FUN MCQ QUIZ **20 marks** **30 mins**

NAME:A

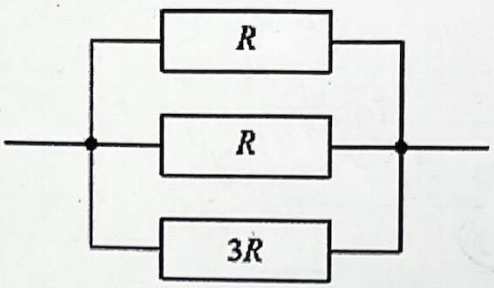
Q. No.	Answer				Topic	
1	(A)	B	C	D	4	✓
2	A	B	C	(D)	3	A
3	A	(B)	C	D	4	✓
4	(A)	B	C	D	5	B
5	A	(B)	C	D	3	D
6	A	B	(C)	D	4	✓
7	A	(B)	C	D	3	✓
8	A	B	(C)	D	3	✓
9	A	B	C	D	3 C,B	✓✓
10	(A)	B	C	D	3	D
11	A	B	(C)	D	4	✓
12	(A)	B	C	D	2	✓
13	A	(B)	C	D	1	✓
14	A	B	(C)	D	2	D
15	(A)	B	C	D	2	✓
16	A	B	(C)	D	1	✓
17	A	B	(C)	D	4	✓
18	A	B	C	(D)	4	B ~
19	A	(B)	C	D	5	A ~
20	A	B	C	D	4	? NoQ?

Topic	Score	Percent
3.5.1.1	/2	
3.5.1.2	/3	
3.5.1.3	/6	
3.5.1.4	/7	
3.5.1.5	/2	
TOTAL	/20	

13/20

Q1.

Resistors of resistance R, R and $3R$ are connected as shown.



What is the resistance of the arrangement?

A $\frac{3R}{7}$

B $\frac{7R}{3}$

C $\frac{5R}{6}$

D $\frac{6R}{5}$

$= \frac{1}{\frac{1}{R}+\frac{1}{R}+\frac{1}{3R}}$

$= \frac{1}{\frac{2}{R}+\frac{1}{3R}}$

$= \frac{1}{\frac{6R+R}{3R^2}} = \frac{1}{\frac{7}{3R}} = \frac{3R}{7}$

(Total 1 mark)

Q2.

Two resistors R_1 and R_2 are made of wires of the same material. The wire used for R_1 has half the diameter and is twice as long as the wire used for R_2.

What is the value of the ratio $\frac{\text{resistance of } R_1}{\text{resistance of } R_2}$?

A 8

B 4

C 1

D 0.5

$= \frac{0.5}{1} = 0.5$

$\rho = \frac{RA}{L}$

$\rho L = RA$

$R = \frac{\rho L}{A}$

$d \div 2, A \div 4, R \div 4$

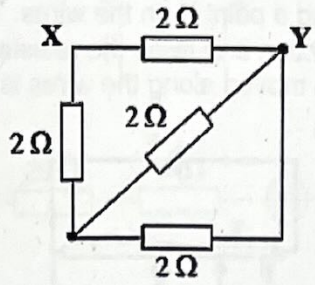
$L \times 2, R \times 2$

(Total 1 mark)

$\frac{\rho L}{A} : \frac{\rho L}{A} : \frac{2\rho L}{0.25A} : \frac{\rho L}{A} = 8$

Q3.

The diagram shows a network of four 2 Ω resistors.



