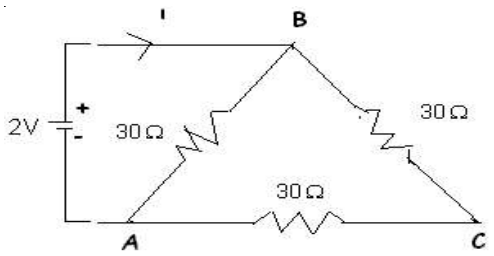
29. Find the equivalent conductance of two wires of resistance 10 ohm and 5 ohm joined together in parallel.

1) $\frac{50}{15}$ mho 2) $\frac{35}{50}$ mho 3) 0.3mho 4) $\frac{2}{3}$ mho

30. Three wires having resistances $1\Omega, 2\Omega$ and 6Ω are joined in parallel across a battery. If a current 0.1A flows through 6Ω resistor, the total current drawn by the combination is

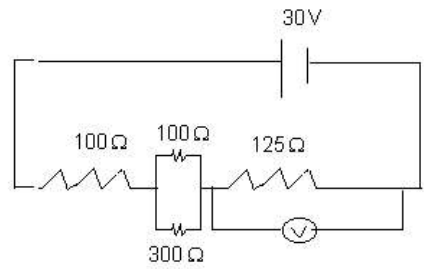
1) 0.6A 2) 0.3A 3) 0.1A 4) 1A

31. The current 'i' in the circuit given aside is



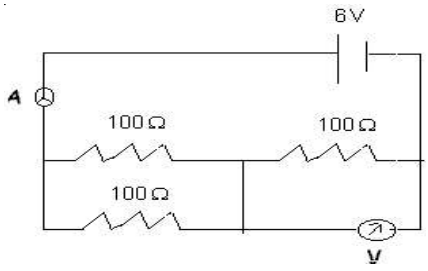
1) 0.1 A 2) 0.2A 3) 1.0A 4) 2.0 A

32. The reading on the voltmeter for the circuit shown aside is



1) 12.5 V 2) 1.25 V 3) 15V 4) 10V

33. In the circuit shown, the reading of the voltmeter and the ammeter is



1) 4V, 0.2A 2) 2V, 0.4A
3) 3V, 0.6A 4) 4V, 0.04A

34. The current that passes through 20 ohm resistance when it is connected in parallel with a 30Ω resistance and this set is connected to a battery of 2V is

1) 0.2A 2) 0.3A 3) 0.1A 4) 0.016A

35. Two wires of same material and same length have their resistances in the ratio 5 : 7. The ratio of the masses of the wires is

1) 5 : 7 2) 7 : 5 3) 3 : 4 4) 4 : 3

36. A wire of 1m long has an area of cross section of 2×10^{-3} cm^2 and has a resistance of 10ohm. The resistivity of the material of the wire is

1) $2 \times 10^{-6}\ \Omega$ cm 2) $2 \times 10^{-4}\ \Omega$ cm
3) $2 \times 10^{-2}\ \Omega$ cm 4) $2 \times 10^{-8}\ \Omega$ cm

37. Two wires made of same material have lengths in the ratio 1 : 2 and their volumes are also in the same ratio. The ratio of their resistances is

1) 4 : 1 2) 2 : 1 3) 1 : 2 4) 1 : 4

38. A wire has a diameter of 0.2 mm and a length of 50cm. The specific resistance of its material is 40×10^{-6} ohm cm. The current through it when a potential difference of 2V is applied across it is

1) 3.14 A 2) 31.4 A
3) 0.314A 4) 0.0314A

39. Two wires have their lengths in the ratio 1 : 3 diameters in the ratio 2 : 3 and their materials have specific resistances in the ratio 2 : 1. Then the ratio of their resistances is

1) 1 : 3 2) 3 : 1 3) 2 : 3 4) 3 : 2

40. The resistance of a wire is 2Ω. If it is drawn in such a way that it experiences a longitudinal strain 200%. Its new resistance is

