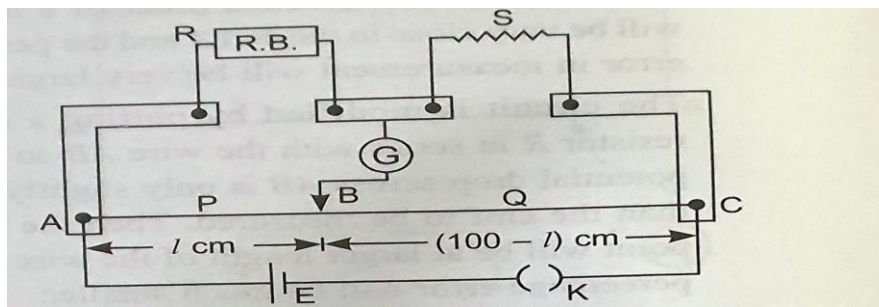


- Section A is of 1 mark questions. Question 1 to 10 are multiple choice questions. Question 11 to 16 are fill in the blank questions. Question 17 is a match the column type questions.
- Section B consist of 5 questions of 2 marks each.
- Section C consists of 5 questions of 3 marks each

SECTION A

1. Which of the following characteristics of electrons determines the current in a conductor?
 - (a) Drift velocity alone
 - (b) Thermal velocity alone
 - (c) Both drift velocity and thermal velocity
 - (d) Neither drift nor thermal velocity.
2. Ohm's law is true.
 - (a) For metallic conductors at low temperature.
 - (b) For conductors at high temperature.
 - (c) For electrolytes when current passes through them.
 - (d) For diode when current flows.
3. The terminal potential difference of a cell is greater than its emf when it is
 - (a) Being discharged
 - (b) In open circuit
 - (c) Being charged
 - (d) Being either charged or discharged.
4. If the length of the potentiometer wire is increased, then the length of the previously obtained balance point will
 - (a) Increase
 - (b) Decrease
 - (c) Remains unaffected
 - (d) Becomes two times
5. When there is an electric current through a conducting wire along its length, then an electric field must exist
 - (a) Outside the wire but parallel to it.

- (b) Outside the wire but normal to it
 - (c) Inside the wire but parallel to it
 - (d) Inside the wire but normal to it.
6. For measurement of potential difference, a potentiometer is preferred over voltmeter because
- (a) Potentiometer is more sensitive than voltmeter.
 - (b) The resistance of potentiometer is less than that of voltmeter.
 - (c) Potentiometer is cheaper than voltmeter.
 - (d) Potentiometer does not take current from the circuit.
7. A resistance R is to be measured using a meter bridge. Student chooses the standard resistance S to be 100 ohms. He finds the null point at $l_1=2.9$ cm. He is told to attempt to improve the accuracy. Which of the following is a useful way?



- (a) He should measure l_1 more accurately.
 - (b) He should change S to 1000 ohms and repeat the experiment.
 - (c) He should change S to 3 ohms and repeat the experiment.
 - (d) He should give up hope of a more accurate measurement with a meter bridge.
8. Two cells of emf's approximately 5 V and 10 V are to be accurately compared using a potentiometer of length 400 cm.
- (a) The battery that runs the potentiometer should have voltage of 8 V.
 - (b) The battery of potentiometer can have a voltage of 15 V and R adjusted so that the potential drop across the wire slightly exceeds 10 V.
 - (c) The first portion of 50 cm of wire itself should have a potential drop of 10 V.
 - (d) Potentiometer is usually used for comparing resistances and not voltages.
9. Which of the following is wrong?
- Resistivity of a conductor is
- (a) Independent of temperature
 - (b) Inversely proportional to temperature
 - (c) Independent of dimensions of conductor
 - (d) Less than resistivity of a semiconductor.

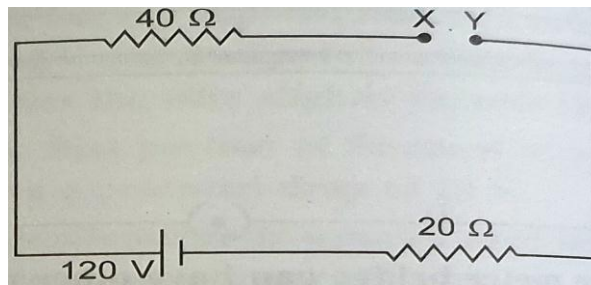
10. In an experiment of meter bridge, a null point is obtained at the center of the bridge wire. When a resistance of 10 ohm is connected in one gap, the value of resistance in other gap is

- (a) 10 ohm
- (b) 5 ohm
- (c) 15 ohm
- (d) 50 ohm

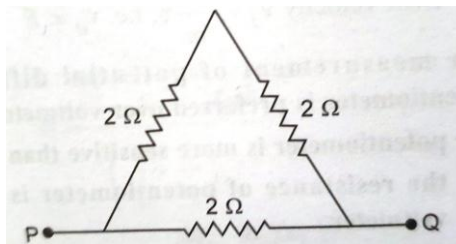
11. When the current I is flowing through a conductor, the drift velocity is v . if $2I$ current flows through the same metal but having double area of cross section, then drift velocity will be.....

