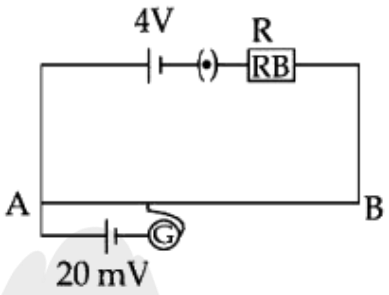
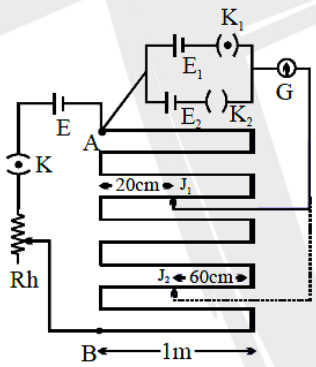
DPP – 10

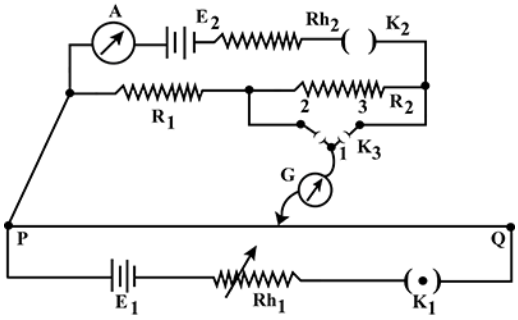
Q.1 As shown in the figure, a potentiometer wire of resistance 20Ω and length 300 cm is connected with resistance box (R.B.) and a standard cell of emf 4 V. For a resistance ' R ' of resistance box introduced into the circuit, the null point for a cell of 20 mV is found to be 60 cm. The value of ' R ' is ____ Ω.



Q.2 In the given circuit of potentiometer, the potential difference E across AB(10 m length) is larger than E_1 and E_2 as well. For key K_1 (closed), the jockey is adjusted to touch the wire at point J_1 so that there is no deflection in the galvanometer. Now the first battery (E_1) is replaced by second battery (E_2) for working by making K_1 open and K_2 closed. The galvanometer gives then null deflection at J_2. The value of $\frac{E_1}{E_2}$ is $\frac{a}{b}$, where a = ____.



Q.3 A potentiometer PQ is set up to compare two resistances as shown in the figure. The ammeter A in the circuit reads 1.0 A when two way key K_3 is open. The balance point is at a length l_1 cm from P when two way key K_3 is plugged in between 2 and 1 , while the balance points is at a length l_2 cm from P when key K_3 is plugged in between 3 and 1 . The ratio of two resistances $\frac{R_1}{R_2}$, is found to be



(A) $\frac{l_2}{l_2-l_1}$ (B) $\frac{l_1}{l_2-l_1}$ (C) $\frac{l_1}{l_1+l_2}$ (D) $\frac{l_1}{l_1-l_2}$

Q.4 A Potentiometer wire has a resistance 40Ω & its length is 10 m. It is connected to a resistance of 760Ω in series. If Emf of battery is 2 V then potential gradient is.

(A) 0.5×10^{-6} V/m (B) 10^{-6} V/m

(C) 1×10^{-2} V/m (D) 2×10^{-6} V/m

Q.5 A potentiometer wire has length 4m & resistance 8Ω. The resistance that must be connected in series with the wire & an accumulator of emf 2V. So as to get a potential gradient 1mv per cm on the wire is

(A) 40Ω (B) 44Ω (C) 48Ω (D) 32Ω

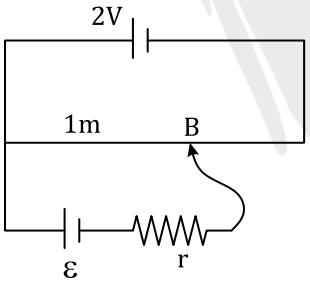
Q.6 A potentiometer wire of length L and resistance r is connected in series with a battery of Emf ε_0 & a resistance r_1. An unknown Emf E is balanced at a length l of the potentiometer wire. The emf E will be given by

(A) $\frac{LE_0 r}{(r+r_1)l}$ (B) $\frac{LE_0 r}{\ell r_1}$ (C) $\frac{\varepsilon_0 r}{(r+r_1)} \cdot \frac{l}{L}$ (D) $\frac{\varepsilon_0 l}{L}$

Q.7 A potentiometer wire is 100 cm long & a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then it opposite dirⁿ. The balance points are obtained at 50 cm & 10 cm from the positive end of the wire in the two coses, The ratio of emf'0 is

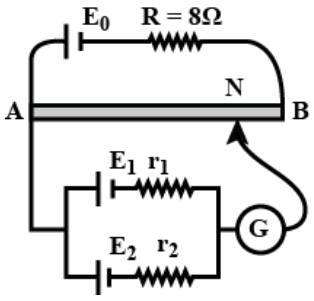
(A) 5: 1 (B) 5: 4 (C) 3: 4 (D) 3: 2

Q.8 In figure battery E is balanced over 55 cm length of potentiometer wire but when a resistance of 10Ω is connected in parallel with the battery then it balances over a 50 cm length of the potentiometer wire then internal resistance r of the battery is.