1) 4Ω 2) 8Ω 3) 16Ω 4) 18Ω

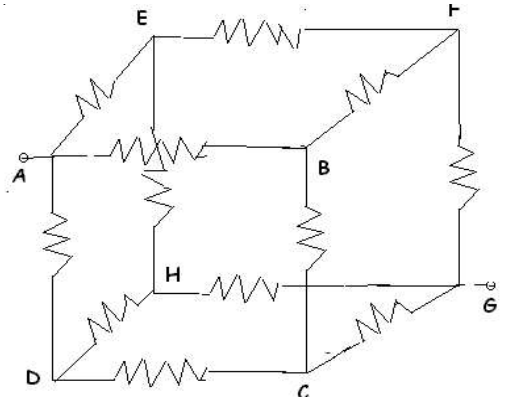
41. A wire of resistance 100Ω is doubled on itself. The percentage of decrease of its resistance is

1) 25% 2) 50% 3) 75% 4) 20%

42. A wire has a resistance of 10 ohm. Its resistance if it is stretched by one-tenth of its original length is

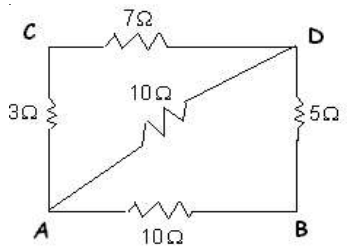
1) 12.1Ω 2) 7.9Ω 3) 11Ω 4) 9Ω

43. Twelve identical resistors of each 6Ω are connected to form a cube as shown. The effective resistance across the solid diagnonal, AG is



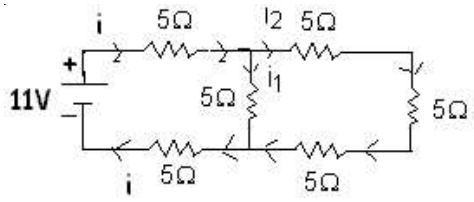
1) 5Ω 2) 4.5Ω 3) 3.5Ω 4) 1.5Ω

44. Five resistances are connected as shown in the figure. The resultant resistance across AB is



1) 5 Ω 2) 2.5 Ω 3) 7.5 Ω 4) 10 Ω

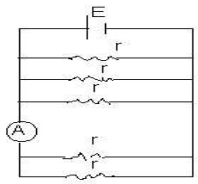
45. In the circuit given below all resistances are of values 5 ohm each. The currents i_1 and i_2 given that the e.m.f. of the cell is 11V are



1) 0.6 A, 0.2A 2) 0.4A, 0.6A

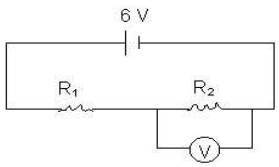
3) 0.8 A, 0.4A 4) 0.2A, 0.4A

46. An ammeter 'A' is connected as shown in the diagram. Ammeter reading is



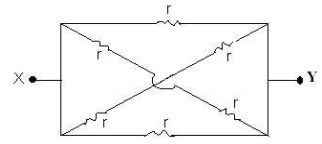
1) 2E/r 2) 5E/r 3) E/r 4) E/2r

47. In the circuit R_1=400 ohm and R_2=200 ohm. If the resistance of the voltmeter V = 10,000 ohm. Then the voltmeter reading is



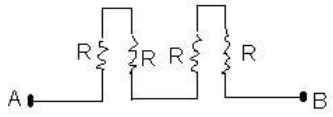
1) 2 V 2) nil 3)>2V 4) <2V

48. The equivalent resistance across XY is



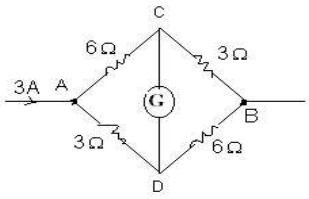
1) r/3 2) 2r 3) r/2 4) r/4

49. Four identical wires each having resistance R are connected as shown in the figure. Equivalent resistance between A & B is



