PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960 PHYSICS (HINGLISH)

ELECTRO MAGNETIC INDUCTION

Exercise

1. In electromagnetic induction, the induced charge in a coil is independent of

A. Change in the flux

B. Time

C. Resistance of the circuit

D. None of the above

Answer: C

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2. Lenz's law is consequence of the law of conservation of

A. Charge

B. Momentum

C. Mass

D. Energy

Answer: D

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3. In electromagnetic induction, the induced charge in a coil is independent of

A. Change in the flux

B. Time

C. Resistance in the circuit

D. None of the above

Answer: B

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4. The magnetic flux through a circuit of resistance R changes by an amount $\Delta\phi$ in a time Δt. Then the total quantity of electric charge Q that passes any point in the circuit during the time Δt is represent by

A. $Q = \frac{\Delta\phi}{\Delta t}$

B. $Q = \frac{\Delta\phi}{\Delta t} \times R$

C. $Q = -\frac{\Delta\phi}{\Delta t} + R$

D. $Q = \frac{\Delta\phi}{R}$

Answer: D

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5. A cylindrical bar amgnet is kept along the axis of a circular coil. If the magnet is rotated about its axis, then

A. A current will be induced in a coil

B. No current will be induced in a coil

C. Only an e.m.f. will be induced in the coil

D. An e.m.f. and a current both will be induced in the coil

Answer: B

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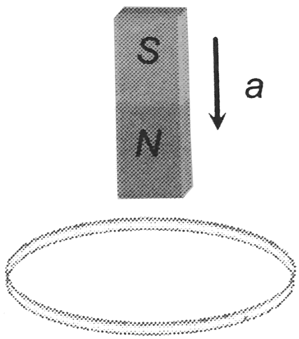
6. A metalic ring is attached with the wall of a room. When the north pole of a magnet is brought near to it, the induced current in the ring will be



A. First clockwise then anticlockwise

B. In clockwise direction

C. In anticlockwise direction

D. First anticlockwise then clockwise

Answer: C

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7. A coil having an area A_0 is placed in a magnetic field which changes from B_0 to $4B_0$ in a time interval t. The e.m.f. induced in the coil will be

A. $\dfrac{3A_0B_0}{t}$

B. $\dfrac{4A_0B_0}{t}$

C. $\dfrac{3B_0}{A_0t}$

D. $\frac{4B_0}{A_0t}$

Answer: A

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8. The magnetic flux linked with a coil is given by an equation ϕ (in webers) $= 8t^2 + 3t + 5$. The induced e.m.f. in the coil at the fourth second will be

A. 16 units

B. 39 units

C. 67 units

D. 145 units

Answer: C

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9. The current flowing in two coaxial coils in the same direction. On increasing the distance the two, the electric current will

A. Increase

B. Decrease

C. Remain unchanged

D. The information is incomplete

Answer: A

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10. A metal ring is held horizontally and bar magnet is dropped through the ring with its length along the axis of the ring. The acceleration of the falling magnet

A. Equal to that due to gravity

B. Less than that due to gravity

C. More than that due to gravity

D. Depends on the diameter of the ring and the length of the magnet

Answer: B

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11. A square coil of $10^{-2}m^2$ area is placed perpenducular to a uniform magnetic field of $10^3 Wb/m^2$. What is magnetic flux through the coil?

A. 10 weber

B. 10^{-5} weber

C. 10^5 weber

D. 100 weber

Answer: A

12. A magnet is brought towards a coil (i) speedily (ii) slowly then the induced e.m.f.//induced charge will be respectively

A. More in first case / More in first case

B. More in first case/Equal in both case

C. Less in first case/More in second case

D. Less in first case/Equal in both case

Answer: B

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13. The direction of induced e.m.f. during electromagnetic induction is given by

A. Faraday's law

B. Lenz's law

C. Maxwell's law

D. Ampere's law

Answer: B

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14. A coil of area $10cm^2$ and 10 turns is in magnetic field directed perpendicular to the plane and changing at a rate of $10^8 gauss / s$. The resistance of coil is 20Ω. The current in the coil will be

A. 5 amp

B. $0.5 amp$

C. $0.05 amp$

D. $5 \times 10^8 amp$

Answer: A

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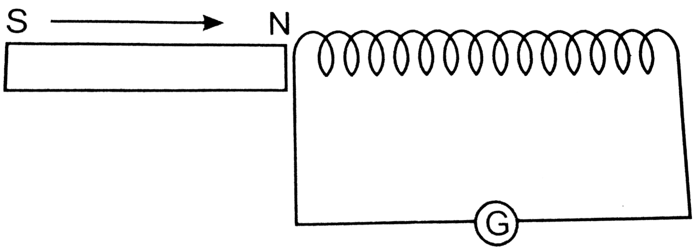
15. As shown in the figure, a magnetic is moved with a a fast speed towards a coil at rest. Due to this, induced electromotive force, induced charge in the coil are E, I and Q respectively. If the speed of magnetic is doubled, the incorrect statement is



A. E increases

B. I increases

C. Q remains same

D. Q increases

Answer: D

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16. A coil having 500 square loops each of side $10cm$ is placed normal to a magnetic flux which increase at the rate of $1.0\frac{\text{tesla}}{\text{second}}$. The induced r.m.f. in volts is

A. 0.1

B. 0.5

C. 1

D. 5

Answer: D

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17. A coil of area $100 cm^2$ has 500 turns. Magnetic field of $0.1 \text{weber} / \text{metre}^2$ is perpendicular to the coil. The field is reduced to zero in 0.1 second. The induced $e. m. f.$ in the coil is

A. 1 V

B. 5 V

C. 50 V

D. Zero

Answer: B

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18. A 50 turns circular coil has a radius of 3cm , it is kept in a magnetic field acting normal to the area of the coil. The magnetic field B increased from 0.10 tesla to 0.35 tesla in 2 milliseconds . The average induced e.m.f. in the coil is

A. 1.77volts

B. 17.7volts

C. 177volts

D. 0.177volts

Answer: B

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19. A coil having an area $2m^2$ is placed in a magnetic field which changes from $1Wb/m^2$ to $4Wb/m^2$ in an interval of 2 second. The average e.m.f. induced in the coil will be

A. 4 V

B. 3 V

C. $1.5V$

D. 2 V

Answer: B

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20. A coil has 2000 turns and area of $70cm^2$. The magnetic field perpendicular to the plane of the coil is $0.3Wb/m^2$ and takes 0.1 sec to rotate through 180^0. The value of the induced e.m.f. will be

A. $8.4V$

B. $84V$

C. $42V$

D. $4.2V$

Answer: B

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21. Two different wire loops are concentric and lie in the same plane. The current in the outer loop is clockwise and increasing with time. The induced current in the inner loop then is

A. Clockwise

B. Zero

C. Counter clockwise

D. In a direction that depends on the ratio of the loop radii

Answer: C

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22. According to Faraday's law of electromagnetic induction

A. The direction of induced current is such that it opposes the cause producing it

B. The magnitude of induced e.m.f. produced in a coil is directly proportional to the rate of change of magnetic flux

C. The direction of induced e.m.f. is such that it opposes the cause producing it

D. None of the above

Answer: B

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23. SI unit of magnetic flux is

A. Weber / m^2

B. Weber

C. Henry

D. Ampere/m

Answer: B

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24. The north pole of a long horizontal bar magnet is being brought closer to a vertical conducting plane along the perpendicular direction. The direction of the induced current in the conducting plane will be

A. Horizontal

B. Vertical

C. Clockwise

D. Anticlockwise

Answer: D

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25. The magnetic field in a coil of 100 turns and 40 square cm area is increased from 1 Tesla to 6 Tesla in 2 second. The magnetic field is perpendicular to the coil. The e.m.f. generated in it is

A. $10^{4}V$

B. $1.2V$

C. $1.0V$

D. $10^{-2}V$

Answer: C

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26. The dimensions of magnetic flux are

A. $MLT^{-2}A^{-2}$

B. $ML^2T^{-2}A^{-2}$

C. $ML^2T^{-1}A^{-2}$

D. $ML^2T^{-2}A^{-1}$

Answer: D

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27. Lenz's law gives:

A. The magnitude of the induced e.m.f.

B. The direction of the induced current

C. Both the magnitude and direction of the induced current

D. The magnitude of the induced current

Answer: B

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28. The north pole of a bar magnet is moved swiftly downward towards a closed coil and then second time it is raised upwards slowly. The magnitude and direction of the induced currents in the two cases will be of

A.

