PHYSICS

BOOKS - R G PUBLICATION

CURRENT ELECTRICITY

Exercise

1. Give the dimensional representation of Resistance.

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2. State Ampere's circuital law.

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3. What is the missing term is Ampere's Circuital law?

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4. On a resistor, the four colour bands are green, violet, red and gold. Give the complete information about the resistor.

5. Draw the circuit diagram of potentionmeter to compare the emf of two cells and briefly describ e the procedure.

6. State Kirchoff's laws of current electricity.

7. Establish the following relation for current flowing through a circuit containing an external ressitanace R, a battery of e.m.f E and internal resistance r.

$$I = \frac{E}{R + r}$$

8. How do you define mobility of a charge carrier in a conductor? Establish the following relation for mobility.
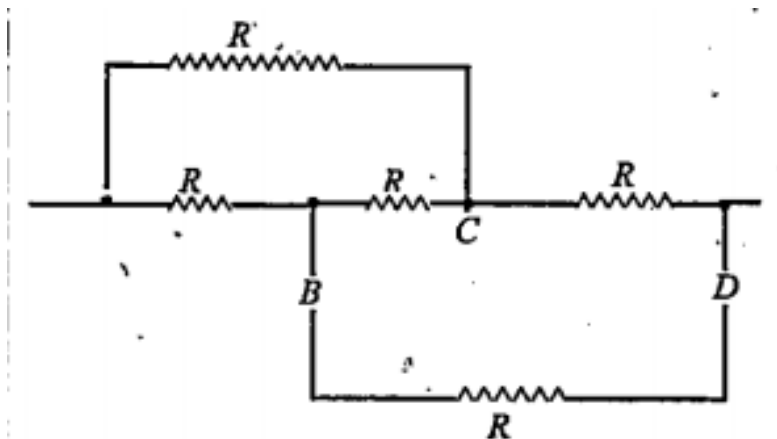
$$\mu = q\tau/m$$

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9. State Ohm's law of current electricity. Define one Ohm resistance.

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10. Find the equivalent resistance between A and D.

11. What do you mean by specific resistance of a conductor? What is its S.I. unit?

12. What is a potentiometer? Would you prefer a voltmeter or a potentiometer to measure the e.m.f. of a battery?
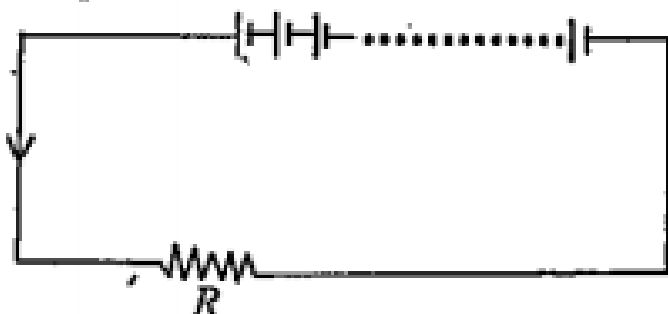
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13. Apply Kirchoff's laws of current electricity to establish the condition of a balanced Wheatstone's bridge.

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14. n-identical cells each of emf E and internal resistance r are connected in series. Find the expression for current in the circuit given below.

15. Establish the following relation for drift velocity.

$$V_d = \frac{eE}{m}\tau$$

16. A copper wire is stretched so as to increase its length by 0.2% . Calculate the percentage change in the resistance of the wire.

17. A 100W heather coil is rated 200V. Find the resistance of the coil.

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18. Draw the circuit diagram of potentionmeter to compare the emf of two cells and briefly describ e the procedure.

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19. Draw the circuit diagram of the potentiometer to determine the internal resistance of a cell and briefly describe the procedure.

20. You are given a potentiometer, a rheostat, one key, a driving cell for potentiometer, one galvanometer, two cells of unknown e.m.f., one two way key and some connecting wires. Using

all those given drawa circuitdiagram for finding j the ratio ofthe e.m.fofthe two cells.