1) R/4 2) R/2 3) 4R 4) R

50. In the given circuit current through the galvanometer



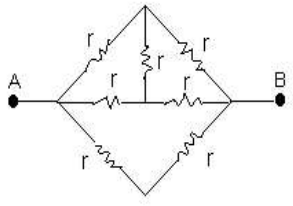
1) No current flows.
2) Current flows from C to D
3) Current flows from D to C
4) Current flows perpendicular to A

51. A carbon filament has resistance of 120Ω at 0^0C. What must be the resistance of a copper filament connected in series with carbon so that the combination has same resistance at all temperatures.
α carbon = -7×10^{-4}/ ^{o}C
α copper = 4×10^{-3} / ^{0}C
1) 120Ω 2) 21Ω 3) 60Ω 4) 210Ω

52. You are given 'mn' wires of equal resistance, If 'm' wires are in series and 'n' such combinations are in parallel the resultant resistance is R_1. If 'n' wires are in series and 'm' such combinations are in parallel, the resultant resistance is R_2. Then $\frac{R_1}{R_2}$ is

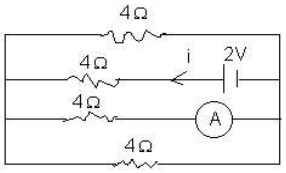
1) 1: 1 2) m:n 3) $m^2:n^2$ 4)$n^2:m^2$

53. Effective resistance between A and B in the given circuit is



1) 8r 2) r 3) 5r 4) 2r/3

54. Current 'i' coming from the battery and ammeter reading are



1) $\frac{3}{8}A, \frac{1}{8}A$ 2) $\frac{1}{8}A, \frac{1}{8}A$

3) $2A, \frac{2}{3}A$ 4) $2A, \frac{1}{8}A$

55. The electrical resistance of a mercury column in a cylindrical container is 'R'. The mercury is poured into another cylindrical container with half the radius of cross-section. The resistance of the mercury column is
1) R 2) 2R 3) 16R 4) 5R

56. Two wires of equal diameters, resistivities ρ_1 and ρ_2 and lengths x_1 and x_2 respectively are joined in series. The equivalent resistivity of the combination is

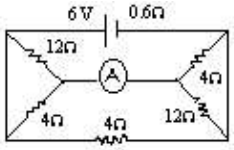
1) $\frac{\rho_1 x_1 + \rho_2 x_2}{x_1 + x_2}$ 2) $\frac{\rho_1 x_2 - \rho_2 x_1}{x_1 - x_2}$

3) $\frac{\rho_1 x_2 + \rho_2 x_1}{x_1 + x_2}$ 4) $\frac{\rho_1 x_1 - \rho_2 x_2}{x_1 - x_2}$

57. A metallic cube has a resistance 9Ω. It is now cut into 27 smaller identical cubes. The resistance of each smaller cube is
1) 1/3Ω 2) 27Ω 3)18Ω 4) 3Ω

58. The areas of cross section of two wires of the same material are in the ratio 1:2 and their lengths are in the ratio 2 : 1. If their ends have the same potential differences then currents through them will be in the ratio of
1) 1 : 2 2) 2 : 1 3) 1 : 4 4) 4 : 1

59. In the circuit shown in the figure, the ammeter reading is



1) 0.8 A 2)1.2 A 3) 2 A 4) 0.4 A

60. A uniform length of wire 1.2 m has a resistance of 16Ω. It is stretched such that its resistance is 36Ω. The new length is
1) 1.8 m 2)2.4 m 3)2.7 m 4)3 m

61. A copper (ρ =1.6x10^{-8}Ωm) wire and an Aluminium (ρ=2.5x10^{-8}Ωm) wire have equal cross sectional area and equal resistances. The ratio of their lengths is
1) 5:4 2) 4:5 3) 16:25 4) 25:16

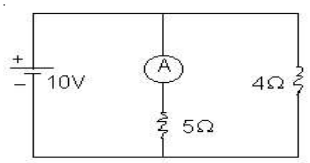
62. How many 160 ohms resistors in parallel are required to carry 5 A current on a 100V line.
1) 2 2) 4 3) 8 4) 10