First case	second case
Low value clockwise	Higher value anticlockwise

B.

First case	second case
Low value clockwise	Equal value anticlockwise

C.

First case	second case
Higher value clockwise	Low value clockwise

D.

First case	second case
Higher value anticlockwise	Low value clockwise

Answer: D

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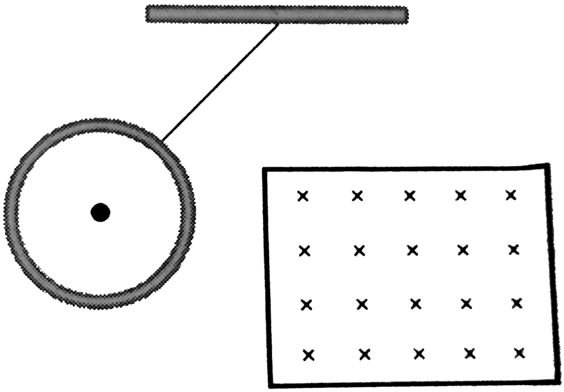
29. A metallic ring connected to a rod oscillates freely like a pendulum. If now a magnetic field is applied in horizontal direction so that the pendulum now swings through the field, the pendulum will



A. Keep oscillating with the old time period

B. Keep oscillating with a smaller time period

C. Keep oscillating with a larger time period

D. Come to rest very soon

Answer: D

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30. A circular coil opf 500 turns of wire has an enclosed area of $0.1m^2$ per turn. It is kept perpendicular to a magnetic field of induction $0.2T$ and rotated by 180° about a diameter perpendicular to the field in 0.1 sec. how much charge will pass when the coil is connected to a gavanometer with a combined resistance of $50ohms$

A. $0.2C$

B. $0.4C$

C. $2C$

D. $4C$

Answer: B

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31. A coil of 100 turns and area 5 square centimetre is placed in a magnetic field B = 0.2 T . The normal to the plane of the coil makes an angle of 60° with the direction of the magnetic field. The magnetic flux linked with the coil is

A. $5 \times 10^{-3} Wb$

B. $5 \times 10^{-5} Wb$

C. $10^{-2} Wb$

D. $10^{-4} Wb$

Answer: A

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32. Magnetic flux in a circuite containing a coil of resistance 2Ωchange from $2.0Wb$ to $10Wb$ in $0.2 \sec.$ The charge passed through the coil in this time is

A. 5.0 coulomb

B. 4.0 coulomb

C. 1.0 coulomb

D. 0.8 coulomb

Answer: B

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33. The direction of induced current is such that it opposes the very cause that has produced it. This is the law of

A. Lenz

B. Faraday

C. Kirchhoff

D. Fleming

Answer: A

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34. To induce an e.m.f. in a coil, the linking magnetic flux

A. Must decrease

B. Can either increase or decrease

C. Must remain constant

D. Must increase

Answer: B

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35. A solenoid is 1.5 m long and its inner diameter is 4.0 cm . It has three layers of windings of 1000 turns each and carries a current of 2.0 amperes. The magnetic flux for a cross-section of the solenoid is nearly

A. 2.5×10^{-7}weber

B. 6.31×10^{-6}weber

C. 5.2×10^{-5}weber

D. 4.1×10^{-5}weber

Answer: B

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36. A coil of 40Ω resistance has 100 turns and radius $6mm$ us connected to ammeter of resistance of $160 ohms$. Coil is placed perpendicular to the magnetic field. When coil is taken out of the field, $32\mu C$ charge flows through it. The intensity of magnetic field will be

A. $6.55T$

B. $5.66T$

C. $0.655T$

D. $0.566T$

Answer: D

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37. Faraday's law are consequence of conservation

A. Energy

B. Energy and magnetic field

C. Charge

D. Magnetic field

Answer: A

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38. A magnetic field of $2 \times 10^{-2} T$ acts at right angles to a coil of area $100 cm^2$ with 50 turns. The average emf induced in the coil is $0.1V$, when it is removed from the field in time t. The value of t is

A. $0.1 \sec$

B. $0.01 \sec$

C. $1 \sec$

D. $20 \sec$

Answer: A

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39. The total charge induced in a conducting loop when it is moved in magnetic field depends on

A. The rate of change of magnetic flux

B. Initial magnetic flux only

C. The total change in magnetic flux

D. Final magnetic flux only

Answer: C

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40. A rectangular coil of 20 turns and area of cross-section $25cm^2$ has a resistance of $100ohm$. If a magnetic field which is perpendicular to the plane of the coil changes at the rate of 1000 telsa per second, the current in the coil is

A. 1.0 ampere

B. 50 ampere

C. 0.5 ampere

D. 5.0 ampere

Answer: C

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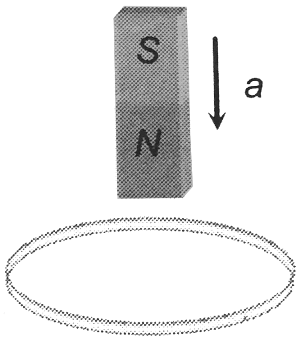
41. A metalic ring is attached with the wall of a room. When the north pole of a magnet is brought near to it, the induced current in the ring will be



A. Clockwise

B. Anticlockwise

C. Towards north

D. Towards south 43

Answer: B

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42. Lenz's law applies to

A. Electrostatics

B. Lenses

C. Electro-magnetic induction

D. Cinema slides

Answer: C

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43. A coil of metal wire is kept stationary in a non-uniform magnetic field. An e.m.f. Is induced in the coil.

A. An e.m.f. is induced in the coil

B. A current is induced in the coil

C. Neither e.m.f. nor current is induced

D. Both e.m.f. and current is induced

Answer: C

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44. The magnetic flux linked with a coil, in webers, is given by the equation $f = 3t^2 + 4t + 9$. Then the magnitude of induced e.m.f. at $t = 2$ second will be

A. 2 volt

B. 4 volt

C. 8 volt

D. 16 volt

Answer: D

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45. A coil has an area of $0.05m^2$ and it has 800 turns. It is placed perpendicular in a magnitude field of strength $4 \times 10^{-5} Wb/m^2$, it is rotated through 90° in 0.1 sec. the average e.m.f. induced in the coil is

A. $0.056V$

B. $0.046V$

C. $0.026V$

D. $0.016V$

Answer: D

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46. A moving conductor coil in a magnetic field produces an induced e.m.f. This is in accordance with

