



## PHYSICS

# BOOKS - NN GHOSH PHYSICS (HINGLISH)

## WHEATSTONE BRIDGE, METER BRIDGE

### Examples

1. In a PO box experiment it is found that for the 1000:10 ratio, the deflection is to the left

by 2 divisions when R is  $437\Omega$  and to the right by 1.3 cm division when R is  $436\Omega$ . Compute the correct value of the unknown resistance.



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## Exercise

1. When the resistance in left and right gap of a mere bridge are  $101\Omega$  and  $1\Omega$  respectively, the null point is found at 99.5 cm. When the resistances are interchanged the null point is

now at 0.7cm. Calculate the end-corrections of the metre bridge.



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2. Show that in a metre bridge, percentage error in the determination of an unknown resistance is minimum when the null point is at the center of the wire.



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3. In A PO box experiment it is found that for the 100:10 ratio deflection in the galvanometer is to the left by 0.7 division of the scale when resistance I the rheostat are is  $978\Omega$  and to the right by 1.2 division when is  $979\Omega$ . Calculate the unknown resistance.



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4. In a simple meter bridge circuit, the gaps are bridged by cord P and Q having the

smaller resistance. A balance is obtained when the jockey makes the coil  $Q$  with a resistance of  $50\Omega$ , the balance po



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5. A coil of copper wire is put in the left gap and some resistance in the right gap of a simple meter bridge. The coil is immersed in a water bath. When the temperature of the bath is  $0^\circ\text{C}$ , the null point occurs at  $50.0\text{cm}$ . When the water in the bath is boiled, the null point

shift to 52cm. Calculate the temperature coefficient of resistance of copper.



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6. The resistance of the four arms of a Wheatstone bridge are  $P=10\Omega$  ,  $Q = 100\Omega$ ,  $R=40\Omega$  and  $S = 10\Omega$ . What resistance in series or parallel with the last one will be required to obtain no deflection in the galvanometer?



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7. In a PO box experiment a student observes that he does not get the null point for any of the ratios. But when the ratio is 1000:10 he finds that the deflection is to the right by 1 division for  $596\Omega$  in the rheostat arm and 0.2 division to the left when it is  $597\Omega$ . Compute the correct value of the unknown resistance from the observations of the student.



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8. In a metre bridge, the wire consist of two parts one of length 30 cm and of radius  $r$  and the other of radius  $2r$ . Where wil the null point occur if the resistance in the left and right gaps are  $5\Omega$  and  $8\Omega$ , respectively? The material of the wires is the same.

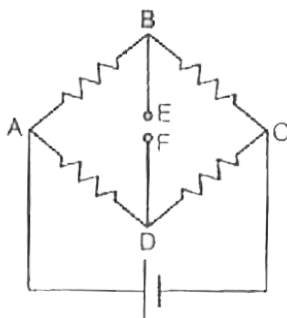
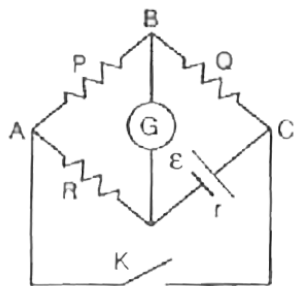


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9. In the modified whetstone bridge (fig), find the concition for no charge in deflection of the



galvanometer on opening or closing the key K.



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**10.** When an ideal voltmeter is connected between the points E and F (fig) the reading of the meter is  $V_0$ . When an ideal ammeter is connected between E and F, reading is  $I_0$ . Find the current  $I$  through a resistor  $R$  connected

between E and F.

[Hint: The circuit behaves like voltage source of  $V_0$  and some resistance  $r$  in series]



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