The effective resistance, in Ω, between **X** and **Y** is

A 0.5

B 1.2

C 1.7

D 2.0

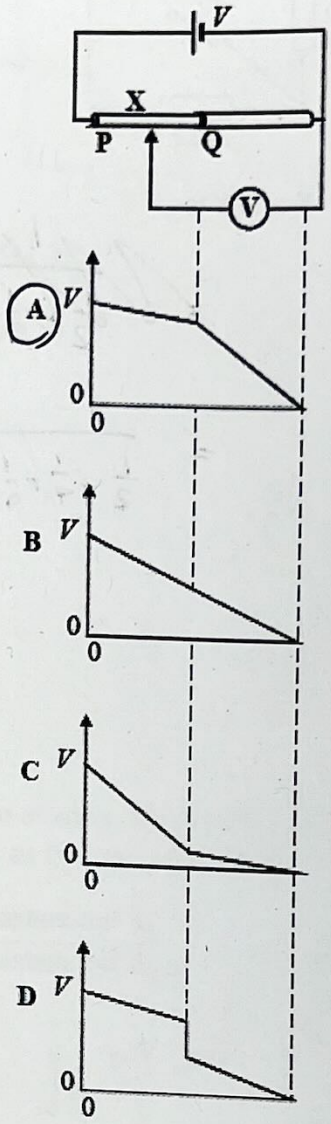
$$= \frac{1}{\frac{1}{2}+\frac{1}{4}+\frac{1}{4}} = 1$$

(Total 1 mark)

Q6.

Q4.

The diagram shows two wires, **P** and **Q**, of equal length, joined in series with a cell. A voltmeter is connected between the end of **Q** and a point **X** on the wires. The p.d. across the cell is V. Wire **Q** has twice the area of cross-section and twice the resistivity of wire **P**. The variation of the voltmeter reading as the point **X** is moved along the wires is best shown by



(Total 1 mark)

Q5.

Copper metal is a good conductor of electricity because copper atoms in copper metal

A have gained an extra or "free" electron

B are ionised so that both ions and "free" electrons can move

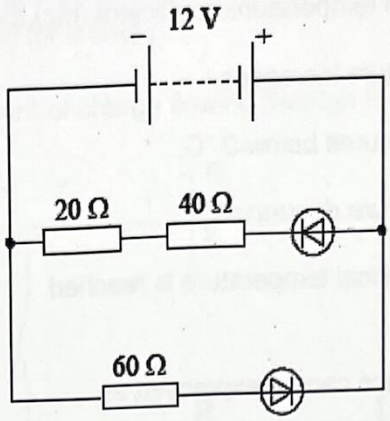
C have a negative charge because of the "free" electrons

D have lost an electron to form positive ions and "free" electrons

(Total 1 mark)

Q6.

The 12 V battery in the circuit shown has negligible internal resistance. The diodes have 'ideal' characteristics.



$V = IR$

$I = \frac{V}{R} = \frac{12}{60} = 0.2$

$= 60\,\Omega$

Can only go 1 way

The current through the battery is approximately

A 0 A

B 0.10 A

C 0.20 A

D 0.40 A

(Total 1 mark)

Q7.

A 1.5 m length of wire has a cross-sectional area 5.0×10^{-8} m ^{2}. When the potential difference across its ends is 0.20 V, it carries a current of 0.40 A. The resistivity of the material from which the wire is made is

$V = IR$

$R = \frac{V}{I} = \frac{0.2}{0.4} = 0.5\,\Omega$

$\rho = \frac{RA}{L} = \frac{0.5 \times 5 \times 10^{-8}}{1.5} = 1.7 \times 10^{-8}$

A $6.0 \times 10^{7}\ \Omega$ m

B $1.7 \times 10^{-8}\ \Omega$ m

C $1.1 \times 10^{6}\ \Omega$ m

D $9.4 \times 10^{-7}\ \Omega$ m

(Total 1 mark)

Q8.

The resistance of a metallic conductor increases with temperature because, at higher temperatures,

A more electrons become available for conduction

B the conductor becomes a superconductor

C the amplitude of vibration of lattice ions increases

D the length and cross-sectional area of the conductor both increase

(Total 1 mark)

Q9.

In parts (i) and (ii) circle the letter that corresponds to the correct answer.

(i) The resistance of a negative temperature coefficient (ntc) thermistor

A increases as temperature increases.

B is constant at temperatures below 0 °C.

C increases as temperature decreases.

D falls to zero when a critical temperature is reached.

(1)

(ii) The unit of potential difference can be expressed as

A $C\ s^{-1}$

B $J\ C^{-1}$ $V = \frac{W}{Q} = JC^{-1}$

C $V\ A^{-1}$

D $J\ A^{-1}$

(1)

(Total 2 marks)

Q10.