A. Amperes law

B. Coulomb law

C. Lenz's law

D. Faraday's law

Answer: D

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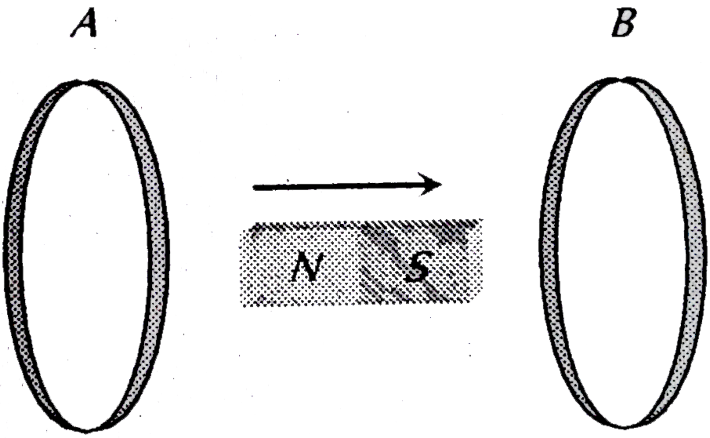
47. In the diagram shown if a bar magnet is moved along the common axis of two single turn coils A and B in the direction of arrow



A. Current is induced only in A & not in B

B. Induced currents in A & B are in the same direction

C. Current is induced only in B and not in A

D. Induced currents in A & B are in opposite directions

Answer: D

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48. Magnetic flux ϕ (in weber) linked with a closed circuit of resistance $10 ohm$ varies with time t (in seconds) as

$\phi = 5t^2 - 4t + 1$

The induced electromotive force in the circuit at $t = 0.2$ sec. is

A. 0.4 volts

B. -0.4volts

C. -2.0volts

D. 2.0volts

Answer: D

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49. The formula for induced e.m.f. in a coil due to change in magnetic flux through the coil is (here A = area of the coil, B = magnetic field)

A. $e = -A.\frac{dB}{dt}$

B. $e = -B.\frac{dA}{dt}$

C. $e = -\frac{d}{dt}(A.B)$

D. $e = -\frac{d}{dt}(A \times B)$

Answer: C

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50. Lenz's law is expressed by the following formula (here e = induced e.m.f., ϕ = magnetic flux in one turn and N = number of turns)

A. $e = -\phi\frac{dN}{dt}$

B. $e = -N\frac{d\phi}{dt}$

C. $e = -\frac{d}{dt}\left(\frac{\phi}{N}\right)$

D. $e = N\frac{d\phi}{dt}$

Answer: B

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51. A magnet is dropped down an infinitely long vertical copper tube

A. The magnet moves with continuously increasing velocity and ultimately acquires a constant terminal velocity

B. The magnet moves with continuously decreasing velocity and ultimately comes to rest

C. The magnet moves with continuously increasing velocity but constant acceleration

D. The magnet moves with continuously increasing velocity and acceleration

Answer: A

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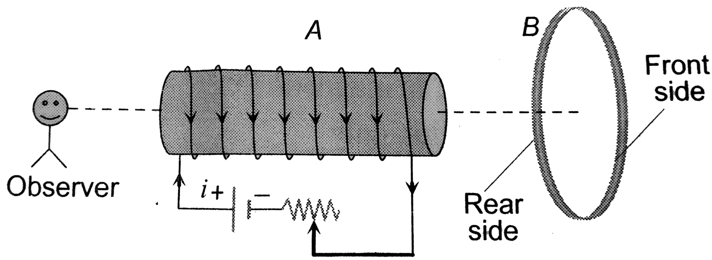
52. An aluminium ring B faces an electromagnet A. The current I through A can be altered



A. Whether I increases or decreases, B will not experience any force

B. If I decrease, A will repel B

C. If I increases, A will attract B

D. If I increases, A will repel B

Answer: D

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53. The magnetic flux linked with a coil at any instant 't' is given by $\phi - 5t - 100t + 300$, the e.m.f. induced in the coil at t = 2 second is

A. $-40V$

B. $40V$

C. $140V$

D. $300V$

Answer: B

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54. A coil has $1,000$ turns and $500cm^2$ as its area. The plane of the coil is placed at right angles to a magnetic induction field of $2\times10^{-5}web/m^2$. The coil is rotated through 180° in 0.2 second. The average emf induced in the coil, in milli volts, is :

A. 5

B. 10

C. 15

D. 20

Answer: B

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55. When a bar magnet falls through a long hollow metal cylinder fixed with its axis vertical, the final acceleration of the magnet is

A. Equal to zero

B. Less than g

C. Equal to g

D. Equal to g in to beginning and then more than g

Answer: A

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56. The magnetic flux linked with a vector area $\vec{A}$ in a uniform magnetic field $\vec{B}$ is

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

B. AB

C. $\vec{B} . \vec{A}$

D. $\frac{B}{A}$

Answer: C

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57. The magnetic flux linked with a circuit of resistance $100 ohm$ increase from 10 to 60 webers. The amount of induced charge that flows in the circuit is (in coulomb)`

A. 0.5

B. 5

C. 50

D. 100

Answer: A

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58. A coil having n turns and resistance $R\Omega$ is connected with a galvanometer of resistance $4R\Omega$. This combination is moved in time t seconds from a magnetic field W_1 weber to W_2 weber. The induced current in the circuit is

A. $-\dfrac{W_2 - W_1}{5Rnt}$

B. $-\dfrac{n(W_2 - W_1)}{5Rnt}$

C. $-\dfrac{(W_2 - W_1)}{Rnt}$

D. $-\dfrac{n(W_2 - W_1)}{Rt}$

Answer: B

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59. If a copper ring is moved quickly towards south pole of a powerful stationary bar magnet, then

A. Current flows through the copper ring

B. Voltage in the magnet increase

C. Current flows in the magnet

D. Copper ring will get magnetised

Answer: A

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60. The magnetic flux linked with coil, in weber is given by the equation, $\phi = 5t^2 + 3t + 16$. The induced emf in the coil in the fourth second is

A. $10V$

B. $30V$

C. $45V$

D. $90V$

Answer: A

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61. The coil of area $0.1 m^2$ has 500 turns. After placing the coil in a magnetic field of strength $4 \times 10^{-4} Wb/m^2$, if rotated through 90° in 0.1 s, the average emf induced in the coil is

A. $0.012V$

B. $0.05V$

C. $0.1V$

D. $0.2V$

Answer: D

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62. Magnetic flux in a circuite containing a coil of resistance 2Ωchange from $2.0Wb$ to $10Wb$ in 0.2 sec. The charge passed through the coil in this time is

A. $0.8C$

B. $1.0C$

C. $5.0C$

D. $4.0C$

Answer: D

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63. An infinitely long cylinder is kept parallel to an uniform magnetic field B directed along positive z-axis. The direction of induced current as seen from the z-axis will be

A. Clockwise of the + ve z axis

B. Anticlockwise of the + ve z axis

C. Zero

D. Along the magnetic field

Answer: C

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64. In a magnetic field of $0.05T$, area of a coil changes from $101cm^2$ to $100cm^2$ without changing the resistance which is 2Ω. The amount of charge that flow during this period is

A. 2.5×10^{-6}coulomb

B. 2×10^{-6}coulomb

C. 10^{-6}coulomb

D. 8×10^{-6}coulomb

Answer: A

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65. If a coil of 40 turns and area $4.0 cm^2$ is suddenly remove from a magnetic field, it is observed that a charge of $2.0 \times 10^{-4} C$ flows into the coil. If the resistance of the coil is 80Ω, the magnetic flux density in Wb/m^2 is

A. 0.5

B. 1.0

C. 1.5

D. 2.0

Answer: B

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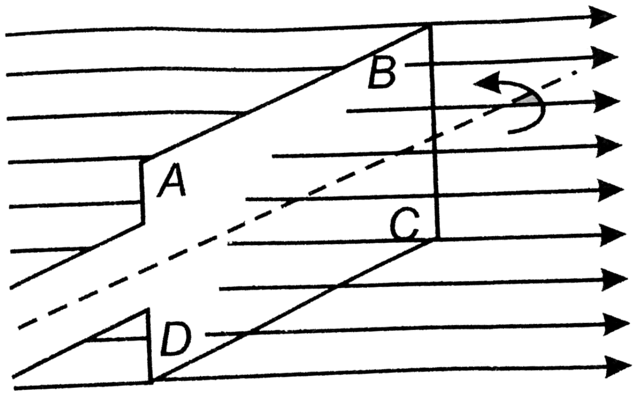
66. A rectangular coil ABCD is rotated anticlockwise with a uniform angular velocity about the axis shown In the fig. the axis of rotation of the coil as well as the magnetic field B are horizontally.the induced emf in the coilwould be minimum when the plane of the coil



