PHYSICS

BOOKS - EDUCART PUBLICATION

SAMPLE PAPER 6

Section A

1. Stable equilibrium of a magnetic dipole in a uniform magnetic field will be at orientation when:

A. Dipole moment vector and magnetic field vector are in same direction

B. Dipole moment vector and magnetic field vector are in opposite direction

C. Dipole moment vector is perpendicular to magnetic field vector

D. Both a and c

Answer: A

▶ **Watch Video Solution**

2. A bar magnet falls through a material ring. Will its acceleration be equal to 'g' ?

A. $= g$

B. $< g$

C. $> g$

D. $\neq g$

Answer: B

3. A coil of inductance L is carrying a steady current I. what is the nature of its stored energy ?

A. $\dfrac{1}{2}Li^2$

B. Li^2

C. $2Li^2$

D. $\dfrac{Li^2}{\sqrt{2}}$

Answer: A

4. A transformer steps down from 220V to 22V with secondary impedance of 220Ω. Current is drawn by a primary coil is

A. $10^{-6}A$

B. $10^{-4}A$

C. $10^{-2}A$

D. $10^2 A$

Answer: C

▶ Watch Video Solution

5. Is there any device by which direct current can be controlled without any loss of energy ? Can a choke coil do so?

A. Transformer

B. Rectifler

C. Generator

D. No device can control

Answer: D

▶ **Watch Video Solution**

6. What is the SI unit of Galvanometer.

A. $\dfrac{\text{div}}{\text{volt}}$

B. $\dfrac{\text{div}}{A}$

C. $\dfrac{\text{div}}{C}$

D. $\dfrac{\text{rad}}{V}$

Answer: B

▶ **Watch Video Solution**

7. Electromotive force of primary cell is 2.4V. What is the internal resistance if cell is short circuited and

current become 4A.

A. 1.2Ω

B. 60Ω

C. 0.6Ω

D. 4Ω

Answer: C

▶ **Watch Video Solution**

8. Electromagnetic damping is based on

A. Super-position

B. Resistivity

C. Eddy currents

D. Both a and c

Answer: C

▶ **Watch Video Solution**

9. A 900 pF capacitor is charged by 100V battery.

(a) How much electrostatic energy is strored by the capacitor ? The capacitor is disconnected from the battery and connected to another 900 pF capacitor.

How much is the electrostatic energy stored in the system ?

A. $4.5 \times 10^{-6} J$

B. $4.5 \times 10^{6} J$

C. $45 \times 10^{-6} J$

D. $0.45 \times 10^{5} J$

Answer: A

▶ **Watch Video Solution**

10. Electric Field lines

A. always form a closed loop

B. are superimposed

C. can penetrate through conducting surface

D. emerges from negative charge

Answer: B

▶ **Watch Video Solution**

11. Two coil are placed close to each other. The mutual inductance of the pair of coils depends upon.

A. current in two coils

B. material of wires of coils

C. relative position and oridentation

D. rate of change of current in two coils

Answer: C

> ▶ **Watch Video Solution**

12. Electric flux through a cube with charge q inside is

A. $\dfrac{q}{\varepsilon_0}$

B. $\dfrac{q}{6\varepsilon_0}$

C. $\dfrac{q}{3\varepsilon_0}$

D. 0

Answer: A

▶ **View Text Solution**

13. The self-inductance L of a solenoid of area of cross-section A and length l, with N turns increase as:
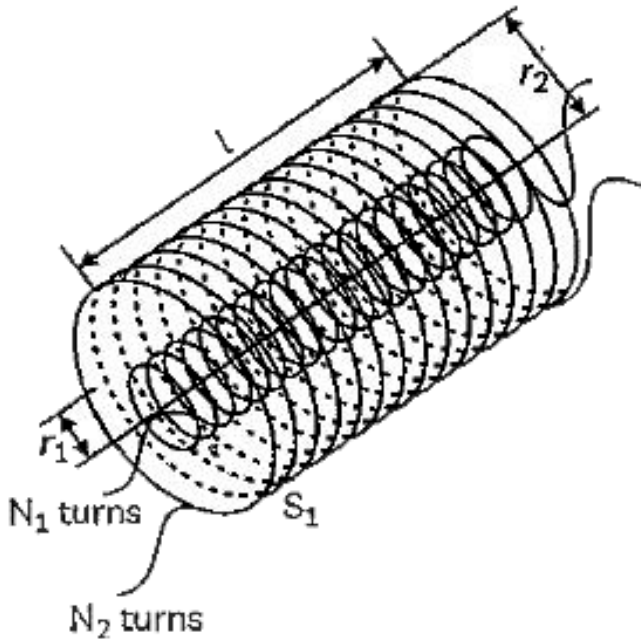
A. A and l decreases

B. A and l increases

C. A increases and I decreases

D. A decreases and I increase

Answer: C

▶ **Watch Video Solution**

N₁ turns   S₁

N₂ turns

14.