12. Two resistors having value in ratio 2:1 are connected in parallel with one cell then the ratio of power dissipated is.....

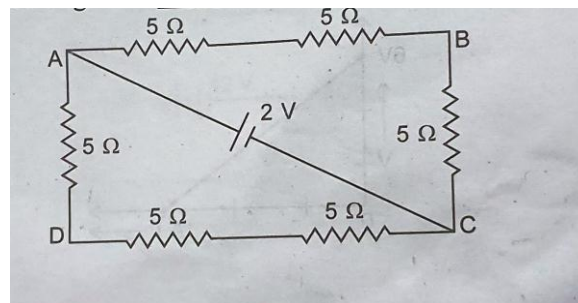
13. In the circuit shown, potential difference between X and Y is.....and across 40 ohm is.....



14. The equivalent resistance across P and Q is.....



15. The potential difference between points A and B is.....

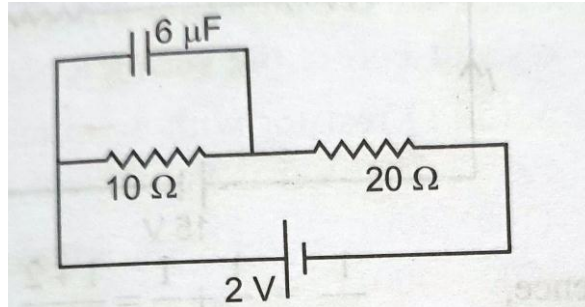


16. The current density is a quantity though current is aquantity.

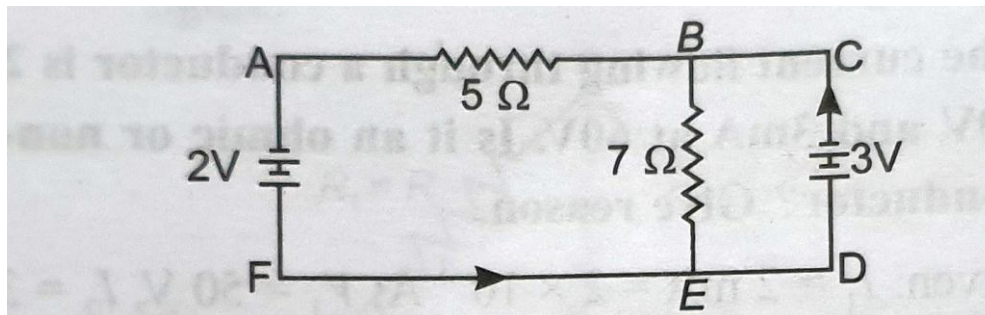
17.

COLUMN 1	COLUMN 2
A. In series combination of bulbs, the bulb with maximum power will glow with	(i) Minimum brightness
B. In parallel combination of bulbs, the bulb with maximum power will glow with	(ii) Maximum brightness
	(iii) Same brightness

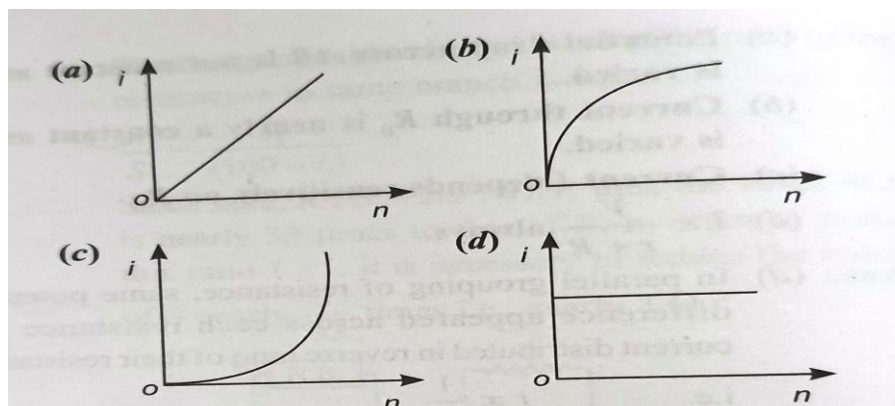
18. Find the charge on the capacitor as shown in the circuit.



19. If the 3 V battery is short circuited. What will be the current through 5 ohm?



20. A battery consists of a variable number n of identical cells having internal resistances connected in series. The terminals of battery are short circuited and the current I is measured. Which of the graph shows the relationship between I and n ?