A. The plane of the coil is horizontal

B. The plane of the coil makes an angle of 45° with the magnetic field

C. The plane of the coil is at right angles to the magnetic field

D. The plane of the coil makes an angle of 30^{o} with the magnetic field

Answer: A

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67. A 10 metre wire kept in east-west falling with velocity 5 m/sec perpendicular to the field $0.3 \times 10^{-4} Wb/m^2$. The induced e.m.f. across the terminal will be

A. $0.15V$

B. $1.5mV$

C. $1.5V$

D. $15.0V$

Answer: B

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68. An electric potential difference will be induced between the ends of the conductor shown in the diagram when it moves in the direction

A. P

B. Q

C. L

D. M

Answer: D

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69. The two rails of a railway track, insulated from each other and the ground, are connected to a milli voltmeter. What is the reading of the milli voltmeter when a train travels at a speed of $180km/hours$ along the track, given that the vertical components of earth's magnitic field is $0.2 \times 10^{-4} weber / m^2$ & the rails are separated by 1 meter?

A. 10^{-2} volt

B. 10^{-4} volt

C. 10^{-3} volt

D. 1 volt

Answer: C

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70. A conductor of $3m$ in length is moving perpendicularly to magnetic field of 10^{-4} tesla with the speed of $10^2 m / s$, then the e.m.f. produced across the ends of conductor will be

A. 0.03volt

B. 0.3volt

C. 3×10^{-3} volt

D. 3 volt

Answer: B

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71. A wire loop is rotated in a uniform magnetic field about an an axis perpendicular to the field. The direction of the current induced in the loop reverses once each

A. $\frac{1}{4}$ revolution

B. $\frac{1}{2}$ revolution

C. 1 revolution

D. 2 revolution

Answer: B

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72. An aeroplane in which the distance between the tips of wings is $50m$ is flying horizontal with a speed of

$360km/hr$ over a place where the verticle components of earth magnetic field is $2.0 \times 10^{-4} webr/m^2$. The potential different between the tips of wings would be

A. 0.1 V

B. 1.0 V

C. 0.2 V

D. 0.01 V

Answer: B

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73. A copper disc of radius $0.1m$ rotates about its centre with 10 revolutuion per second in a uniform magnetic field of 0.1 tesla. The emf induced across the radius of the disc is

A. $\frac{\pi}{10}V$

B. $\frac{2\pi}{10}V$

C. $\pi \times 10^{-2}V$

D. $2\pi \times 10^{-2}V$

Answer: C

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74. A metal conductor of length 1m rotates vertically about one of its ends at angular velocity 5 radians per second. If the horizontal component of earth's magnetic field is $0.2 \times 10^{-4} T$, then the emf developed between the two ends of hte conductor is

A. $5mV$

B. $5 \times 10^{-4} V$

C. $50mV$

D. $50\mu V$

Answer: D

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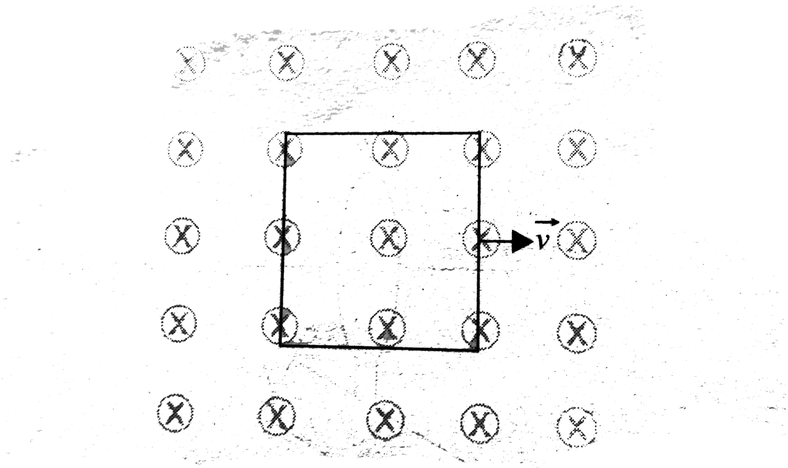
75. Conducting square loop of side L and resistance R moves in its plane with a uniform velocity v perpendicular to one of its sides. A magnetic induction B, constant in time and space, pointing perpendicular and into the plane of the loop exists everywhere.

The current induced in the loop is



A. $\dfrac{Blv}{R}$ clockwise

B. $\dfrac{Blv}{R}$ anticlockwise

C. $\frac{2Blv}{R}$ anticlockwise

D. Zero

Answer: D

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76. A player with 3 meter long iron rod runs toward east with a speed of $30km/hr$. Horizontal component of eath's magnetic field is $4 \times 10^{-5} Wb/m^2$. If he runs with the rod in horizontal and vertical position, then the potential difference induced between the two ends of the rod in the two cases will be

A. Zero in vertical position and $1 \times 10^{-3} V$ in horizontal position

B. $1 \times 10^{-3} V$ in vertical position and zero is horizontal position

C. Zero in both cases

D. $1 \times 10^{-3} V$ in both cases

Answer: B

Watch Video Solution

77. A coil of area 80 square cm and 50 turns is rotating with 2000 revolution per minut about an axis perpendicular to a magnetic field field of 0.05 Telsa. The maximum value of the e.m.f. developed in it is

A. $200\pi \text{volt}$

B. $\frac{10\pi}{3}\text{volt}$

C. $\frac{4\pi}{3}\text{volt}$

D. $\frac{2}{3}\text{volt}$

Answer: C

Watch Video Solution

78. A conducing rod of length l is falling with a velocity v perpendicular to a unifrorm horizontal magnetic field

B . The potential difference between its two ends will be

A. 2Blv

B. Blv

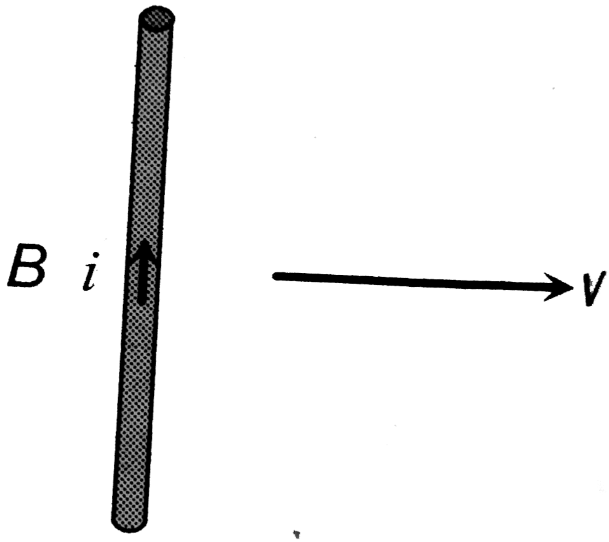
C. $\frac{1}{2}Blv$

D. $B^2l^2v^2$

Answer: B

Watch Video Solution

79. A conducting wire is moving towards right in a magnetic field B. The direction of induced current in the wire is shown in the figure. The direction of magenetic field will be