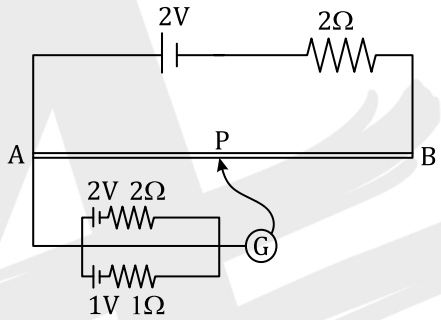
(A) 1Ω (B) 3Ω (C) 10Ω (D) 5Ω

Q.9 A battery of emf $\varepsilon_0 = 12$ V is connected across a 4 m long uniform wire having resistance 4Ω/m. The cells of small emfs $\varepsilon_1 = 2$ V and $\varepsilon_2 = 4$ V having internal resistance 2Ω and 6Ω respectively, are connected as shown in the figure. If galvanometer shows no reflection at the point N, the distance of point N from the point A is equal to:



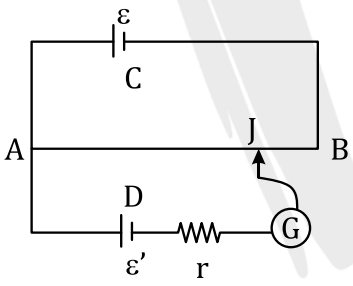
(A) 125 cm (B) $\frac{1}{3}$ m (C) 25 cm (D) 50 cm

Q.10 A battery of emf 2 V is connected across a long uniform wire AB of length 1 m and resistance per unit length $2\Omega m^{-1}$. Two cells of emf $\varepsilon_1 = 1$ V and $\varepsilon_2 = 2$ V are connected as shown in the fig. If the galvanometer shows no deflection at point P, the distance of point P from point A is equal to:



(A) 0 (B) 50 cm (C) 100 cm (D) 25 cm

Q.11 The figure shows a potentiometer arrangement ε is e.m.f. of driving cell. ′ is to be determined. Then which of the following are essential condition?



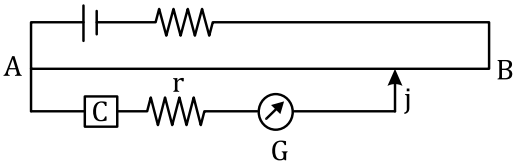
(A) ε must be greater than ε′

(B) The positive terminals of C and D must be joined to A only

(C) Either the +ve terminal of C and D or -ve terminal of both C and D must be joined to A.

(D) The resistance r must be smaller than total resistance of wire AB

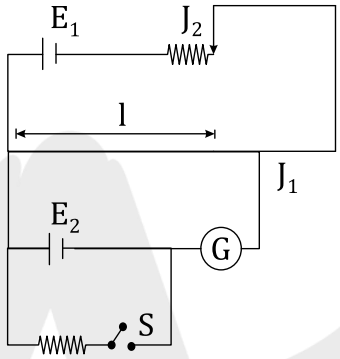
Q.12 In the given potentiometer circuit, the resistance of the potentiometer wire AB is R_0. C is a cell of internal resistance r. The galvanometer G does not give zero deflection for any position of the jockey. J which of the following cannot be a reason for this?



(A) $r > R_0$ (B) $R \gg R_0$

(C) emf of C > emf of D (D) The negative terminal of C is connected to A

Q.13 In the potentiometer experiment shown in, the null point length is l. Choose the correct options given below



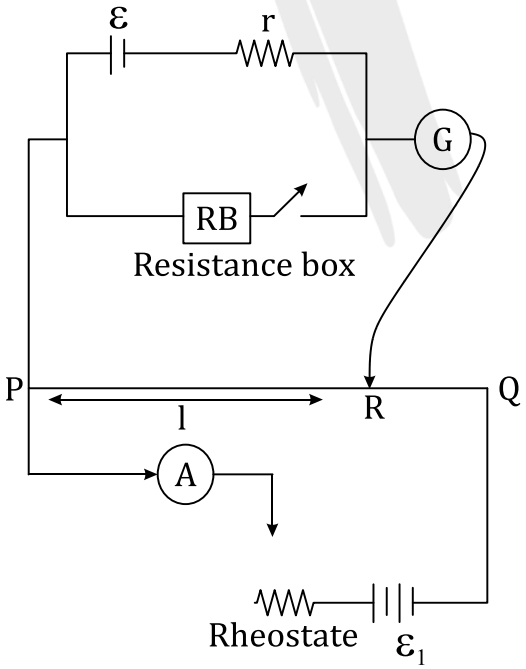
(A) If jokey J_2 is shifted towards right, l will increase

(B) if value of E_1 is increased, l is decreased

(C) If value of E_2 is increased, l is increased

(D) If switch S is closed, l will decreased

Q.14 Fig. shows an experimental setup for a potentiometer, point *R* is null point [no deflection of galvanometer] ε_1 is primary source. Match the following:



	Column-I		Column-II
(a)	If only emf of battery ε_1 is increased	(p)	Point R will shift to left
(b)	If only resistance of rheostatic is increased	(q)	Point R will shift to right
(c)	If resistance box is connected and resistance RB is increased	(r)	Point R may shift to left or right
(d)	If an ideal battery is connected in parallel to ε		

ANSWER KEY

1.	(780)	**2.**	(1)	**3.**	(B)	**4.**	(C)	**5.**	(D)	**6.**	(C)	**7.**	(D)
8.	(A)	**9.**	(A)	**10.**	(A)	**11.**	(A,C)	**12.**	(A)	**13.**	(A,B,C)		

14. (a)-p;(b)-q;(c)-q;(d)-r