If the magnetic flux changes by 2×10^{-2} wb and current change is 0.01A, then the co-efficient of mutual inductance is:

A. 2H

B. 3H

C. 4H

D. 8H

Answer: A

▶ View Text Solution

15. SI units of inductive capacitance is given by

A. Ω

B. A

C. V

D. $\dfrac{\Omega}{m}$

Answer: A

16. Is it necessary condition for a Gaussian surface to

have a symmetrical area as per gauss law?

 A. No

 B. Yes

 C. Sometimes

 D. Can't say

Answer: A

17. The phase difference between voltage and current

in an LCR series circuit is

A. $\dfrac{\pi}{3}$

B. $\dfrac{\pi}{2}$

C. 0

D. $\dfrac{\pi}{6}$

Answer: C

18. A copper disk of radius 0.1m is rotated about its center with 200 rev/s in uniform magnetic field. Induced emf across the radius of the disc is:

A. $\dfrac{\pi}{20}V$

B. $\dfrac{\pi}{100}V$

C. $20\pi mV$

D. 0

Answer: C

19. Maximum energy stored in a capacitor consisting dielectric constant of dielectric strength U_d and breakdown voltage $V = U_d d$ is given by

A. $\dfrac{1}{2}\varepsilon A d U_d$

B. $\dfrac{1}{2}\varepsilon A d U_d^2$

C. $\varepsilon A d U_d^2$

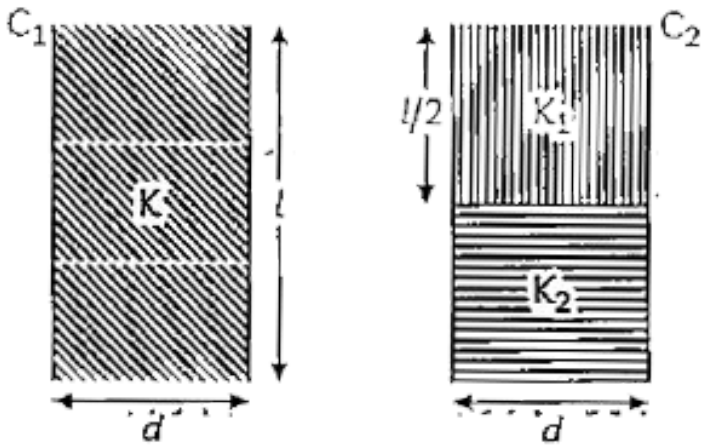D. $\varepsilon A d U_d$

Answer: C

▶ **Watch Video Solution**

20. An electron in a certain region is not deflected, then

    A. Magnetic field does not exist

    B. Magnetic field does exist in opposite direction

    C. Magnetic field exists at times

    D. Magnetic field may exist

Answer: D

▶ **Watch Video Solution**

21.

A conductor can turn into dielectric by

A. Doping

B. Heating

C. Compression

D. Freezing

Answer: B

22. In a uniform magnetic field of 5T, an electron is moving with constant velocity of 15m/s. The force on the electron is
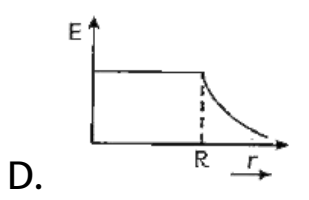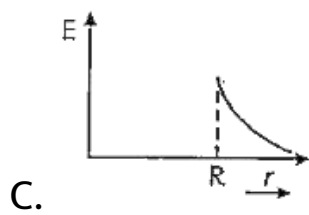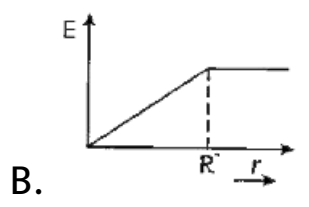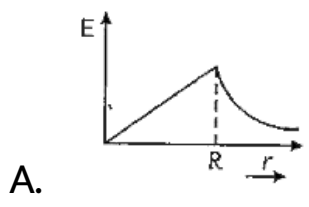
A. 75N

B. $2.4 \times 10^{-18} N$

C. 1

D. zero

Answer: D

23. $\vec{E}$ due to uniformly charged sphere of radius R as a function of distance from its centre is represented by

A.