A. In the plane of paper pointing towards right

B. In the plane of paper pointing towards left

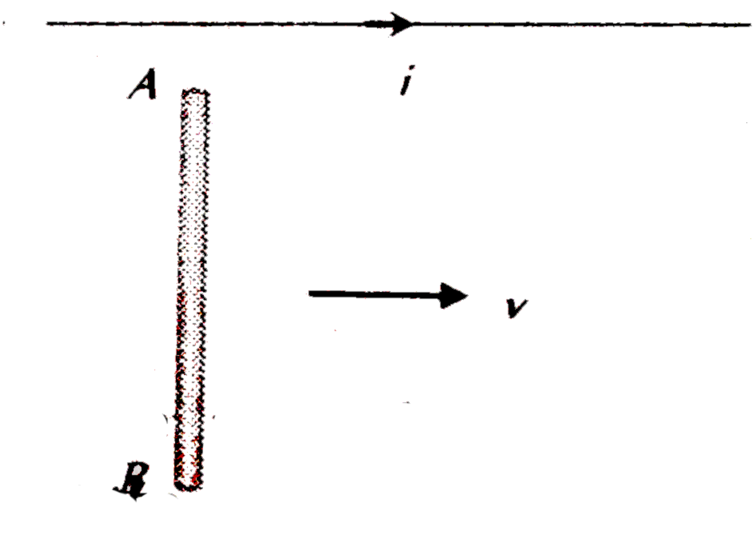
C. Perpendicular to the plane of paper and downwards

D. Perpendicular to the plane of paper and upwards

Answer: C

Watch Video Solution

80. The current carrying wire and the rod AB are in the same plane. The rod moves parallel to the wire with a velocity v . Which one of the following statements is true about induced emf in the rod



A. End A will be at lower potential with respect to B

B. A and B will be at the same potential

C. There will be no induced e.m.f. in the rod

D. Potential at A will be higher than that at B

Answer: D

Watch Video Solution

81. A long horizontal metallic rod with length along the east-west direction is falling under gravity. The potential difference between its two ends will

A. Be zero

B. Be constant (c) Increase with time (d) Decrease with time

C. Increase with time

D. Decrease with time

Answer: C

Watch Video Solution

82. A two metre wire is moving with a velocity of 1 m/sec perpendicular to a magnetic field of $0.5\text{weber} / m^2$. The e.m.f. induced in it will be

A. 0.5 volt

B. 0.1 volt

C. 1 volt

D. 2 volt

Answer: C

Watch Video Solution

83. A metal rod moves at a constant velocity in a direction perpendicular to its length. A constant, uniform magnetic field exists in space in a direction perpendicular to the rod as well as its velocity. Select the correct statements(s) from the following

A. The entire rod is at the same electric potential

B. There is an electric field in the rod

C. The electric potential is highest at the centre of the rod and decreases towards its ends

D. The electric potential is lowest at the centre of the rod and increases towards its ends

Answer: B

Watch Video Solution

84. The magnetic induction in the region between the pole faces of an electromagnet is 0.7 weber/m 2. The induced e.m.f. in a straight conductor 10 cm long, perpendicular to B and moving perpendicular both to magnetic induction and its own length with a velocity 2 m/sec is

A. $0.08V$

B. $0.14V$

C. $0.35V$

D. $0.07V$

Answer: B

Watch Video Solution

85. A straight conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to the magnetic field of intensity of $0.9Wb/m^2$. The induced e.m.f. across the conductor will be

A. $7.25V$

B. $3.75V$

C. $1.25V$

D. $2.52V$

Answer: D

Watch Video Solution

86. A coil of N turns and mean cross-sectional area A is rotating with uniform angular velocity ω about an axis at right angle to uniform magnetic field B. The induced emf E in the coil will be

A. $NBA \sin \omega t$

B. $NB\omega \sin \omega t$

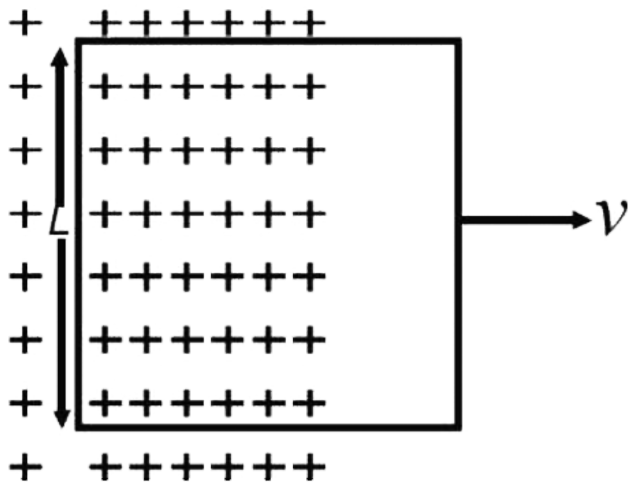
C. $NB / A \sin \omega t$

D. $NBA\omega \sin \omega t$

Answer: D

Watch Video Solution

87. A conduting square loop of side L and resistnce R moves in its plane with a uniform velocity v perpendicular to one of its sides. A magnitude induction B constant in time and space, pointing perpendicular and into to plane at the loop exists every with half the loop outside the field, as shown in figure. The induced emf is



A. Zero

B. RvB

C. VBl/R

D. VBl

Answer: D

Watch Video Solution

88. A wheel with ten metallic spokes each $0.50m$ long is rotated with a speed of $120rev/\min$ in a plane normal to the earth's magnetic field at the place. If the magnitude of the field is 0.4 gauss, the induced e.m.f. between the axle and the rim of the wheel is equal to

A. $1.256 \times 10^{-3} V$

B. $6.28 \times 10^{-4} V$

C. $1.256 \times 10^{-4} V$

D. $6.28 \times 10^{-5} V$

Answer: D

Watch Video Solution

89. A metal rod of length $2m$ is rotating with an angular velocity of $100 rad / \sec$ in a plane perpendicular to a uniform magnetic field of $0.3T$. The potential difference between the ends of the rod is

A. $30V$

B. $40V$

C. $60V$

D. $600V$

Answer: C

Watch Video Solution

90. The wing span of an aeroplane is 20 metre. It is flying in a field, where the verticle component of magnetic field of earth is 5×10^{-5} tesla, with velocity $360km/h$. The potential difference produced between the blades will be

A. $0.10V$

B. $0.15V$

C. $0.20V$

D. $0.30V$

Answer: A

Watch Video Solution

91. A horizontal straight conductor when placed along south-north direction falls under gravity, there is

A. A current will be induced from South to North

B. A current will be induced from North to South

C. No induce e.m.f. along the length of conductor

D. An induced e.m.f. is generated along the length of conductor

Answer: C

Watch Video Solution

92. A rectangular coil of 300 turns has an average area of average area of $25cm \times 10cm$ the cooil rotates with a speed of $50cps$ in a uniform magnetic field of strength $4 \times 10^{-2}T$ about an axis perpendicular of the field. The peak value of the induced e.m.f. is (in volt)`

A. 3000π

B. 300π

C. 30π

D. 3π

Answer: C

Watch Video Solution

93. A rod of length 20 cm is rotating with angular speed of 100 rps in a magnetic field of strength 0.5 T about it's one end . What is the potential difference betweet two ends of the rod :

A. $2.28V$

B. $4.28V$

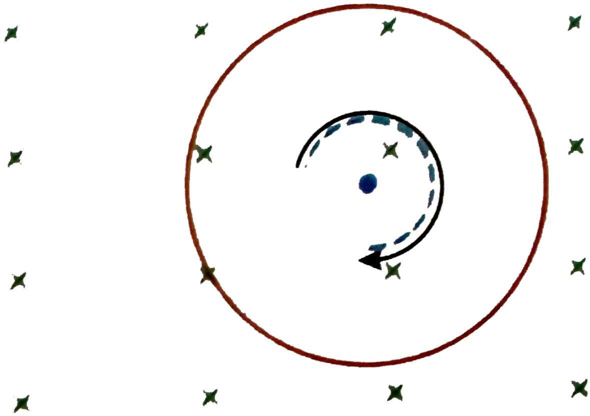
C. $6.28V$

D. $2.5V$

Answer: C

Watch Video Solution

94. A non-conducting disk of radius R is rotating about its own axis with constant angular velocity ω in a perpendicular uniform magnetic field B as shown in figure. The emf induced between centre and rim of disk is