63. An electrical cable of copper has just one wire of radius 9 mm. Its resistance is 5 ohm. This single copper wire of the cable is replaced by 6 different well insulated copper wires each of radius 3 mm. The total resistance of the cable will now be equal to
1) 7.5 ohm 2) 45 ohm 3) 90 ohm 4) 270 ohm

64. Masses pf three wires of the same metal are in the ratio 1:2 :3 and their lengths in the ratio 3:2:1. Electrical resistances of these wires will be in the ratio
1) 1:2:3 2) 3:2:1 3) 1:6:27 4) 27:6:1

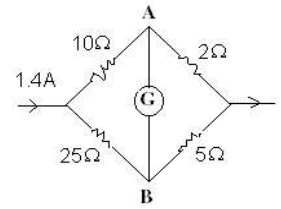
65. Two copper wires whose masses are 8 and 12 gm have lengths in the ratio 3:4. Their resistances are in the ratio.
1) 4 : 9 2) 16 : 9 3) 27 : 32 4) 27 : 128

66. The reading of the ammeter in the figure is (internal resistance of battery is zero)



1) $\frac{40}{29}A$ 2) $\frac{10}{9}A$ 3) $\frac{5}{3}A$ 4) 2A

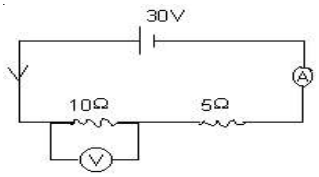
67. The current in 2 ohms resistor in the circuit is



1) 1.4A 2) 1.2A 3) 0.4A 4) 1.0A

68. There are five equal resistors. The minimum resistance possible by their combination is 2 ohm. The maximum possible resistance we can make with them is
1) 25 ohm 2) 50 ohm 3) 100 ohm4) 150 ohm

69. The reading of ammeter is 'x' amperes and that of voltmeter is 20 volts shown in the figure. Then x=



1) 4 2) 6 3) 8 4) 2

70. Two wires of Aluminium have same weight and have lengths of 10m and 20m. Their resistances are in the ratio.
1) 1 : 2 2) 2 : 1 3) 4 : 1 4) 1 : 4

71. A wire is bent into a circle of radius'r' If 's' is the resistance per unit length of the wire, the effective resistance at the ends of the diameter is
1) rs/2 2) πr/2s 3) πrs/2 4)πs/2r

72. You are given a wire of length 100 cm and linear resistance of 1 ohm/cm. If it is cut into two parts, sos that when they are in parallel, the effective resistance is 24 ohm. The lengths of the two parts are
1) 30cm & 70cm 2) 60cm & 40cm
3) 70cm & 30cm 4) 20cm & 80cm

73. The resistance of a voltmeter is 100Ω. It is connected to a 12V-20Ω battery. The reading of voltmeter is
1) 6V 2) 8V 3) 9V 4) 10V

74. The resistance of a conductor is 1.08Ω. To reduce it to 1Ω, the resistance that must be connected is
1) 0.08Ω in series 2) 13.5Ω is parallel
3) 0.08Ω in parallel 4) 13.5Ω in series.

75. A current of 1 A is passed through two resistances 1Ω and 2Ω connected in parallel. The current flowing through 2Ω resistor will be
1) 1/3 A 2) 1 A 3) 2/3 A 4) 3 A

76. When three resistors of resistances 3,4,5Ω are connected in parallel, the currents through them are in the ratio
1) 3 : 4 : 5 2) 5 : 4 : 3
3) 20 : 15 : 12 4) 12 : 15 : 20

77. The resistivity of a material is S ohm meter. The resistance between opposite faces of a solid cube of edge 10 cm is (in ohm)
1) S/2 2) S/10 3) 100S 4) 10S