A potential divider circuit consists of a battery connected across a thermistor and variable resistor in series.

Which of the following causes the potential difference (pd) across the thermistor to increase?

A increasing the temperature of the thermistor ☒

B increasing the resistance of the variable resistor ☒

C reducing the emf of the battery ☒

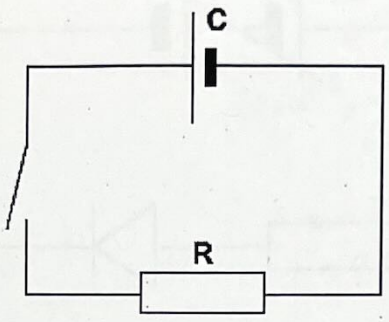
D adding a resistor across the variable resistor ☒

(Total 1 mark)

Q11.

A cell C of negligible resistance and a switch are in series with a resistor R. The switch is moved to the on (closed) position for a time t.

Which change reduces the amount of charge flowing through R in time t?



A add an identical cell in parallel with C ○

B add an identical cell in series with C ○

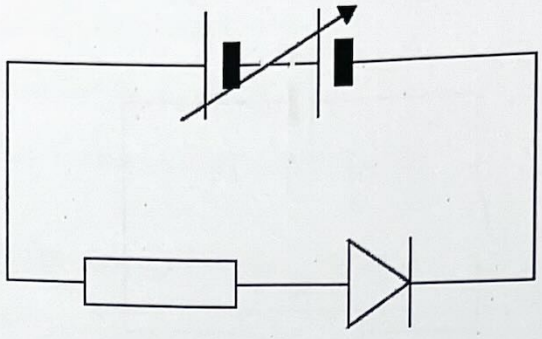
C add a second resistor in series with R ○

D add a second resistor in parallel with R ○

(Total 1 mark)

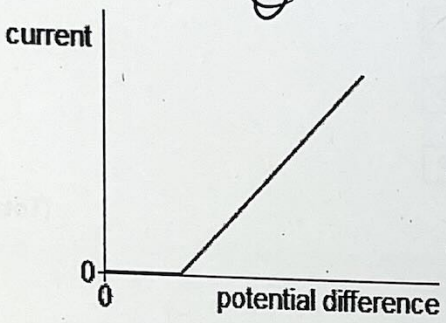
Q12.

A resistor and diode are connected in series with a variable power supply as shown in the diagram.

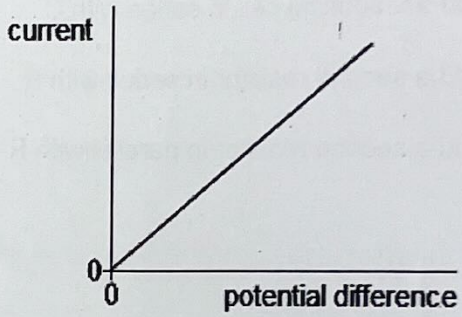


Which best shows the characteristic for the combination of the resistor and diode?

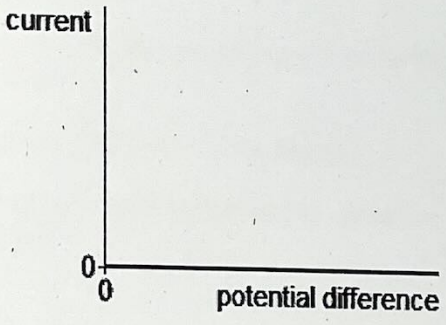
A



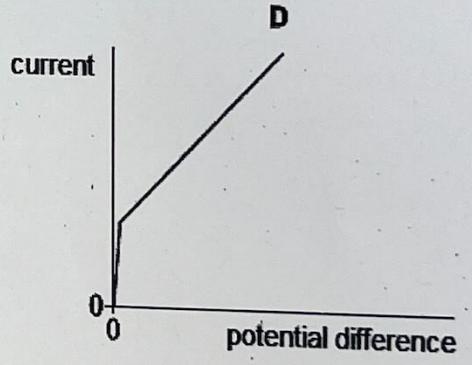
B



C



D



A ⭕

B ⭕

C ⭕

D ⭕

(Total 1 mark)

Q13.

