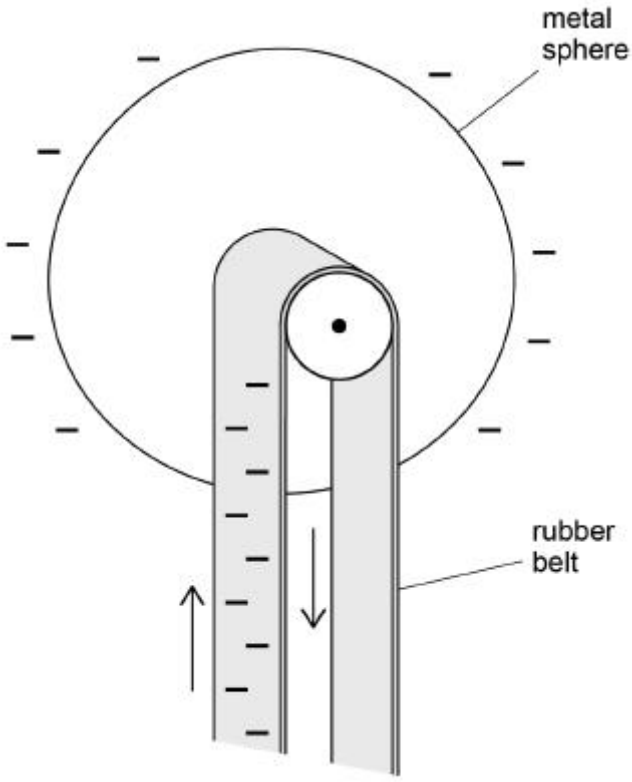
C 2.0 Ω ⬭

D 4.0 Ω ⬭

(Total 1 mark)

Q5.

A rubber belt in an electrostatic machine has a width of 0.1 m and moves with speed 0.4 m s^{-1}. Each square metre of the belt carries a charge Q coulomb. The charge is removed and transferred to a metal sphere.



What is the charge collected by the sphere each second?

A 0.016Q ⬭

B 0.04Q ⬭

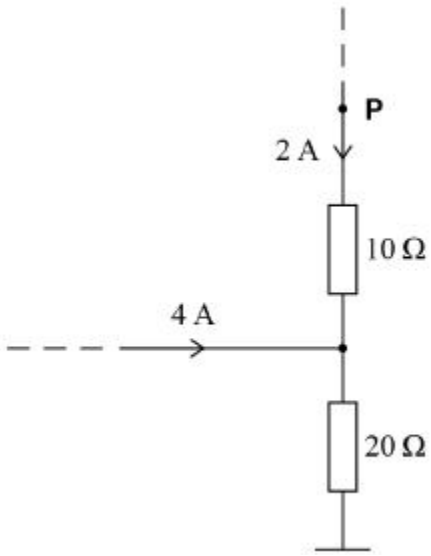
C 0.25Q ⬭

D 4Q ⬭

(Total 1 mark)

Q6.

The diagram shows part of a circuit and the currents in the circuit.



What is the potential difference between point P and earth?

A 60 V ⬭

B 100 V ⬭

C 120 V ⬭

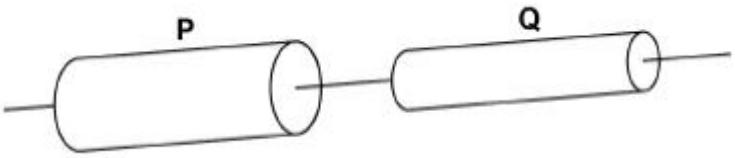
D 140 V ⬭

(Total 1 mark)

Q7.

Two cylindrical wires **P** and **Q** are of equal length and made of the same material.
The diameter of **P** is greater than that of **Q**.

P and **Q** are connected in series and the ends of this arrangement are connected to a power supply.



Which two quantities are the same for **P** and **Q**?

A	potential difference across wire	resistivity	⬭
B	resistivity	current	⬭
C	current	resistance	⬭
D	resistance	potential difference across wire	⬭

(Total 1 mark)

Q8.

A voltmeter has a resistance of 4.0 kΩ and reads 1.0 V for every scale division on the meter.

A power supply of emf 20 V and negligible internal resistance is connected across this voltmeter and a resistor in series. The voltmeter reads two divisions.

What is the value of the resistor?

A 44 kΩ ⬭

B 36 kΩ ⬭

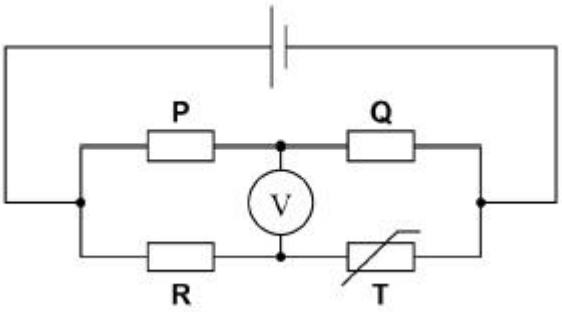
C 4.4 kΩ ⬭

D 3.6 kΩ ⬭

(Total 1 mark)

Q9.