B.

C.

D.

24. A body of area $0.5m^2$ makes an angle of $60°$ with the uniform magnetic field of $4Wbm^{-2}$. The magnetic flux passing through the body will be

A. 2Wb

B. $\sqrt{3}Wb$

C. 0.5 Wb

D. 1Wb

Answer: D

25. An electron is projected along the axis of a current carrying solenoid of length I, with uniform velocity then:

A. The electron path will be circular about the axis.

B. The electron will be accelerated along the axis.

C. The electron will continue to move uniform velocity

D. The electron will experience a force of $45°$ to the axis will execute a helical path.

Answer: C

▶ **Watch Video Solution**

1. A bar magnet of length 3cm has points X and Y along the axis at a distance of 24 cm and 48cm on opposite ends. Ratio of magnetic field at these points will be

A. 3

B. 8

C. $\dfrac{1}{2}\sqrt{2}$

D. 4

Answer: B

▶ **Watch Video Solution**

2. A bar magnet of magnetic moment $\overrightarrow{M}$ is placed in a magnetic field of induction $\overrightarrow{B}$. The torque exerted on it is

A. $\vec{M} \times \vec{B}$

B. $-\vec{M} \times \vec{B}$

C. $-\vec{M} . \vec{B}$

D. $\vec{M} . \vec{B}$

Answer: A

▶ **Watch Video Solution**

3. The Wheatstone bridge and its balance condition

provide a practical method for determination ,of an

A. unknown resistance

B. known resistance

C. Both a and b

D. Temperature of the wire

Answer: A

▶ **Watch Video Solution**

4. What is the total flux due to the configuration of

the surface S

$-q$ $+2q$ $+3q$

A. $\dfrac{2q}{\varepsilon_0}$

B. $\dfrac{q}{\varepsilon_0}$

C. $\dfrac{4q}{\varepsilon_0}$

D. $\dfrac{q}{\varepsilon_0}$

Answer: B

▶ **Watch Video Solution**

5. Current drawn from the cell is maximum when:

A. R=0

B. R=r

C. $R > r$

D. $R < r$

Answer: A

▶ **Watch Video Solution**

---

6. If the battery and galvanometer are interchanged then the deflection in galvanometer will

A. See no change

B. Change in previous direction

C. Change in opposite direction

D. Circuit will die

Answer: A

> ▶ **Watch Video Solution**

7. Thermal compensation in wheatstone bridge can be provided by

    A. using more than one sensor of resistance

    B. using cooling sink

    C. using of heat sink

    D. immersing circuit into liquid

Answer: A

8. Same equipotential lines distributed in space are

shown below. A charged object moves from A to B

10V 20V 30V 40V 50V
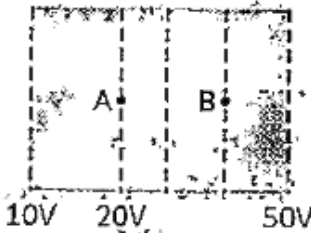
A   B

(I)

20V   40V

A   B

10V 30V   50V

(II)

30V 40V

A   B

10V   20V   50V

(III)

A. Work done is same in fig (I), (II) nad (III)

B. Work done is greatest in fig (I)

C. Work done is least in fig (II)

D. Work done in fig (III) is greater then fig (II) but

equal to that in fig (I)

Answer: A

▶ **View Text Solution**

9. For any circuit, number of independent equations

containing emf's, resistance and current equals:

A. no. of junction

B. no. of branches

C. no. of branches +1

D. no of junction + number of branches

Answer: B

▶ **View Text Solution**

---

10. If emf and current in the circult is given by

$$e = E_0 \sin \omega t$$

$i = l_0 \sin(\omega t - \phi)$ Then the average power in the circuit over one cycle of ac is