A. $\pi\omega BR^2$

B. ωBR^2

C. $\pi\omega R/2$

D. $\omega BR^2/2$

Answer: D

Watch Video Solution

95. A circular coil of mean radius of $7cm$ and having 4000 turns Is rotate at the rate of 1800 revolution per minute in the earth 's magnetic field (B=0.5 gauss), the maximum e.m.f. induced in coil will be

A. $1.158V$

B. $0.58V$

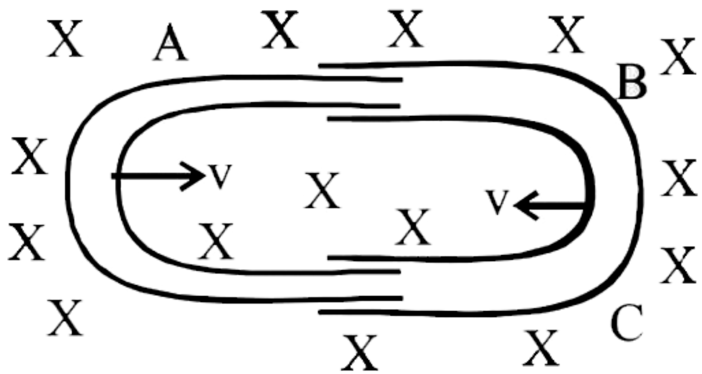
C. $0.29V$

D. $5.8V$

Answer: B

Watch Video Solution

96. One conducting U tube can slide inside another as shown in figure, maintaining electrical contacts between the tubes. The magnetic field B is perpendicular to the plane of the figure. If each tube maoves towards the other at a constant speed v. Then the emf induced in the circuit in terms of B, l and v where l is the width of each tube will be



A. Zero

B. $2Blv$

C. Blv

D. $-Blv$

Answer: B

Watch Video Solution

97. The magnitude opf the earth's magnetic field at a place is B_0 and the angle of dip is δ . A horizontal conductor of length l , lying north-south, moves eastward with a velocity v . The emf induced across the rod is

A. Zero

B. $B_0 lv \sin \delta$

C. $B_0 lv$

D. $B_0 lv \cos \delta$

Answer: B

Watch Video Solution

98. The back e.m.f. induced in a coil, when current change from 1 ampere to zero in one millisecond , is 4 volts, the self-inductance of the coil is

A. 1H

B. 4H

C. $10^{-3}H$

D. $4 \times 10^{-3}H$

Answer: D

Watch Video Solution

99. An e.m.f. of 5volt is produced by a self-inductance, when the current changes at a steady rate from $3A$ to $2A$ 1millisecond. The value of self-inductance is

A. Zero

B. 5 H

C. 5000 H

D. 5mH

Answer: D

Watch Video Solution

100. A 50 mH coil carries a current of 2 ampere. The energy stored in joules is

A. 1

B. 0.1

C. 0.05

D. 0.5

Answer: B

Watch Video Solution

101. The current passing through a choke coil of 5 hery is decreasing at the rate of $2ampere/\sec$. The e.mf. Devlopeing across the coil is

A. $10V$

B. $-10V$

C. $2.5V$

D. $-2.5V$

Answer: A

Watch Video Solution

102. Average energy stored in a pure inductance L when current i flows through it, is

A. Li^2

B. $2Li^2$

C. $\frac{Li^2}{4}$

D. $\frac{Li^2}{2}$

Answer: D

Watch Video Solution

103. A solenoid has 2000 turns wound over a length of $0.3m$. Its cross-sectional area is equal to $1.2 \times 10^{-3} m^2$. Around its central cross-section a coil of 300 turns in wound. If an initial current of $2A$ flowing in the solenoid is reversed in $0.25s$, the emf induced in the coil is

A. $6 \times 10^{-4} V$

B. $4.8 \times 10^{-3} V$

C. $6 \times 10^{-2} V$

D. $48mV$

Answer: D

Watch Video Solution

104. A coil is wound as a transformer of rectangular cross section. If all the linear dimension of the transformer are increased by a factor 2 and the number of turns per unit length of the coil remain the same, the self-inductance increased by a factor of

A. 16

B. 12

C. 8

D. 4

Answer: C

Watch Video Solution

105. Two coils of self-inductance L_1 and L_2 are placed closed to each other so that total flux in one coil is completely linked with other. If M is mutual inductance between them, then

A. $M = L_1 L_2$

B. $M = L_1 / L_2$

C. $M = \sqrt{L_1 L_2}$

D. $M = (L_1 L_2)^2$

Answer: C

Watch Video Solution

106. The momentum in mechanics is expressed as $m \times v$. The analogous expression in electricity is

A. $I \times Q$

B. $I \times V$

C. $L \times I$

D. $L \times Q$

Answer: C

Watch Video Solution

107. In what form is the energy stored in an inductor or

A coil of inductance L is carrying a steady current i .

What is the nature of its stored energy

A. Magnetic

B. Electrical

C. Both magnetic and electrical

D. Heat

Answer: A

Watch Video Solution

108. The coefficient of self-inductance of a solenoid is $0.18mH$. If a crude of soft iron of relative permeability

900 is inserted, then the coeffcient of self-inductance will become nearly

A. $5.4 mH$

B. $162 mH$

C. $0.006 mH$

D. $0.0002 mH$

Answer: B

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109. In a transformer , the coefficient of mutual inductance between the primary and the secondary coil is 0.2 henry. When the current changes by 5 ampere//second in the primary, the induced e.m.f. in the secondary will be

A. 5V

B. 1V

C. 25 V

D. 10 V

Answer: B

Watch Video Solution

110. When the current in a coil changeg from 8 amperes to 2 amperes in 3×10^{-2} seconds, the e.m.f. induced in the coil is 2 volt. The self-inductance of the coil (in millihenry) is

A. 1

B. 5

C. 20

D. 10

Answer: D

Watch Video Solution

111. The mutual inductance between two coils is 1.25 henry. If the current in the primary changes at the rate of $80 ampere / \sec ond$, then the induced e.m.f. in the secondary is

A. $12.5V$

B. $64.0V$

C. $0.016V$

D. $100.0V$

Answer: D

Watch Video Solution

112. A coil of wire of a certain radius has 600 turns and a self-inductance of $108mH$. The self-inductance of a 2^{nd} similar coil of 500 turns will be

A. $74mH$

B. $75mH$

C. $76mH$

D. $77mH$

Answer: B

Watch Video Solution

113. When the number of turns in a coil is doubled without any change in the length of the coil, its self-inductance becomes

A. Four times

B. Doubled

C. Halved

D. Unchanged

Answer: A

Watch Video Solution

114. The average e.m.f. induced in a coil in which the current changes from 2 ampere to 4 ampere in 0.05 second is 8 volt . What is the self inductance of the coil ?