In the circuit below, the initial voltmeter reading is zero.



The temperature of the negative temperature coefficient thermistor **T** is then increased.

Which change to the circuit could restore the voltmeter reading to zero?

A Decreasing the resistance of **R**. ⬭

B Increasing the resistance of **R**. ⬭

C Decreasing the resistance of **P**. ⬭

D Increasing the resistance of **Q**. ⬭

(Total 1 mark)

Q10.

An electric motor lifts a load of weight W through a vertical height h in time t.
The potential difference across the motor is V and the current through it is I.

What is the efficiency of the motor?

A $\frac{Wht}{VI}$ ⬭

B $\frac{VI}{Wht}$ ⬭

C $\frac{Wh}{VIt}$ ⬭

D $\frac{VIt}{Wh}$ ⬭

(Total 1 mark)

Q11.

A 1.0 μF capacitor is charged for 20 s using a constant current of 10 μA.

What is the energy transferred to the capacitor?

A 5.0×10^{-3} J ⬭

B 1.0×10^{-2} J ⬭

C 2.0×10^{-2} J ⬭

D 4.0×10^{-2} J ⬭

(Total 1 mark)

Q12.

A 1.0 μF capacitor initially stores 15 μC of charge. It then discharges through a 25 Ω resistor.

What is the maximum current during the discharge of the capacitor?

A 0.60 mA ⬭

B 1.2 mA ⬭

C 0.60 A ⬭

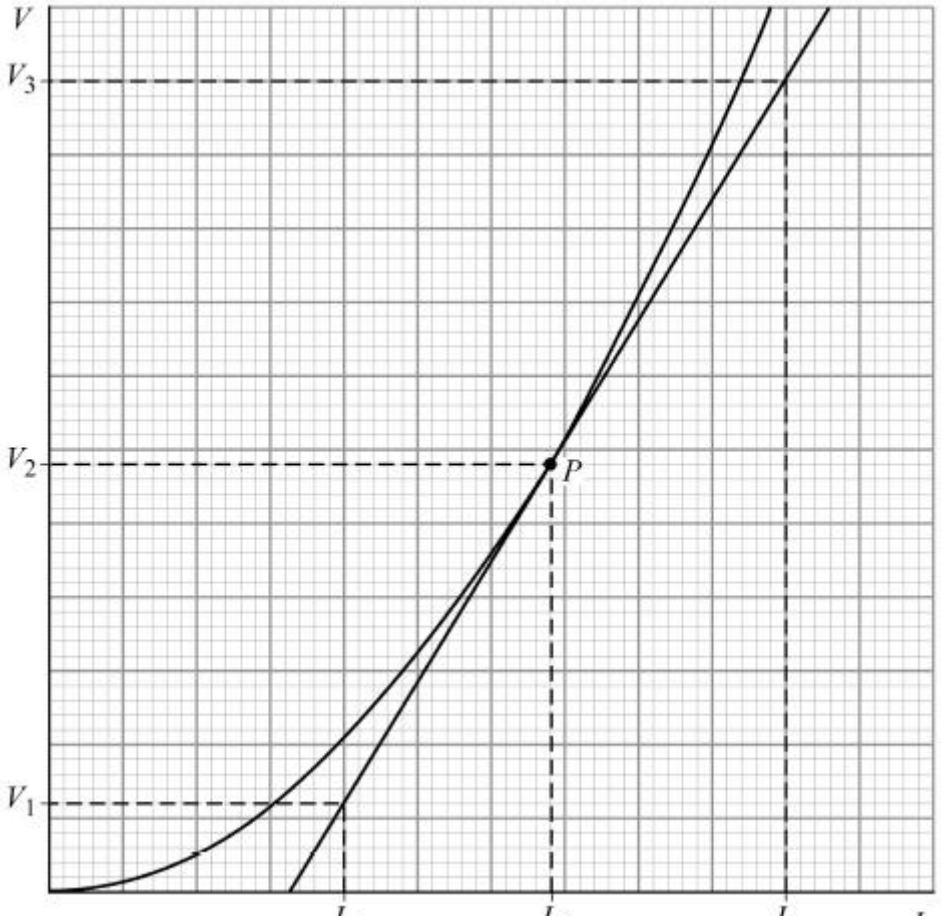
D 1.2 A ⬭

(Total 1 mark)

Q13.

The graph shows how the potential difference V across an electrical component varies with current I in the component.

A tangent has been drawn on the curve at point P for a current of I_2.



What is the resistance of the electrical component when the current in the component is I_2?

