

South West

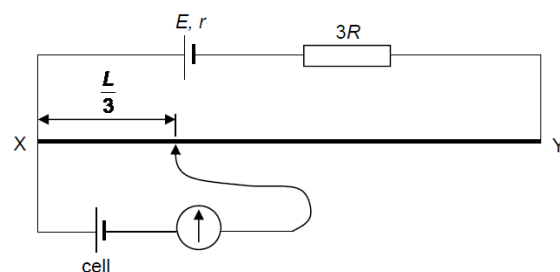
Center for

Centralized Physics Worksheet for Grade 12

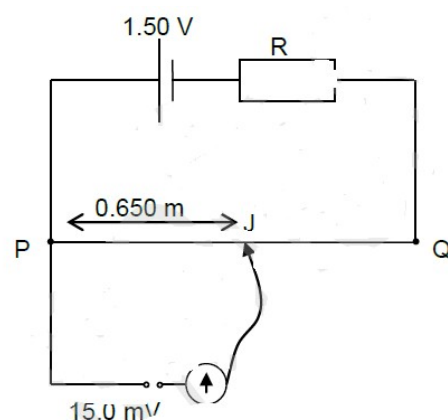
Attempt the following questions. Show all the steps where necessary. Neatness matters.

1. How can we modify a galvanometer into an ammeter?
2. Can a magnetic force do work on a charged particles? Explain.

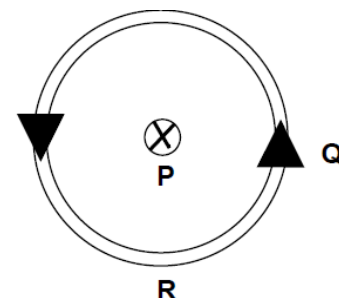
3. A potentiometer has a wire XY of length L and resistance R . It is powered by a battery of e.m.f. E and internal resistance r in series with a resistor of resistance $3R$. With a cell in the branch circuit, the null point is found to be $\frac{L}{3}$ from X , as shown in the figure. What is the e.m.f. of the cell?



4. The diagram below shows a simple potentiometer circuit for measuring a small e.m.f. produced by a thermocouple. The potentiometer wire PQ is 1m long and has a resistance of 10Ω . The driver cell has an e.m.f. of 1.50 V. If a balance point is to be obtained at 0.650 m along PQ when measuring an e.m.f. of 15.0 mV, what is the value of the resistance R assuming that the driver cell has negligible internal resistance?



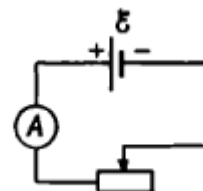
5. A long straight wire P is placed along the axis of a flat circular coil Q . The wire P carries current into the page while the coil Q carries current in anti-clockwise direction as



shown in the figure. What can be deduced about the direction of the force acting on point **R** of coil **Q** due to current in **P**?

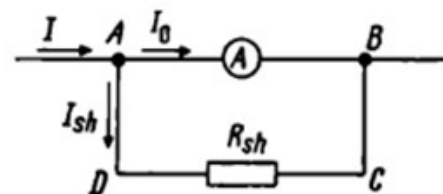
6. A conductor of length 0.5 m is placed at right angles to a magnetic field of strength 0.45 T. Calculate the force exerted on the conductor if it carries a current of 5 A.

7. A cell having an emf of 2.1 V and an internal resistance of $0.2\ \Omega$ is connected to a potentiometer. Determine the current in the circuit and the resistance of the potentiometer if the voltage across the cell terminals is 2 V. What must be the length of the iron wire used for preparing the potentiometer if its cross sectional area is $0.75\ \text{mm}^2$? ($\rho_{\text{iron}} = 1.2 \times 10^{-7}\ \Omega\text{m}$)



8. A milliammeter of resistance $10\ \Omega$ has a full-scale deflection of 1 mA. How can it be converted into a voltmeter with a full scale deflection of 10 V? (If $R = 9990\ \Omega$ is put in series with the milliammeter then, the combination becomes a voltmeter with a full scale deflection of 10V)

9. A milliammeter is intended for measuring currents below 10 mA. What should be done to use this meter for measuring current up to 1 A if its internal resistance is $9.9\ \Omega$?