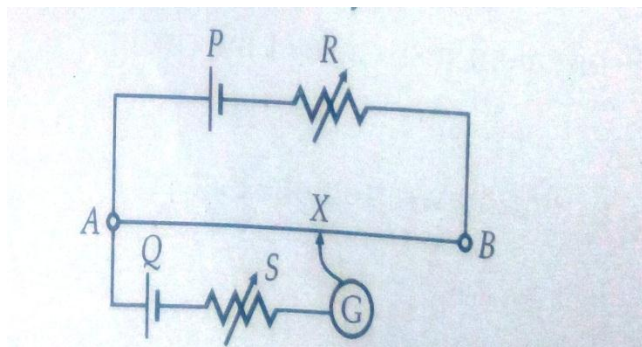


SECTION B

21. Use Kirchhoff's rules to determine balanced condition of Wheatstone bridge.
22. A cell of emf E and internal resistance r is connected across a variable resistor. The terminal potential difference across the cell and current through the resistor is measured using an ideal voltmeter and an ideal ammeter respectively. Following data was collected. Calculate the value of E and r from the data.

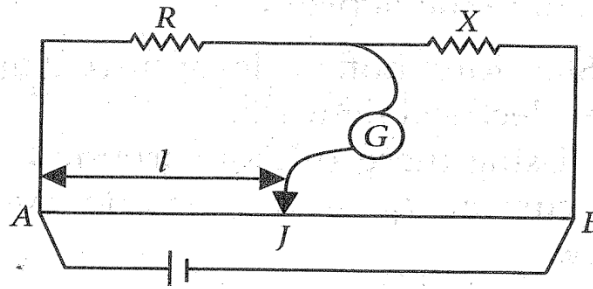
V (volt)	I (ampere)
0	3
0.5	2
1.0	1
1.5	0

23. In the potentiometer circuit shown in the figure, the balance point is at X . state with reason, where the balance point will be shifted when:
- Resistance R is increased, keeping all parameters unchanged
 - Resistance S is increased, keeping R constant.



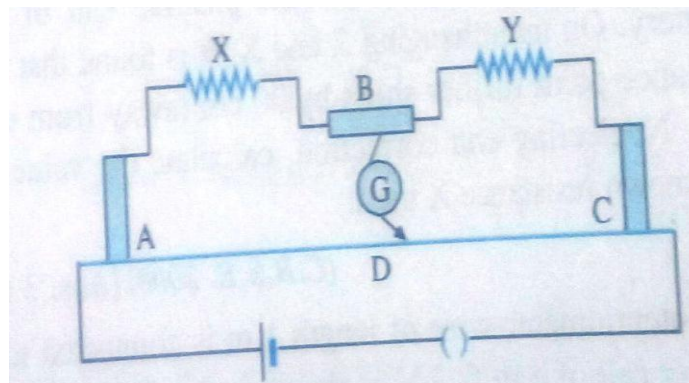
24. A conductor of length l is connected to a dc source of potential V . if the length of the conductor is tripled by gradually stretching it keeping V constant. How will
- Drift speed of electrons,
 - Resistance of the conductor be affected.
- Justify your answer.
25. In the meter bridge experiment, the balance point is obtained at J .
- If the values of R and X were doubled, what will be the position of new balance point?

- (ii) If the cell and galvanometer are interchanged, what will be the position of new balance point?



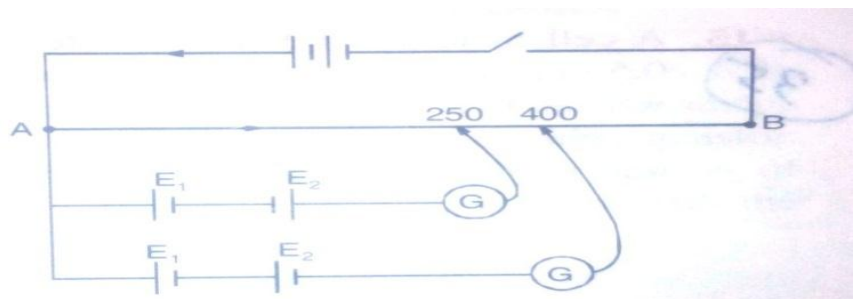
SECTION C

26. The figure shows experimental set up of a meter bridge. When the two unknown resistance X and Y are inserted, the null point D is obtained at 40cm from the end A.



When the resistance of 10Ω is connected in series with X, the null point shifts by 10cm. Find the position of the null point when the 10Ω resistance is instead connected in series with resistance Y. determine the values of resistance X and Y.

27. A circuit using a potentiometer and battery of negligible internal resistance is set up as shown in figure. Two cells of emfs E_1 and E_2 are connected in series as shown in combinations 1 and 2. The balance points are obtained at 400 cm and 240 cm from the point A. Find
- The ratio E_1/E_2
 - Balancing length for the cell E_1 only.



28. Define the term current density of a metallic conductor. Deduce the relation connecting current density and conductivity of the conductor, when an electric field is applied to it.
29. State the principle of potentiometer. Draw a circuit diagram used to compare the emf of two primary cells. Write the formula used. How can the sensitivity of a potentiometer be increased?
30. Define EMF and terminal potential difference of a cell. Derive an expression for equivalent EMF and internal resistance of a combination of two cells connected in parallel.



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