21. A battery of e.m.f 2V and internal resistance 1Ω is used to send a current through a potentiometer wire of length 200cm and resistance 4Ω. What length of the wire will be required to balance a cell of e.m.f `1.08V?
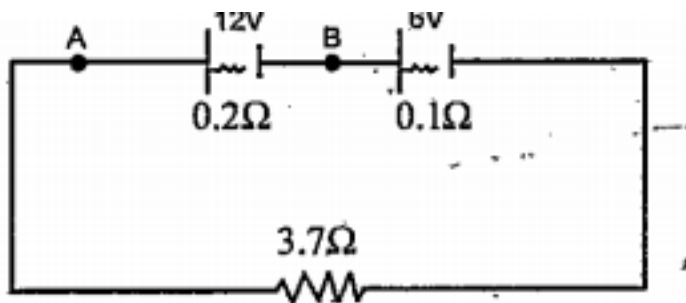
22. Compare the amount of heat developed in three similar wires having length in the ratio 1:5:8 and radii 1:2:3 when joined in parallel.

23. In the circuit given below, find the potential difference between A and B

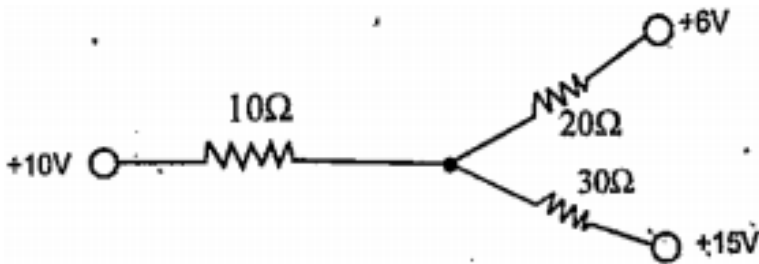**24.** State Kirchoff's laws of current electricity.

**25.** In the circuit given below, find the current through 10Ω.

26. How is the changing electric filed between the plates of a parallel plate capacitor during its charging, related to the idea of displacement current?

27. A potentiometer wire AB has a length 0.5, and resistacne 0.5Ω. AS shown in the diagram, it is connected with a cell of e.m.f 3V and a combination of resistance $R = S = 5\Omega$. Fin
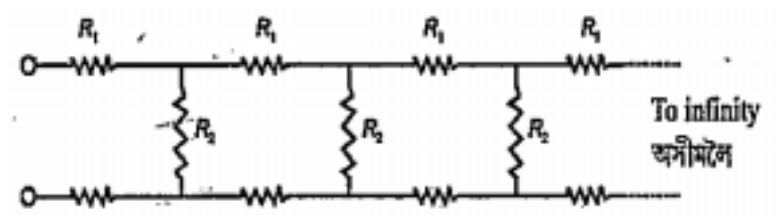
the potential dropt per unti length of the wire.
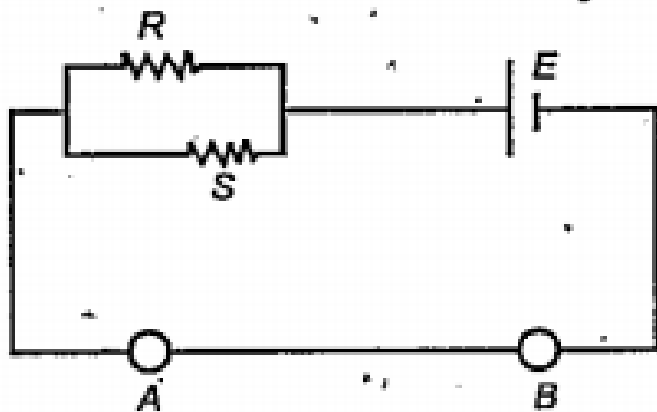
28. As shown in the diagram, network of resistors R_1 and R_2 extends off to infinity of

the right. Find the equivalent resistance.

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29. Establish the following relation for drift velocity.

$$V_d = \frac{eE}{m}\tau$$

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30. With the help of graphs, how resistivity changes with temperature in the case of Copper

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31. With the help of graphs, how resistivity changes with temperature in the case of Nichrome

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32. With the help of graphs, how resistivity changes with temperature in the case of Semiconductor.

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33. Why is an insulator sometimes called a dielectric? What is the main difference between free and bound charge? Generally one of the two plates of a Capacitor System is earthed, why? Derive the expression for the energy stored in a charged capacitor.