The current in a wire is 20 mA.

How many electrons pass a point in the wire in 2 minutes?

A 2.5×10^{17} ☐

B 1.5×10^{19} ☐

C 2.5×10^{20} ☐

D 1.5×10^{22} ☐

$= 2.4 \div 1.6 \times 10^{-19}$

$= 1.5 \times 10^{19}$

$I = \frac{Q}{t}$

$20 \times 10^{-6} = \frac{x}{60 \times 2}$

$x = 20 \times 10^{-3} \times 120$

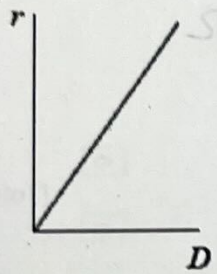
$= 2.4$ C

(Total 1 mark)

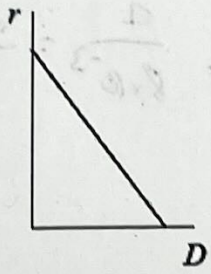
Q14.

Which graph shows how the resistance per unit length *r* of a wire varies with diameter *D* of the wire?

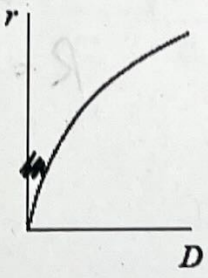
A



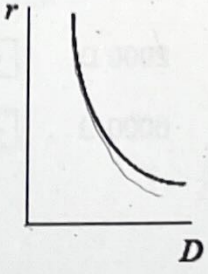
B



C



D



$D = 0, R = \infty$

A ☐

B ☐

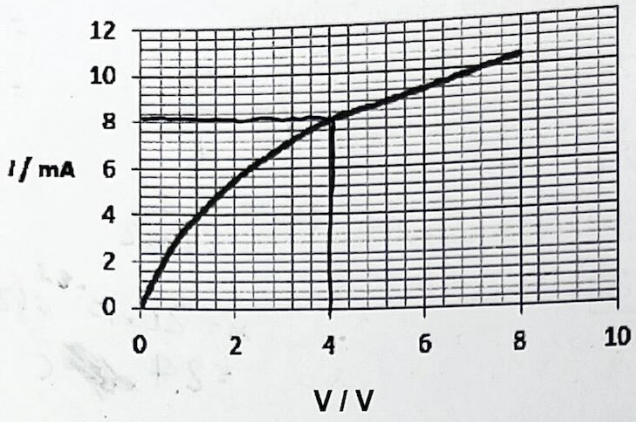
C ☐

D ☐

(Total 1 mark)

Q15.

The graph shows the current–voltage (*I*–*V*) characteristics of a filament lamp.



What is the resistance of the filament when the potential difference (pd) across it is 4.0 V?

A 500 Ω ☐

B 1700 Ω ☐

C 2000 Ω ☐

D 6000 Ω ☐

$= 8\,mA$

$R = \frac{V}{I} = \frac{4}{8\times10^{-3}} = 500\,\Omega$

(Total 1 mark)

Q16.

In a cathode ray tube 7.5×10^{15} electrons strike the screen in 40 s. What current does this represent?

Charge of the electron is 1.6×10^{-19} C.

A 1.3×10^{-16} A ☐

B 5.3×10^{-15} A ☐

C 3.0×10^{-5} A ☐

D 1.2×10^{-3} A ☐

$I = \frac{Q}{T}$

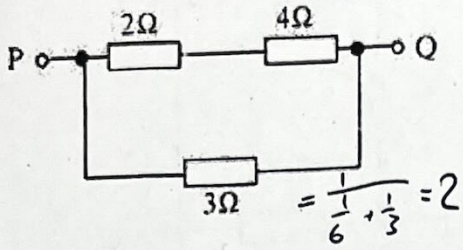
$= \frac{7.5\times10^{15} \times 1.6\times10^{-19}}{40}$

$= 3\times10^{-5}$

(Total 1 mark)

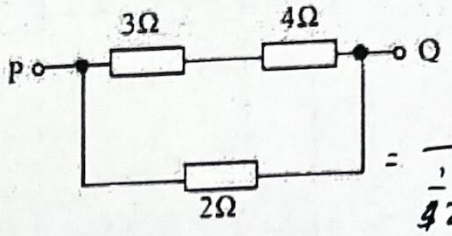
Q17.