A. $0.1H$

B. $0.2H$

C. $0.4H$

D. $0.8H$

Answer: B

Watch Video Solution

115. If a current of 3.0 amperes flowing in the primary coil is reduced to zero in 0.001 second, then the induced e.m.f. in the secondary coil is 15000volts. The mutual inductance between the two coils is

A. 0.5 henry

B. 5 henry

C. 1.5 henry (d) 10 henry

D. 10 henry

Answer: B

Watch Video Solution

116. An e.m.f. of 12volts is induced in a given coil when the current in it changes at the rate of 48 amperes per minute. The self-inductance of the coil is

A. 0.25 henry

B. 15 henry

C. 1.5 henry

D. 9.6 henry

Answer: B

Watch Video Solution

117. A closely wound coil of 100 turns and area of cross-section $1cm^2$ has a coefficient of self-induction $1mH$. The magnetic induction in the centre of the core of the coil when a current of $2A$ flows in it, will be

A. $0.022Wbm^{-2}$

B. $0.4Wbm^{-2}$

C. $0.8Wbm^{-2}$

D. $1Wbm^{-2}$

Answer: A

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118. Two circuits have coefficient of mutual induction of 0.09 henry. Average e.m.f. induced in the secondary by a change of current from 0 to 20 ampere in 0.006 second in the primary will be

A. $120V$

B. $80V$

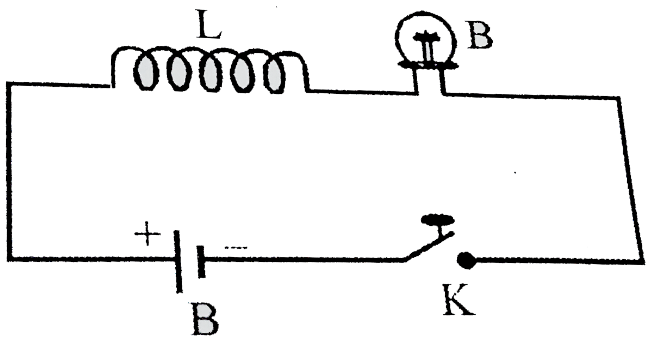
C. $200V$

D. $300V$

Answer: D

Watch Video Solution

119. In the circuit of Fig, the bulb will become suddenly bright if



A. Contact is made or broken

B. Contact is made

C. Contact is broken

D. Won't become bright at all

Answer: C

Watch Video Solution

120. Two pure inductors each of self-inductance L are connected in parallel but are well separted from each other. The total inductance is

A. $2L$

B. L

C. $\frac{L}{2}$

D. $\frac{L}{4}$

Answer: C

Watch Video Solution

121. A coil and a bulb are connected in series with a dc source, a soft iron core is then inserted in the coil. Then

A. Intensity of the bulb remains the same

B. Intensity of the bulb decreases

C. Intensity of the bulb increases

D. The bulb ceases to glow

Answer: B

Watch Video Solution

122. Self induction of a solenoid is

A. Directly proportional to current flowing through the coil

B. Directly proportional to its length

C. Directly proportional to area of cross-section

D. Inversely proportional to area of cross-section

Answer: C

Watch Video Solution

123. Mutual inductance of two coils can be increased by

A. Decreasing the number of turns in the coils

B. Increasing the number of turns in the coils

C. Winding the coils on wooden core

D. None of the above

Answer: B

Watch Video Solution

124. The self inductance of a coil is 5 henry , a current of 1 amp change to 2 amp within 5 second through the coil. The value of induced e.m.f. will be

A. 10 volt

B. 0.10 volt

C. 1.0 volt

D. 100 volt

Answer: C

Watch Video Solution

125. The unit of inductance is

A. Volt/ampere

B. Joule/ampere

C. Volt sec/ampere

D. Volt - ampere/sec

Answer: C

126. The current flowing in a coil of self-inductance $0.4mH$ is increased by $250mA$ in 0.1 sec. the e.m.f. induced will be

A. $+1V$

B. $-1V$

C. $+1mV$

D. $-1mV$

Answer: D

127. $5cm$ long solenoid having 10 ohm resistance and $5mH$ induced is joined to a 10 volt battery. At steady state the current through the solenoid in apmpere will be

A. 5

B. 2

C. 1

D. Zero

Answer: B

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128. When current in a coil changes to 2 ampere from 8 ampere in 3×10^{-3}, the e.m.f. induced in the coil is 2 volt. The self-inductance of the coil in millihenry is

A. 1

B. 5

C. 20

D. 10

Answer: A

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129. An ideal coil of 10 henry is joined in series with a resistance of 5 ohm and a battery of 5 volt. 2 second after joining, the current flowing in ampere in the circuit will be

A. e^{-1}

B. $(1-e^{-1})$

C. $(1-e)$

D. e

Answer: B

Watch Video Solution

130. The number of turns of primary and secondary coils of a transformer are 5 and 10 respectively and the mutual inductance of the tranformar is 25 henry. Now the number of turns in the primary and secondary of the transformar are made 10 and 5 respectivaly. The mutual inductance of the transformar in henry will be

A. 6.25

B. 12.5

C. 25

D. 50

Answer: C

Watch Video Solution

131. The inductance of a coil is $60\mu H$. A current in this coil increase from $1.0A$ to $1.5A$ in 0.1 second. The magnitude of the induced e.m.f. is

A. $60 \times 10^{-6}V$

B. $300 \times 10^{-4}V$

C. $30 \times 10^{-4}V$

D. $3 \times 10^{-4}V$

Answer: D

Watch Video Solution

132. A circular coil of radius 5 cm has 500 turns of a wire. The approximate value of the coefficient of self-induction of the coil will be

A. 25 millihenry

B. 25×10^{-3} millihenry

C. 50×10^{-3} millihenry

D. 50×10^{-3} henry

Answer: A

Watch Video Solution

133. An e.m.f. of 100 millivolts is induced in a coil when the current in another nearby coil becomes 10 ampere from zero in 0.1 second. The coefficient of mutual induction between the two coils will be

A. 1 millihenry

B. 10 millihenry

C. 100 millihenry

D. 1000 millihenry

Answer: A

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134. In a coil of self-inuctance 0.5 henry, the current varies at a constant rate from zero to 10 amperes in 2 seconds. The e.m.f. generated in the coil is

A. 10 volts

B. 5 volts

C. 2.5 volts

D. 1.25 volts

Answer: C

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135. A coil of self-inductance 50 henry is joined to the terminals of a battery of e.m.f. 2 volts through a resistance of $10 ohm$ and a steady current is flowing through the circuit. If the battery is now disconnected, the time in which the current will decay to $1/e$ of its steady value is

A. 500 seconds

B. 50 seconds

C. 5 seconds

D. 0.5 seconds

Answer: C

Watch Video Solution

136. The self inductance of a solenoid of length L, area of cross-section A and having N turns is-

A. $\frac{\mu_0 N^2 A}{L}$

B. $\frac{\mu_0 N A}{L}$

C. $\mu_0 N^2 L A$

D. $\mu_0 N A L$

Answer: A

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137. The self inductance of a coil is L . Keeping the length and area same, the number of turns in the coil is increased to four times. The self inductance of the coil will now be

A. $\frac{1}{4}L$

B. L

C. 4L

D. 16 L

Answer: D

Watch Video Solution

138. The mutual inductance between a primary and secondary circuit is $0.5H$. The resistance of the primary and the secondary circuits are $20 ohms$ and $5 ohms$ respectvely. To genrate a current of $0.4A$ in the secondary,current in the primary must be changed at the rate of

A. $4.0A/s$

B. $16.0A/s$

C. $1.6A/s$

D. $8.0A/s$

Answer: A

Watch Video Solution

139. The energy stored in a 50 mH inductor carrying a current of 4 A will be

A. $0.4J$

B. $4.0J$

C. $0.8J$

D. $0.04J$

Answer: A

Watch Video Solution

140. The average e.m.f. induced in a coil in which the current changes from 2 amperes to 4 amperes in 0.05 seconds is 8 volts. What is the self-inductance of the coil?