A. $\dfrac{E_0 l_0}{2}$

B. $\dfrac{E_0 l_0}{2}\sin\phi$

C. $E_0 l_0$

D. $\dfrac{E_0 l_0}{2}\cos\phi$

Answer: D

▶ **Watch Video Solution**

11. Capacitance of a capacitor A, when a dielectric is placed between the capacitor then charged to
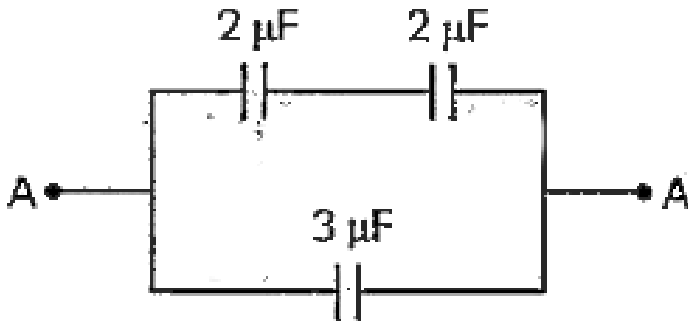
potential difference 110V is?

A. $2 \times 10^9 F$

B. $2.5 \times 10^9 F$

C. $3.6 \times 10^6 F$

D. $3 \times 10^6 F$

Answer: A

▶ **Watch Video Solution**

12. Find the capacitance of the circuit

A. $\dfrac{1}{4}\mu F$

B. $\dfrac{7}{12}\mu F$

C. $\dfrac{12}{7}\mu F$

D. $4\mu F$

Answer: D

▶ Watch Video Solution

13. If we pull apart the plates of parallel plate capacitor then,

    A. The capacitance increases

    B. Total charge increases

    C. The potential difference increases

    D. Capacitance increases
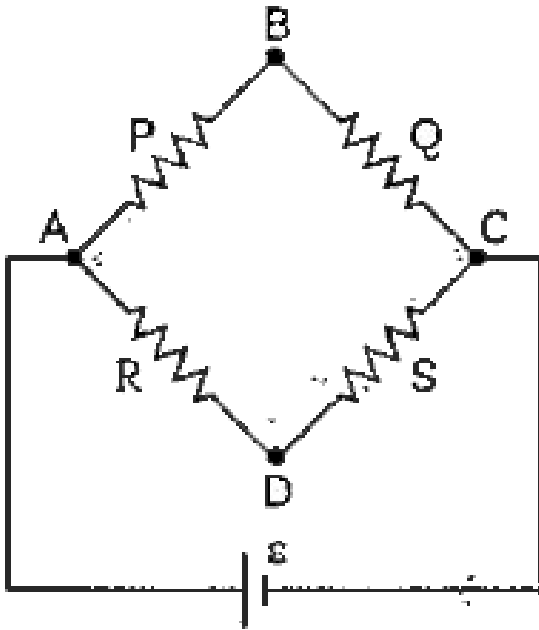
Answer: C

▶ **Watch Video Solution**

14. A balanced wheat stone bridge has resistance

$P = 10\Omega, Q = 20\Omega R = 5\Omega, S = 11\Omega, \varepsilon = 48V$ and C

is grounded

Potential of point B is

    A. 32V

    B. 36V

C. 24V

D. 16V

Answer: A

▶ **View Text Solution**

15. If $10\mu C$ charge exists at centre of a square ABCD

and $2\mu C$ point charge is moved from A to B. Find the

work done

A. 20J

B. 5J

C. 0

D. 8J

Answer: C

> ▶ **View Text Solution**

---

16. The force of attraction between two charges at distance r, when the air is replaced by a medium of dielectric constant k.

A. Increases k^2 times

B. decreases K times

C. remains uncharged

D. increases K times

Answer: B

▶ **Watch Video Solution**

17. Calculate the coulomb force between two electrons separated by $0.8 \times 10^{-15} m$.

A. 300N

B. 360N

C. 340N

D. 320N

Answer: B

> ▶ **Watch Video Solution**

---

18. In vacuum, a parallel plate capacitor has capacitance C_0. New capacitance of sheet of thickness t and relative permittivity k is introduced between the plates is (take t=d):

A. $C = \dfrac{C_0}{k}$

B. $C = C_0$

C. $C = kC_0$

D. $C = \dfrac{2}{3}kC_0$

Answer: C

▶ **Watch Video Solution**

---

19. If ϕ_1 and ϕ_2 are normal of flux entering and leaving an enclosed surface. Electric flux inside the surface will be

A. $(\phi_2 - \phi_1)\varepsilon_0$

B. $(\phi_1 + \phi_2)\varepsilon_0$

C. $\dfrac{(\phi_2 - \phi_1)}{\varepsilon_0}$

D. $\dfrac{(\phi_2 + \phi_1)}{\varepsilon_0}$

Answer: A

▶ **Watch Video Solution**

20. Assertion (A) : As temperature of wire increases,

drift velocity of electrons decreases.