78. A conductor of length x and diameter x has a resistance x. The resistivity of the material is
1) $\pi x^3/4$ 2) πx^2 3) $\pi x^2/4$ 4) $\pi x/2$

INTERNAL RESISTANCE AND EMF

79. A cell of emf 6V is being charged by 1A current. If the internal resistance of the cell is 1 ohm, the potential difference across the terminals of the cell is
1) 5V 2) 7V 3) 6V 4) 8V

80. If the external resistance is equal to the internal resistance of a cell of emf E, the P.D across its terminals is
1) E/2 2) E 3) 2E 4)zero

81. When two identical cells are connected either in series or in parallel across 2 ohm resistor they send the same current through it. The internal resistance of each cell is
1) 2 ohm 2) 1.2 ohm 3) 12 ohm 4) 21 ohm

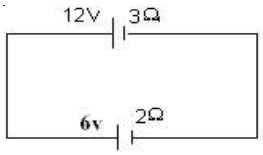
82. A battery of e.m.f. 2.2 volt and internal resistance 1.2 ohm is connected to a potentiometer wire of length 10m and resistance 9.8 ohm. Find the potential drop per cm of length of the wire.
1) 0.196 m V 2) 9.16 m V
3) 19.6 m V 4) 1.96 m V

83. Three cells each of e.m.f 1.5 volt are first connected in series and then in parallel to an external resistance. The currents obtained in the two cases are respectively 1A and 0.36 A. Calculate the external resistance.
1) 1.25 Ω 2) 3.26 Ω 3) 4.125 Ω 4) 2.235 Ω

84. A wire of resistance 0.25 ohm is first connected to a cell of internal resistance 0.50 ohm and then to a combination of 10 such cells in parallel. Find the ratio of currents in the two cases.
1) 1 : 2 2) 3 : 4 3) 1 : 5 4) 2 : 5

85. The pd a cross terminals of a cell is found to be 29 volt and 28 volt respectively when it delivers a current of 1 ampere and 2 ampere respectively. The emf and internal resistance of a cell are respectively
1) 30V, 2Ω 2) 30V,1Ω 3) 29V, 1Ω 4) 28V,2Ω

86. In the following diagram, the pd across 6V cell is



1) 6V 2) 5.6V 3) 8.2V 4) 8.4V

87. After the external resistance of a circuit has been increased 5 times, the voltage across the battery terminals increases from 10V to 30V. The emf of the battery is
1) 60V 2) 30V 3) 40V 4) 50V

88. A voltmeter of resistance 99 Ω connected across a cell, shows a reading of 9.9V. An ammeter of resistance 1Ω connected to the same cell shows 5A. The emf of the cell is
1) 9.9V 2) 14.9V 3) 10V 4) 9.8V

89. A cell of emf 2V delivers current equal to 20% of the maximum current it can produce through a resistance 4Ω. Its internal resistance is
1) 0.1Ω 2) 1 Ω 3) 0.5Ω 4) 1.5Ω

90. A battery of emf 12V is connected to an external resistance of 20 Ω and it is found a potential difference of 10V. The internal resistance of battery is
1) 1 Ω 2) 2 Ω 3) 3 Ω 4) 4 Ω

91. A battery of four cells in series each having an emf of 1.5V and internal resistance 1 Ω are connected in series with an ammeter, a coil of resistance 2 Ω and a filament lamp. If the ammeter reads 0.5A, the resistance of the filment lamp is
1) 4 Ω 2) 6 Ω 3) 2 Ω 4) 12 Ω

92. A battery has six cells in series. Each has an emf 1.5V and internal resistance 1 ohm. If an external load of 24 Ω is connected to it. The potential drop across the load is
1) 7.2V 2) 0.3V 3) 6.8V 4) 0.4V

93. A battery has four cells in parallel each has an emf 1.5V and internal resistance 0.8 ohm. The current delivered by it to a load of 2.8 ohm. is
1) 0.2A 2) 0.4A 3) 0.5A 4) 0.6A