A $\frac{V_3 - V_1}{2I_2}$ ⬭

B $\frac{V_3 - V_1}{I_3 - I_1}$ ⬭

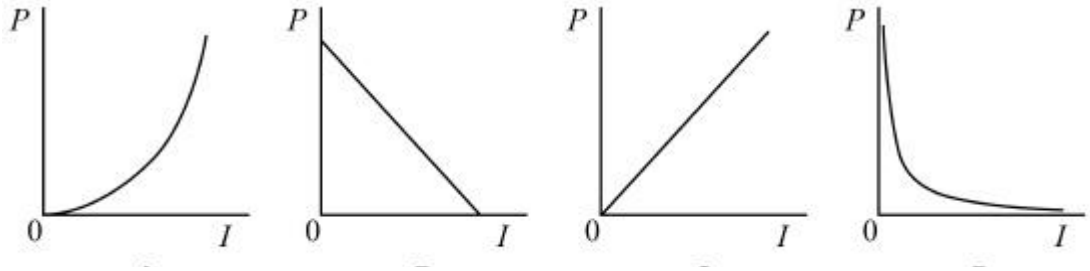
C $\frac{V_2}{I_2}$ ⬭

D $\frac{2V_2}{I_2 - I_1}$ ⬭

(Total 1 mark)

Q14.

Which graph shows how power dissipated P varies with current I in a component that obeys Ohm's law?



A ⬭

B ⬭

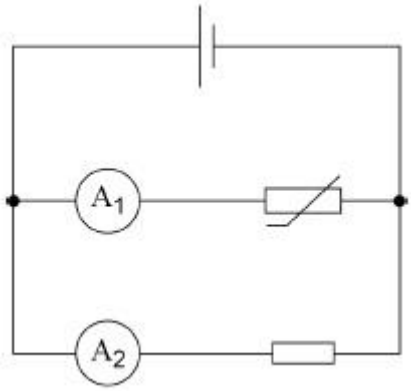
C ⬭

D ⬭

(Total 1 mark)

Q15.

A circuit consists of a cell, a thermistor, a fixed resistor and two ammeters.



The cell has a constant electromotive force and negligible internal resistance. Readings from the two ammeters are taken.

Which row describes what happens to the current in each ammeter when the temperature of the thermistor decreases?

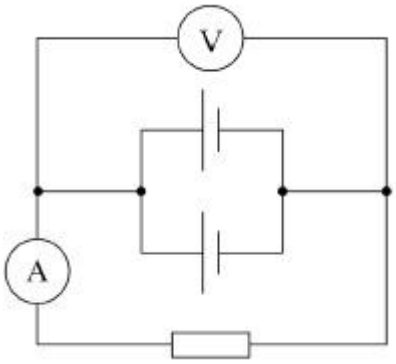
	Current in ammeter A_1	**Current in ammeter A_2**	
A	Decreases	Unchanged	⬭
B	Decreases	Increases	⬭
C	Increases	Decreases	⬭
D	Increases	Unchanged	⬭

(Total 1 mark)

Q16.

A circuit consists of two identical cells, a resistor, an ammeter and a voltmeter. The cells each have

an emf of 3.0 V and the resistor has a resistance of 12 Ω
The cells have negligible internal resistance.



Which row shows the readings on the voltmeter and ammeter?

	Voltage / V	Current / A	
A	3.0	0.25	⬭
B	3.0	0.50	⬭
C	6.0	0.25	⬭
D	6.0	0.50	⬭

(Total 1 mark)

Q17.

Which is equivalent to the ohm?

A $J\,C^{-2}\,s^{-1}$ ⬭

B $J\,C^{-2}\,s$ ⬭

C $J\,s$ ⬭

D $J\,s^{-1}$ ⬭

(Total 1 mark)

Q18.

A student carries out an experiment to determine the resistivity of a metal wire.
She determines the resistance from measurements of potential difference between the ends of the wire and the corresponding current. She measures the length of the wire with a ruler and the diameter of the wire using a micrometer. Each measurement is made with an uncertainty of 1%

Which measurement gives the largest uncertainty in the calculated value of the resistivity?

A current ⬭

B diameter ⬭

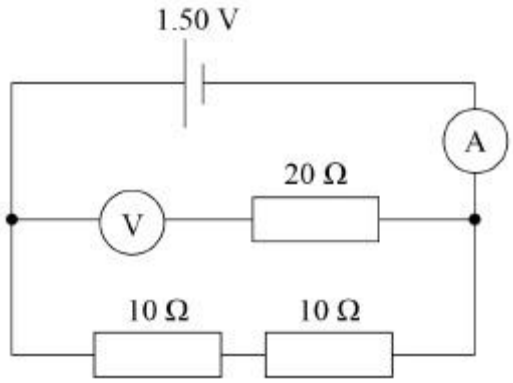
C length ⬭

D potential difference ⬭

(Total 1 mark)

Q19.

The circuit shows a cell with negligible internal resistance connected in a circuit with three resistors, an ammeter and a voltmeter.



Which row shows the readings on the ammeter and voltmeter?

	Current / A	Voltage / V	
A	0.075	0.75	⬭
B	0.075	1.50	⬭
C	0.150	0.75	⬭
D	0.150	1.50	⬭

(Total 1 mark)

Q20.

A gas containing doubly-charged ions flows to give an electric current of 0.64 A

How many ions pass a point in 1.0 minute?

A 2.0×10^{18} ⬭

B 4.0×10^{18} ⬭

C 1.2×10^{20} ⬭

D 2.4×10^{20} ⬭

(Total 1 mark)