JUNE 2008

7 SAT

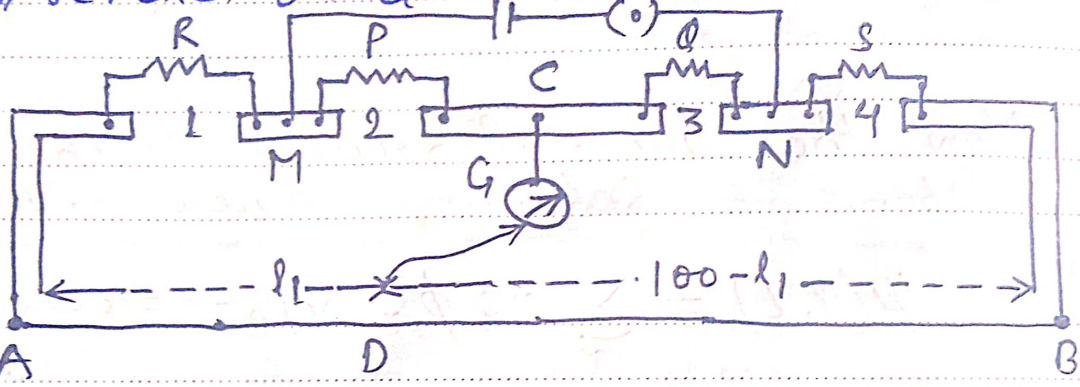
Degree-II(H), Group-B, paper-IV

Name:- Giridhar Kumar.

Date:- 22/04/2008.

Topic:- Carey Foster Bridge

The Carey Foster bridge is a form of Wheatstone's bridge. It consists of a uniform wire AB of length l m stretched on a wooden board.



8 SUN

Two equal resistance P and Q are connected in gaps 2 and 3. The unknown resistance R is connected in gap 1. A standard resistance S, of the same order of resistance as R, is connected in gap 4. A Leclanche cell is connected across MN. A galvanometer G is connected between the terminal C and a sliding contact maker D.

⇒ Theory:- The contact maker is moved until the bridge is balanced.

Notes Let l_1 be the balancing length as measured from end A.

May 2008	Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

2008 JUNE

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9 MON

Let α and β be the end resistance at A and B. Let ρ be the resistance per unit length of the wire.

From the principle of Wheatstone's bridge

$$\frac{P}{Q} = \frac{R + \alpha + l_1\rho}{S + \beta + (100 - l_1)\rho} \quad \text{---- (1)}$$

The resistance R and S are interchanged and the bridge is again balanced. The balancing length l_2 is determined from the same end A. Then.

$$\frac{P}{Q} = \frac{S + \alpha + l_2\rho}{R + \beta + (100 - l_2)\rho} \quad \text{---- (2)}$$

10 TUE

From Equ (1) and (2)

$$\frac{R + \alpha + l_1\rho}{S + \beta + (100 - l_1)\rho} = \frac{S + \alpha + l_2\rho}{R + \beta + (100 - l_2)\rho} \quad \text{---- (3.)}$$

Adding 1 both side to equ (3.) we get

$$\frac{R + \alpha + l_1\rho}{S + \beta + (100 - l_1)\rho} + 1 = \frac{S + \alpha + l_2\rho}{R + \beta + (100 - l_2)\rho} + 1$$

$$\Rightarrow \frac{R + \alpha + l_1\rho + S + \beta + (100 - l_1)\rho}{S + \beta + (100 - l_1)\rho} = \frac{S + \alpha + l_2\rho + R + \beta + (100 - l_2)\rho}{}$$

Notes

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11 WED

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$$= \frac{R+S+\alpha+\beta+100P}{S+\beta+(100-l_1)P} = \frac{R+S+\alpha+\beta+100P}{R+\beta+(100-l_2)P}$$

Since Numerator equal So the denominator must be equal.

So $S+\beta+(100-l_1)P = R+\beta+(100-l_2)P$ — (4)

$S+100P-l_1P = R+100P-l_2P$

$S-l_1P = R+l_2P$

$\Rightarrow R = S-l_1P+l_2P$

12 THU

$\Rightarrow \boxed{R = S+P(l_2-l_1)}$ — (5)

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					1	2	3
					8	9	10

Notes