Reason (R): As temperature increases, conductivity

decreases.

A. Both A and R are true and R is the correct

explanation of A

B. Both A and R are true but R is not the correct

explanation of A

C. A is true but R is false

D. A is false and R is also false

Answer: B

▶ **Watch Video Solution**

21. Assertion (A) : Wire of a heater has high melting

point and resistance.

Reason (R): On high resistance conductivity is less.

A. Both A and R are true and R is the correct

explanation of A

B. Both A and R are true but R is not the correct

explanation of A

C. A is true but R is false

D. A is false and R is also false

Answer: B

▶ View Text Solution

22. Assertion (A) : Real Transformers are 100%

efficient.

Reason (R): In practical Transformers, there is zero energy loss.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

Answer: D

▶ **Watch Video Solution**

23. Assertion (A) : No net power is consumed by a conductor in half cycle.

Reason (R): Average power consumed per cycle in an inductor connected to an AC source is 0.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

Answer: A

24. Assertion (A) : Electrons have no thermal velocity in a conductor.

Reason (R): Electron's direction of motion are randomly oriented.

A. Both A and R are true and R is the correct explanation of A

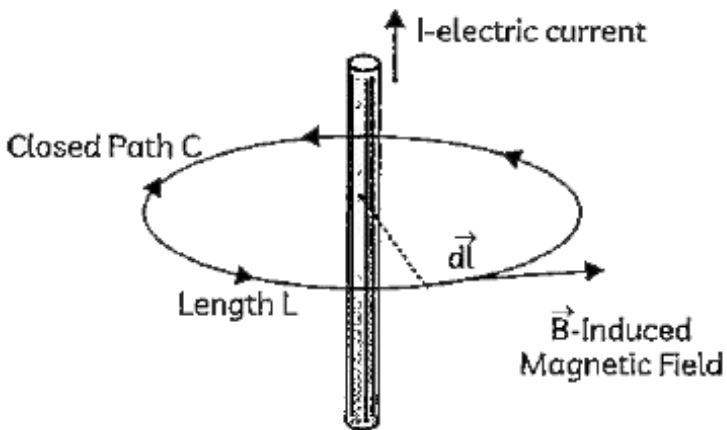B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

Answer: A

Section C

1.

If two conductors carry current in opposite direction, then:

A. there is no force between them

B. force is repulsive

C. force is attractive
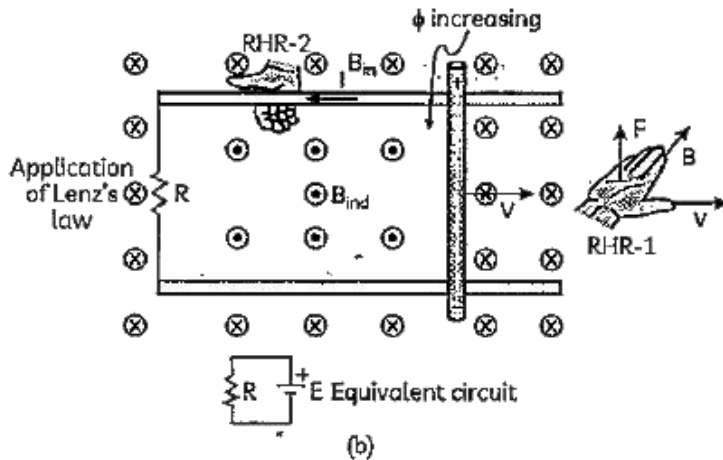
D. independent of force

Answer: B

▶ View Text Solution

RHR-2
φ increasing
Application of Lenz's ⊗ R law
B_m
B_{ind}
F B RHR-1 V

R — E Equivalent circuit

(b)

2.