94. While connecting 6 cells in a battery in series, in a tape recorder, by mistake one cell is connected with reverse polarity. If the effective resistance of load is 24 ohm and internal resistance of each cell is one ohm and emf 1.5V, the current devlivered by the battery is
1) 0.1A 2) 0.2A 3) 0.3A 4) 0.4A

95. The internal resistance of a cell of emf 1.5V, if it can deliver a maximum current of 3 A is
1) 0.5 Ω 2) 4.5 Ω 3) 2 Ω 4) 1 Ω

96. When a battery of internal resistance 0.5 ohm is connected to a thick copper slab a current of 12A. passes through it. The emf of the cell is
1) 6V 2) 24V 3) 12V 4) 4V

97. When a resistor of 2 Ω is connected across the terminals of a battery a current of 2A is found to flow. When a second resistor of 8 Ω is connected in series with the first, the current is reduced to 1A. The emf and internal resistance of the battery is
1) 12V, 4 Ω 2) 10V, 2 Ω
3) 16V, 6 Ω 4) 16V, 4 Ω

98. Five cells of emf 1.5V and internal resistance 0.2 ohm are connected in series. The maximum current that can be delivered is
1) 7.5A 2) 1.5A 3) 4A 4) 2A

99. Twenty four cells each of emf 1.5V and internal resistance 0.5 ohms are to be connected to a 3 ohm resistance. For maximum current through this resistance what will be the number of rows and number of columns that you connect these cells.
1) 12 cells in series 2 rows in parallel
2) 8 cells in series 3 rows in parallel
3) 4 cells in series 6 rows in parallel
4) 6 cells in series 4 rows in parallel

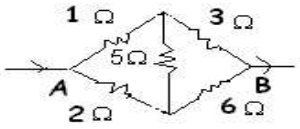
KIRCHHOFF'S LAWS - WHEATSTONE BRIDGE

100. A,B,C and D are four coils of wires of 2, 2, 2 and 3 ohm resistances respectively and are arranged to form a Wheatstone bridge.The resistance which the coil 'D' must be shunted in order that the bridge may be balanced is.
1) 4 Ω 2) 6 Ω 3) 3 Ω 4) 8 Ω

101. In a Wheatstone bridge the four arms have each resistance of 50 ohm. The Galvanometer current is.
1) Zero 2) 1A 3) 2A 4) 1.8A

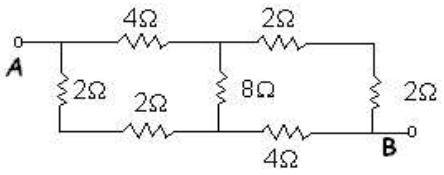
102. In a balanced Wheatstone bridge, a cell of emf 2 volt is connected between the ends of the diagonal, AC. What will be the pontential difference between the ends of the diagonal B and D.
1) Zero 2) 2V 3) 1V 4) 4V

103. The resistance between A and B is



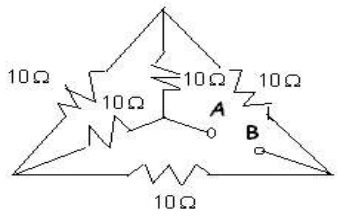
1) $\frac{288}{56}\Omega$ 2) 12 Ω 3) $\frac{8}{3}\Omega$ 4) $\frac{9}{4}\Omega$