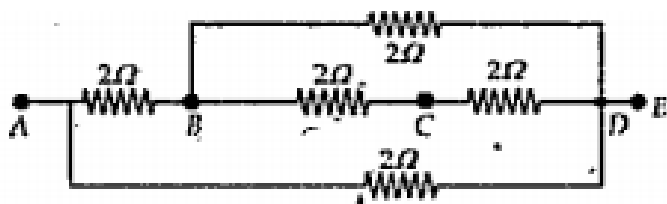**34.** Define drift velocity of free electrons in a conductor across which a potential difference is applied. How is it related to mobility?

35. Calculated the equivalent resistance between the points A and C of the follwing

circuit.

36. Establish the following relation for current flowing through a circuit containing an external ressitanace R, a battery of e.m.f E and internal resistance r.
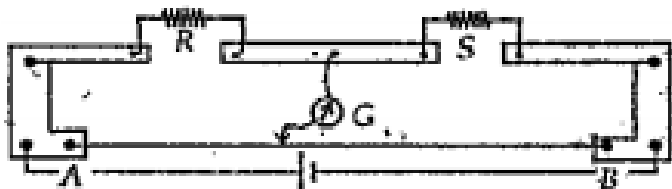
$$I = \frac{E}{R + r}$$

37. State and explain Kirchhoff's rules used for analysis of an electric circuit.

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38.

In the meter bridge shown in the above figure, the null point is found at a distance 33.7 cm from A and of the wire for particular values of R and S. If a resistance of 12Ω is connected

parallel with S, the null point is found to be at 48.1 cm from B end. Determine the value of R and S.
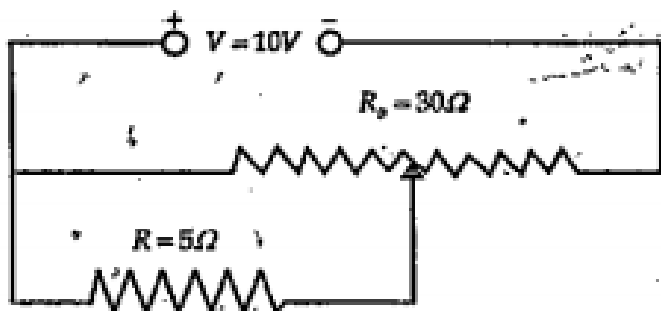
39.

As shown in the figure above, a resistance of R = 5Ω draws current from a potentiometer of total resistance $R_0 = 30\Omega$. A voltage V = 10V is

supplied to the potentiomenter. What is the voltage across R when the sliding contact is in the middle of the potentiometer?

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40. What is the SI unit of current?

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41. Who discovered the basic law regading the flow of current?

42. What is resistance of a conductor?

43. Define the resistance of a conductor. What

is its unit?

44. What is the resistivity range of metals.

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45. Give the relation between emf and P.D.

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46. What is electromotive force(emf)?

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47. Give the relation between emf and P.D.

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48. Why a meter bridge is used?

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49. Give the unit of electromotive force.

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50. What is the unit of current density?

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51. In which principle Kirchhoff's junction rule is based on?

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52. Define conductivity.

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53. What are semiconductors? How electrical conductivity of semiconductors vary with temperature? Give one example of intrinsic semiconductor.

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54. What are the factors on which resistance of a conductor depends?

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55. What is super conductivity.

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56. State the principle of working of a potentiometer.

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57. What is the principle of a meter bridge.

58. Kirchhoff's first law obeys laws of conservation of charge, how?

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59. When a Wheatstone Bridge will be balanced?

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60. What is ohmic and non ohmic conductor?

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61. How drift velocity related with random velocity?

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62. What is one ampere current?

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63. Write an expression for the ratio of resistance in balanced Wheatstone bridge.

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64. What is meant by free electron of a conductor?

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65. What is the difference between electric current and electric current density?

66. What is a shunt? What is its use?

67. What is electic current?

68. Show that for a conductor $R = P\dfrac{l}{A}$ where L is the length and A is the cross sectional area of the conductor.

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69. What is the resistivity and current density? Give their SI unit.

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70. Define conductivity.

71. What is the drift velocity of electrons in a conductor? Establish the relation for drift velocity where the symbols have their usual meaning.

72. What is mobility?Give its SI unit.

73. Draw the characteristic curve of a diode of voltage V versus current I?

74. What is resistors? Why resistors are made mostly from carbon?

75. Distinguish between conductors and insulators .Give examples.

76. What is semiconductors? Give examples.

77. "To reduce power dissipation in the connecting wires between different power stations of hundreds miles long, wires current at enormous valve of V".Explain.