10. A solenoid of length 20 cm and diameter 5 cm should produce a magnetic field strength of 1.26mT on its axis. Find the *p.d* that must be applied across the ends of the solenoid winding if a copper wire of diameter 0.5 mm is used for it. ($\rho_{\text{Cu}} = 0.17 \times 10^{-7}\ \Omega\text{m}$)

11. Find the magnetic field strength of the magnetic field produced by an infinitely long straight wire carrying a current of 5A at a point lying 2 cm from it.

12. Current of 30 A flows in opposite directions through two long parallel wires separated by a distance of 16 cm. Compute the magnetic field strength at a point midway from each wire.

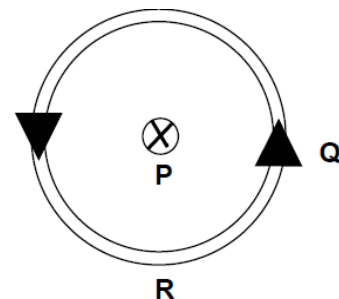
13. An electron describes a circle of radius 4 mm in a magnetic field. The electron velocity is $3.6 \times 10^6\text{m/s}$. Compute the magnetic field strength of the field.

Parent's Signature Date

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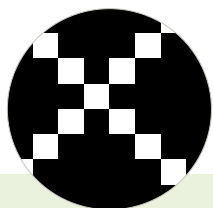
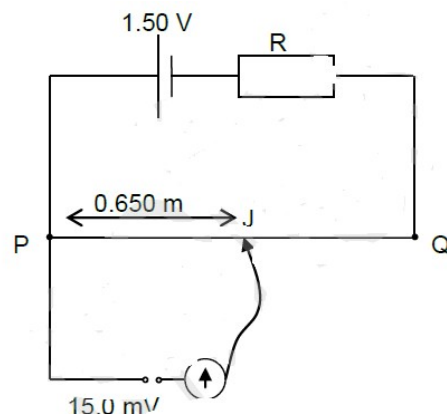
14. A long straight wire **P** is placed along the axis of a flat circular coil **Q**. The wire **P** carries current into the page while the coil **Q** carries current in anti-clockwise direction as shown in the figure. What can be deduced about the direction of the force acting on point **R** of coil **Q** due to current in **P**? (No force acts at **R** due to current in **P**.)

- A. Force acts perpendicular to the plane of the coil.
- B. Force acts in the direction RP
- C. Force acts in the direction PR.
- D. No force acts at **R** due to current in **P**.



15. The diagram below shows a simple potentiometer circuit for measuring a small e.m.f. produced by a thermocouple. The potentiometer wire PQ is 1m long and has a resistance of 10Ω . The driver cell has an e.m.f. of 1.50 V. If a balance point is to be obtained at 0.650 m along PQ when measuring an e.m.f. of 15.0 mV, what is the value of the resistance R assuming that the driver cell has negligible internal resistance?

- A. 417Ω B. 427Ω C. 642Ω D. 652Ω



South West Academy

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Centralized Physics Worksheet for Grade 12

Answer key: Worksheet 2

Academic Year: 2018/2019

Quarter: III

Grade: 12

1. By connecting a shunt resistor in parallel to it
2. **XXXXX**

3. $\frac{ER}{3(4R+r)}$
4. 642Ω
5. No force acts at **R** due to current in **P**
6. **1.125N**
7. 25m
8. $R_{sh}=0.1\Omega$ must be connected in parallel to the milliammeter
9. $R_s=9990\Omega$ must be connected in series with the milliammeter
10. (2.7V)
11. ($50\mu T$)
12. Xxxx
13. ($5mT$)