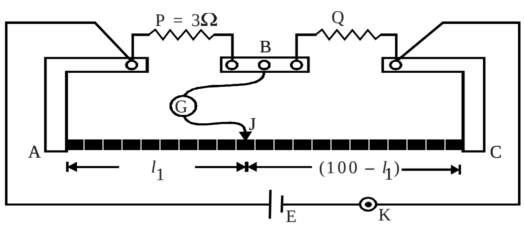
IIT PHYSICS CENTRE

BY D.B. Singh

2-Ka-35, Vigyan Nagar, Kota. Phone No. (0744) 2428962, 977288 1234, 98285 35802
E-mail : dbsiit@gmail.com

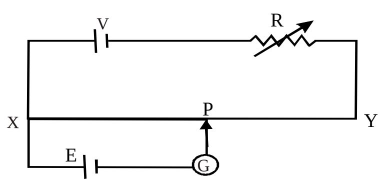
1. Sensitivity of potentiometer can be increased by
(A) Increasing the e.m.f of the cell
(B) Increasing the length of the potentiometer wire
(C) decreasing the length of the potentiometer wire
(D) None.

2. In a meter bridge experiment, resistances are connected as shown in the figure. The balancing length ℓ_1 = 55 cm. Now an unknown resistance x is connected in series with P and the new balancing length is found to be 75 cm. The value of x is



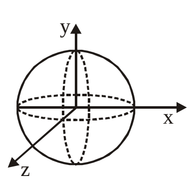
(A) $\frac{54}{12}\Omega$ (B) $\frac{20}{11}\Omega$ (C) $\frac{48}{11}\Omega$ (D) $\frac{11}{48}\Omega$

3. A potentiometer circuit shown in the figure is set up to measure e.m.f. of a cell E. As the point P moves from X to Y the galvanometer G shows deflection always in one direction, but the deflection decreases continiously until Y is reached. In order to obtain balamce point between X and Y it is necessary to



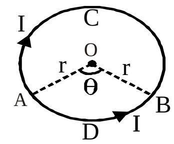
(A) Decrease the resistance R
(B) Increase the resistance R
(C) Reverse the terminals of battery V
(D) Reverse the terminals of cell E

4. Three rings, each having equal radius R,are placed mutually perpendicular to each other and each having its centre at the origin of co-ordinate system. If current 'I' is flowing throughеach ring then the magnitude of the magnetic field at the common centre is



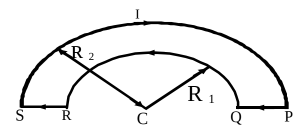
(A) $\sqrt{3}\frac{\mu_0 I}{2R}$ (B) zero (C) $\left(\sqrt{2}-1\right)\frac{\mu_0 I}{2R}$ (D) $\left(\sqrt{3}-\sqrt{2}\right)\frac{\mu_0 I}{2R}$

5. Equal current I flows in the circular wire segments ACB and ADB of equal radius r as shown in the figure. If $\theta = 60^0$, the magnetic field at centre O is



(A) $\frac{\mu_0 I}{r}$ (B) $\frac{\mu_0 I}{2r}$ (C) $\frac{\mu_0 I}{3r}$ (D) $\frac{\mu_0 I}{4r}$

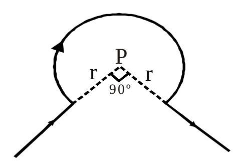
6. The wire loop PQRSP by joining two semi circular wires to radii R_1 and R_2 carries current I as shown in the figure. The magnitude of the megnetic induction at centre C is



(A) $\frac{\mu_0 I}{4}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (B) $\frac{\mu_0 I}{4}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

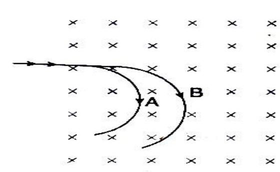
(C) $\frac{\mu_0 I}{2}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (D) $\frac{\mu_0 I}{2}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

7. The wire shown in the figure carries a current of 40 A. If r = 3.14 cm, the magnetic field at point P will be



(A) $1.6\times10^{-3}T$ (B) $3.2\times10^{-3}T$ (C) $4.8\times10^{-3}T$ (D) $6.4\times10^{-3}T$

8. Two charged particles A and B enter a uniform magnetic field with velocities normal to the field. Their paths are shown in the Figure. The possible reasons are:



(A) The momentum of A is greater than that of B
(B) The charge of A is greater than that of B.
(C) The specific charge of A is greater than that of B
(D) The speed of A is less than that of B.