Which resistor arrangement has the greatest value of resistance?



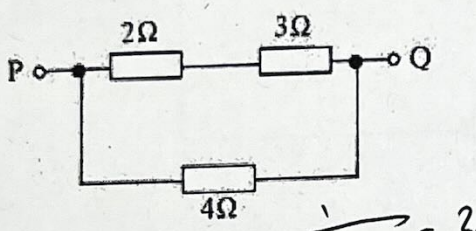
$= \frac{1}{\frac{1}{6}+\frac{1}{3}} = 2$

A



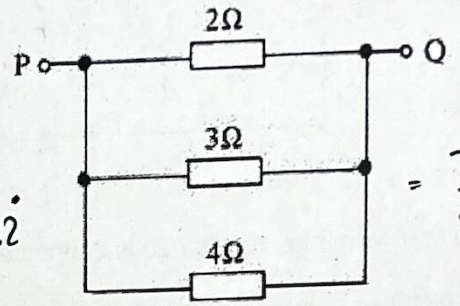
$= \frac{1}{\frac{1}{12}+\frac{1}{7}} = 1.5$

B



$= \frac{1}{\frac{1}{5}+\frac{1}{4}} = 2.2$

C



$= \frac{1}{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}} = 0.9...$

D

A ☐

B ☐

(C) ☐

D ☐

(Total 1 mark)

Q18.

When a constant potential difference (pd) is applied across the ends of a uniform wire there is a current I in the wire.

The wire is replaced by one made from the same material, but of double the length and double the diameter. The same pd is applied across the ends.

What is the new current?

$\rho = \frac{RA}{L}$

$\frac{VA}{Ll} = \rho$

$\frac{V\frac{d^2}{4}}{Ll} = \rho$

A $4I$ ☐

(B) $2I$ ☐

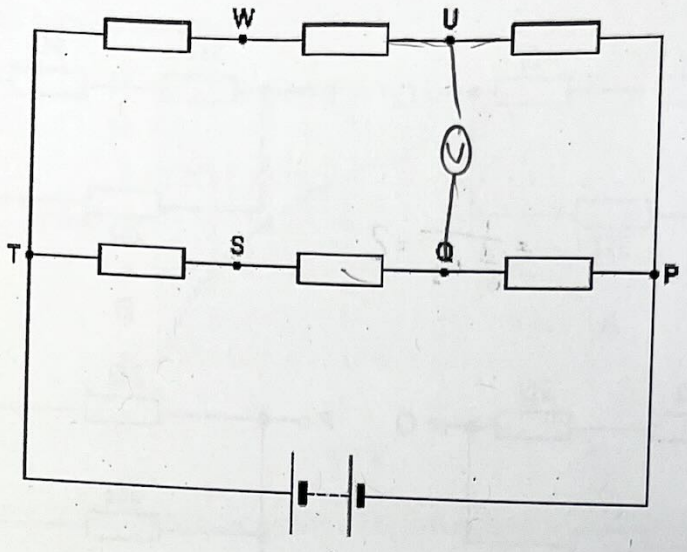
C $\frac{I}{2}$ ☐

(D) $\frac{I}{4}$ ☐

(Total 1 mark)

Q19.

In the circuit shown below, each of the resistors has the same resistance.



A voltmeter with very high resistance is connected between two points in the circuit.

Between which two points of connection would the voltmeter read zero?

A Q and U ⊙

B P and T ⊙

C Q and W ⊙

D S and U ⊙

(Total 1 mark)