Emf induced in the left arm of the loop, if it is moved out of the magnetic field in 1s with constant speed
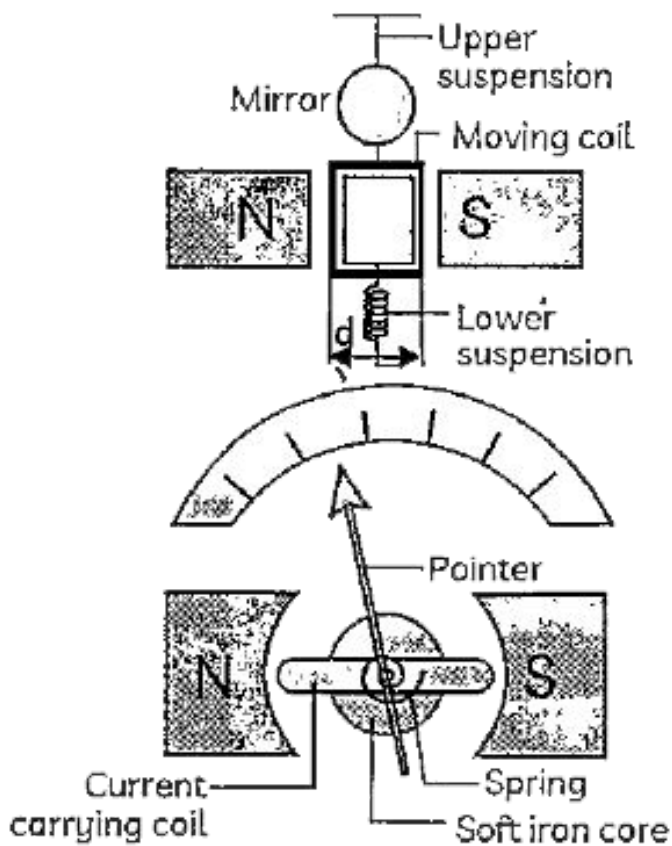
A. 0.1V

B. 2V

C. 1V

D. 0.2V

Answer: A

▶ **View Text Solution**

---

3. Case Study: Read the following paragraph and answer the questions.

Since a voltmeter in a series combination of a galvanometer and a high resistance R. so its resistance is much higher than the galvanometer. Higher the range of voltmeter to be prepared from given galvanometer, higher will be the value of series high resistance required for the purpose. The range of voltmeter can be both increased or decreased.

Upper suspension

Mirror

Moving coil

N

S

Lower suspension

Pointer

N

S

Current-carrying coil

Spring

Soft iron core

To convert galvanometer into answer connect

A. low resistance in series

B. high resistance in series

C. low resistance in parallel
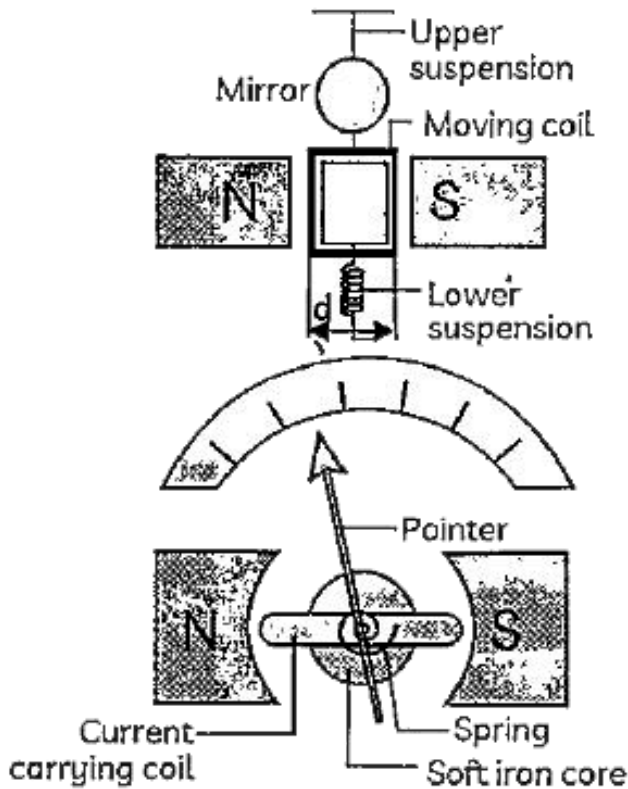
D. high resistance in parallel

Answer: C

> ▶ **View Text Solution**

4. Case Study: Read the following paragraph and answer the questions.

Since a voltmeter in a series combination of a galvanometer and a high resistance R. so its resistance is much higher than the galvanometer. Higher the range of voltmeter to be prepared from given galvanometer, higher will be the value of series high resistance required for the purpose. The range

of voltmeter can be both increased or decreased.