104. The resistance between A and B is



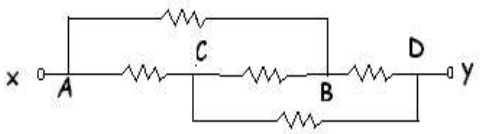
1) 8 Ω 2) 4 Ω 3) 3.75 Ω 4) 2 Ω

105. If each resistance in the net work shown in figure is 10 Ω. The resistance between A and B is



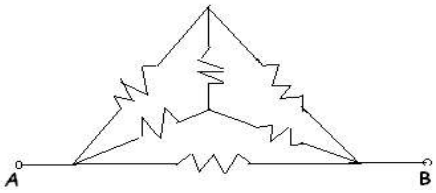
1) 10Ω 2) 20Ω 3) 40Ω 4) 5Ω

106. The equivalent resistance between the points x and y of the circuit. If each resistance is 25 ohm is



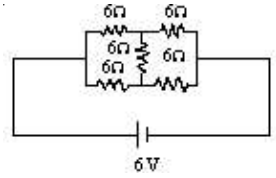
1) 25Ω 2) 100Ω 3) 50Ω 4) 12.5Ω

107. Six resistors of each 2 ohm are connected as shown in the figure. The resultant resistance between A and B is.



1) 4Ω 2) 2Ω 3) 1Ω 4) 10Ω

108. The current that passes in the circuit is



1) 2A 2) 1.2A 3) 1A 4) 1.6A

109. In a Wheatstone bridge P = 10Ω, Q = 20Ω, R=30Ω. The value of 'S' in order that no current may flow through the galvanometer is
1) 15Ω 2) 45Ω 3) 30Ω 4) 60Ω

110. Four conductors of resistance 4, 3, 9 and 6 ohm are connected in AB,BC, CD and DA arms of a Wheatstone bridge. The bridge can be balanced by connecting.
1) 3 ohm in series with 3 ohm conductor
2) 4 ohm in parallel with 4 ohm conductor
3) either 1 or 2 4) neither 1 nor 2

111. In a balanced Wheatstone bridge, P= (10Ω+2Ω in series) Q=x, R=(2Ω + 4Ω in series) and S=(1Ω+1Ω in series) then x =
1)1Ω 2) 2Ω 3) 4Ω 4) 6Ω

112. Four resistance P,Q,R,X formed a Wheatstone bridge. The bridge is balanced when R=100Ω. If P and Q are interchanged the bridge balances for R = 121Ω. The value of X is
1) 100 Ω 2) 200 Ω 3) 300 Ω 4)110 Ω

METER BRIDGE

113. In a meterbridge experiment, the balance length is 40cm. The resistance in the gap opposite to this length of wire is 8 ohm. The resistance in the other gap is
1) 10Ω 2) 6Ω 3) 4Ω 4) 12Ω

114. In a meter bridge the length of the wire is 100cm. At what point will the balance be obtained if the two resistances are in the ratio 2 : 3 ?
1) 20cm 2) 40cm 3) 28.6cm 4) 44.1cm

115. When an unknown resistance and a resistance of 4Ω are connected in the left and right gaps of a Meterbridge, the balance point is obtained at 50cm. The shift in the balance point if a 4Ω resistance is now connected in parallel to the resistance in the right gap is
1) 66.7cm 2) 16.7 cm
3) 34.6 cm 4) 14.6 cm

116. In a meterbridge the balance point is obtained at 40cm. If a resistance equal to that in the left gap is shunted across it, the new balance point is
1) 40cm 2) 15cm 3) 25cm 4) 32cm

117. When two unknown resistances are placed in the gaps of meterbridge, the null point is found to be 40cm from one end of the bridge wire. When one of the resistances is shunted with a 10 ohm coil, the null point is 25 cm from the same end. The value of each of the unknown resistances is
1) $15\Omega, 10\Omega$ 2) $10\Omega, 15\Omega$
3) $20\Omega, 30\Omega$ 4) $30\Omega, 20\Omega$

118. The balance point in a meterbridge is 60cm. The ratio of the resistance in the gaps is
1) 3 : 5 2) 5 : 3 3) 3 : 2 4) 2 : 3

119. The balance point in a Meter bridge is at 35.6 cm. If the resistances in the gaps are interchanged, the new balance point is
1) 64.4 cm 2) 56 cm 3) 41.2 cm 4) 56.7 cm

120. Resistors are connected in the two gaps of a meter bridge. The balance point is 20 cm from the zero end. When a 15Ω resistor is connected in series with the smaller resistance then the null point shifts to 40 cm. The smaller resistance is
1) 80Ω 2) 9Ω 3)10Ω 4) 12Ω