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78. What is internal resistance of a cell?

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79. State and explain Kirchhoff's rules used for analysis of an electric circuit.

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80. State and explain Kirchhoff's rules used for analysis of an electric circuit.

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81. Give the experimental procedure to find out the internal resistance of a given cell using a potentiometer.

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82. What is the principle of a meter bridge.

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83. What is specific resistance of a conductor?

How it is related to electrical conductivity?

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84. The resistance of a Cu wire at $20^\circ C$ is

200Ω what is the resistance at $50^\circ C$?

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85. A current of 10 ampere passes through a wire having cross-sectional area $1mm^2$. The number of free electron peer $1m^3$ of the conductor is 10^{28}. Find the drift velocity of electron.

86. Obtain an expression for equivalent resistance of three conductors when they are connected in series.

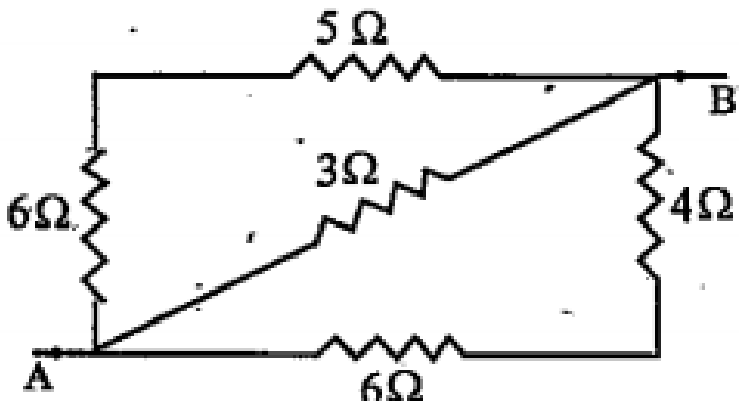**87.** State how resistance of a conductor depends upon length and cross-section.

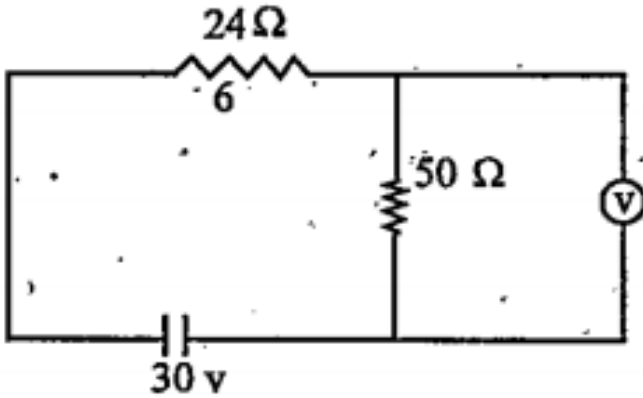**88.** Find the equivalent resistance across A and B in the circuit.

89. From the circuit the reading of a volt meter

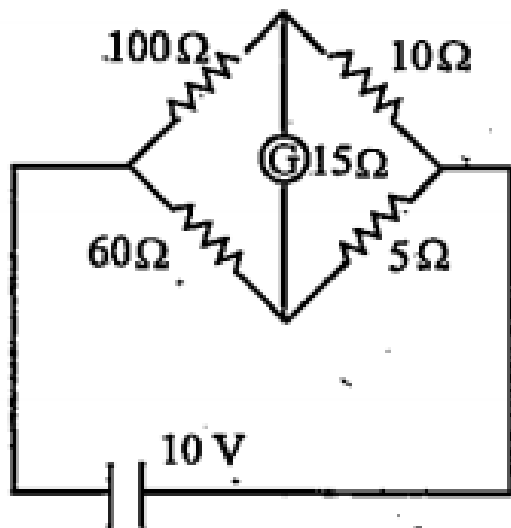is 18 volts. What is the resistance of the volt

meter?

24Ω
6

50 Ω

Ⓥ

30 v

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90. The Wheatstone bridge circuit have the resistance in the various arms shown as figure

Calculate the current through galvanometer

91. 12 identical wire each of resistance 6Ω are joined to form a cube. Find the resistance between the corner of edges of the cube.

A. `

B.

C.

D.

Answer:

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92. State Kirchhoff's voltage law and mention its significance.