A galvanometer acting as a voltmeter will have

A. high resistance in parallel with its coil

B. low resistance in parallel with its coil

C. high resistance in series with its coil
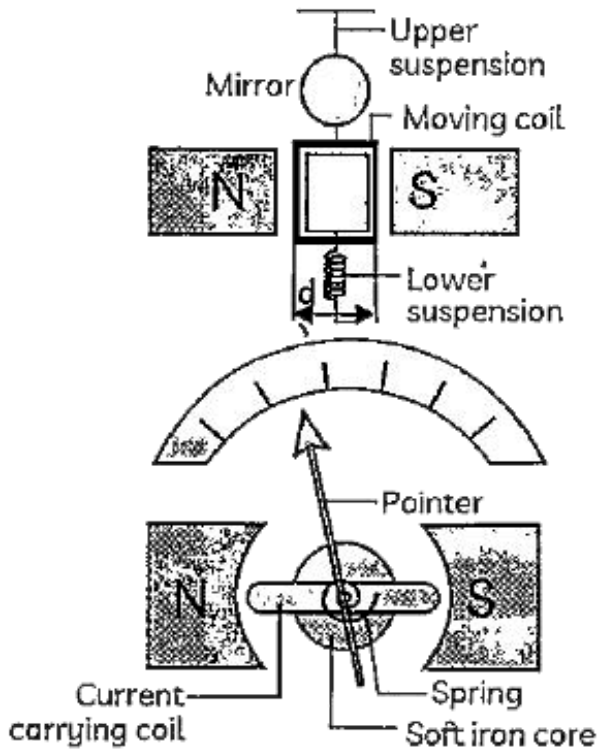
D. low resistance in series with its coil

Answer: C

▶ **View Text Solution**

---

5. Case Study: Read the following paragraph and answer the questions.

Since a voltmeter in a series combination of a galvanometer and a high resistance R. so its resistance is much higher than the galvanometer. Higher the range of voltmeter to be prepared from given galvanometer, higher will be the value of series high resistance required for the purpose. The range

of voltmeter can be both increased or decreased.

To convert a galvanometer into a voltmeter will have

to add

A. high resistance in parallel

B. high resistance in series

C. low resistance in parallel

D. low resistance in series

Answer: B

> ▶ **View Text Solution**

6. Case Study: Read the following paragraph and answer the questions.

Since a voltmeter in a series combination of a galvanometer and a high resistance R. so its resistance is much higher than the galvanometer. Higher the range of voltmeter to be prepared from given galvanometer, higher will be the value of series

high resistance required for the purpose. The range

of voltmeter can be both increased or decreased.
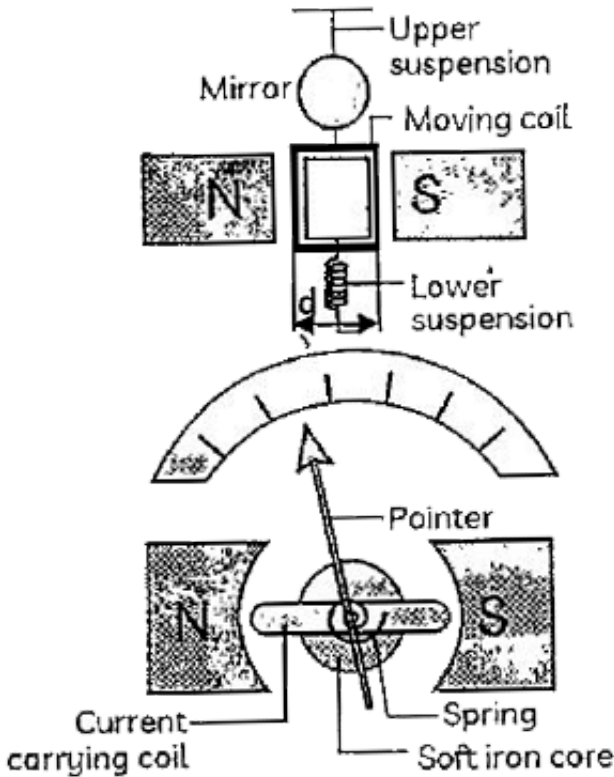
A galvanometer with 8Ω resistance is shunted by

wire of 2Ω current is 1A. The part of current passing

will be

A. 1.2A

B. 0.8A

C. 0.5A

D. 0.3A

Answer: B

▶ View Text Solution