▶

93. What is Ohm's law? Describe.

94. Show thaqt the current I through an area of cross section is given by the scalaer product of two vectors $I = j\delta S$ where j and δs and vectors.

95. Write the limitation of Ohm's law.

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96. Find out the resistance value of the following resistors of four colour codes as

Brown	Black	Black	Gold
Blue	Orange	Yellow	Silver
Red	Orange	Brown	Gold
Brown	Black	Green	No colour.

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97. Deduce the relation of resistors when connected in parallel.

98. N resistors are connected in series, and all resistors are same. Find out the equivalent resistance between the two ends.

99. Give the equations for combination of n cells in series.

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100. Write an expression for the ratio of resistance in balanced Wheatstone bridge.

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101. Write the experimental procedure to find out an unknown resistance using a meter bridge.

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102. Give the experimental procedure to find out the internal resistance of a given cell using a potentiometer.

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103. Is Ohn's law universally applicable for all conducting elements? Write with examples.
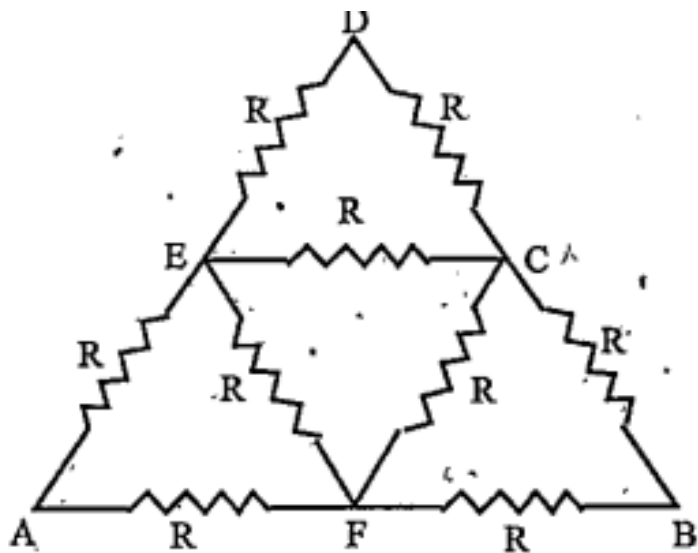
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104. Apply Kirchoff's laws of current electricity to establish the condition of a balanced Wheatstone's bridge.

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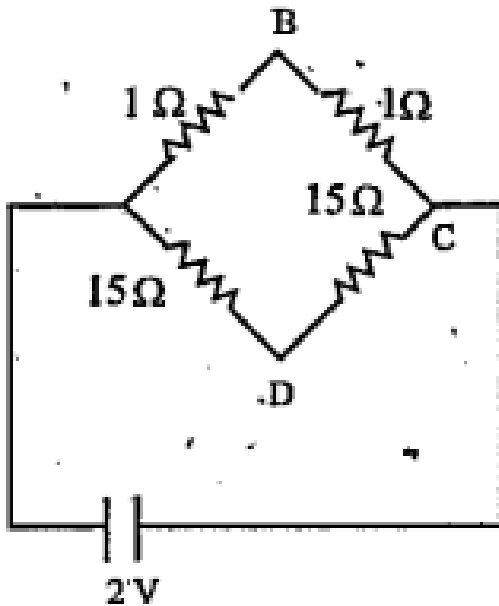**105.** From the circuit calculate the resistance between A and B.

106. In a Wheatstone bridge the ratio arm P and Q are approximately equal. When $R = 500\Omega$ the bridge is balanced. On interchanging P and Q the value of R is 505Ω. Calculate the value of S.

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107. Calculate the potential difference between the junction B and D in the Wheatstone

bridge.

108. In a meter bridge the resistance R and x, R being less than x. A balance point is obtained

40 cm from zero and on shunting the coil by

50Ω the balance point moves through 10cm.

Calculate the value of R and x.

109. In a meterbridge length of the wire is

100cm. At what point balance point be

obtained if the resistance are in the ratio 4:5.

110. Two cell of emf. 1.5v and 2 v and internal resistance 2 and 1Ω respectively have their negative terminal joined by a wire of 6Ω and positive terminal by another wire of 4Ω A third resistance of 8Ω connected mid point of these wire. Find the potential difference at the end of the third wire.

111. State the principle of working of a potentiometer.

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