A. $0.1H$

B. $0.2H$

C. $0.4H$

D. $0.8H$

Answer: B

Watch Video Solution

141. If the current is halved in a coil, then the energy stored is how much times the previous value

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. 2

D. 4

Answer: B

Watch Video Solution

142. The SI unit of inductance, the henry can be written as

A. Weber/ampere

B. Volt - second/ampere

C. $\text{Joule}/(\text{ampere})^2$

D. Ohm - second

Answer: A::B::C::D

Watch Video Solution

143. A varying current in a coil change from $10A$ to $0A$ in $0.5 \sec$. If the average emf induced in the coil is $220V$, the self inductance of the coil is

A. 5H

B. 10 H

C. 11H

D. 12H

Answer: C

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144. Which of the following is wrong statement

A. An emf can be induced between the ends of a straight conductor by moving it through a uniform magnetic field

B. The self induced emf produced by changing current in a coil always tends to decrease the current

C. Inserting an iron core in a coil increases its coefficient of self induction

D. According to Lenz's law, the direction of the induced current is such that it opposes the flux change that causes it

Answer: B

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145. A coil has an inductance of $2.5H$ and a resistance of 0.5Ω. If the coil is suddenly connected across a 6.0 volt battery, then the time required for the current to rise 0.63 of its final value is

A. $3.5 \sec$

B. $4.0 \sec$

C. $4.5 \sec$

D. $5.0 \sec$

Answer: D

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146. When the number of turns and the length of the solenoid are doubled keeping the area of cross-section same, the inductance

A. Remains the same

B. Is halved

C. Is doubled

D. Becomes four times

Answer: C

Watch Video Solution

147. A $100mH$ coil carries a current of 1 ampere. Energy stored in its magnetic field is

A. $0.5J$

B. 1J

C. $0.05J$

D. $0.1J$

Answer: C

Watch Video Solution

148. The mutual inductance of an induction coil is 5H . In the primary coil, the current reduces from 5 A to zero in $10^{-3}s$. What is the induced emf in the secondary coil

A. $2500V$

B. $25000V$

C. $2510V$

D. Zero

Answer: B

Watch Video Solution

149. The self-inductance of a straight conductor is

A. Zero

B. Very large

C. Infinity

D. Very small

Answer: A

Watch Video Solution

150. The coefficient of mutual inductance when magnetic flux change by $2 \times 10^{-2} Wb$ and current changes by $0.01 A$, will be

A. 2 henry

B. 3 henry

C. $\frac{1}{2}$ henry

D. Zero

Answer: A

Watch Video Solution

151. The current in a coil changes from 4 ampere to zero in $0.1s$. If the average e.m.f. induced is 100 volts, what is the self-inductance of the coil?

A. $2.5H$

B. $25H$

C. $400H$

D. $40H$

Answer: A

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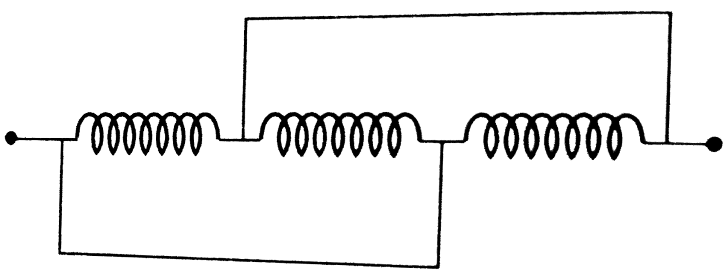
152. Pure inductance of $3.0H$ is connected as shown below. The equivalent inductance of the circuit is



A. 1H

B. 2H

C. 3H

D. 9H

Answer: A

Watch Video Solution

153. A varying current at the rate of $3A/s$ in a coil generates an e.m.f. of $8mV$ in a nearby coil. The mutual inductance of the two coils is

A. $2.66mH$

B. $2.66 \times 10^{-3} mH$

C. $2.66H$

D. $0.266H$

Answer: A

Watch Video Solution

154. If a current of $10A$ flows in one second through a coil and the induced e.m.f. is $10V$, then the self-inductance of the coil is

A. $\frac{2}{5}H$

B. $\frac{4}{5}H$

C. $\frac{5}{4}H$

D. 1H

Answer: D

Watch Video Solution

155. the inductance of a closed-packed coil of 400 turns is $8mH. A$ current of $5mA$ is passed through it. The magnetic flux through each turn of the coil is

A. $\frac{1}{4\pi}\mu_0 Wb$

B. $\frac{1}{2\pi}\mu_0 Wb$

C. $\frac{1}{3\pi}\mu_0 Wb$

D. $0.4\mu_0 Wb$

Answer: A

Watch Video Solution

156. If in a coil rate of change of area is $\frac{5meter^2}{milli\sec ond}$ and current become $1amp$ from $2amp$ in 2×10^{-3} sec. if magnetic field is 1 Tesla then self-inductance of the coil is

A. $2H$

B. $5H$

C. $20H$

D. $10H$

Answer: D

Watch Video Solution

157. The inductance of a solenoid $0.5m$ long of cross-sectional area $20cm^2$ and with 500 turns is

A. $12.5mH$

B. $1.25mH$

C. $15.0mH$

D. $0.12mH$

Answer: B

Watch Video Solution

158. The equivalent inductance of two inductances is 2.4 henry when connected in parallel and 10 henry when connected in series. The difference between the two inductance is

A. 2 henry

B. 3 henry

C. 4 henry

D. 5 henry

Answer: A

Watch Video Solution

159. An e.m.f. of 12volts is produced in a coil when the current in it changes at the rate of $45amp/\min ute$. The inductance of the coil is

A. 0.25 henry

B. 1.5 henry

C. 9.6 henry

D. 16.0 henry

Answer: D

Watch Video Solution

160. An average induced e.m.f. of $1V$ appears in a coil when the current in it is changed from $10\ A$ in one direction to $10A$ in opposite direction in 0.5 sec. self-inductance of the coil is

A. $25mH$

B. $50mH$

C. $75mH$

D. $100mH$

Answer: A

Watch Video Solution

161. A coil of resistance 10Ω and an inductance $5H$ is connected to a 100 volt battery. Then energy stored in the coil is

A. 125 erg

B. 125 J

C. 250 erg

D. 250 J

Answer: D

Watch Video Solution

162. If a change in current of $0.01A$ in one coil produces change in magnetic flux of $1.2 \times 10^{-2} Wb$ in the other coil, then the mutual inductance of the two coils in henries

A. 0

B. 0.5

C. 1.2

D. 3

Answer: C

Watch Video Solution

163. Energy stored in a coil of self inductance 40 mH carrying a steady current of 2 A is

A. $0.8J$

B. $8J$

C. $0.08J$

D. $80J$

Answer: C

Watch Video Solution

164. A solenoid of length l metre has self-inductance L henry. If number of turns are doubled, its self-inductance

A. Remains same

B. Becomes 2L henry

C. Becomes 4 L henry

D. Becomes $\frac{L}{\sqrt{2}}$ henry

Answer: C

Watch Video Solution

165. Two coils A and B having turns 300 and 600 respectively are placed near each other, on passing a current of 3.0 ampere in A, the flux linked with A is 1.2×10^{-4} and with B it is 9.0×10^{-5} weber. The mutual inuctance of the system is

A. 2×10^{-5} henry

B. 3×10^{-5} henry

C. 4×10^{-5} henry

D. 6×10^{-5} henry

Answer: B

Watch Video Solution

166. In a circular conducting coil, when current increases from $2A$ to $18A$ in 0.05 sec., the induced e.m.f. is $20V$. The self-inductance of the coil is

A. $62.5mH$

B. $6.25mH$

C. $50mH$

D. None of these

Answer: A

Watch Video Solution

167. Find out the e.m.f. produced when the current change from 0 to $1A$ in 10 second, given L=10mH`

A. $1V$

B. $1\mu V$

C. $1mV$

D. $0.1V$

Answer: B

Watch Video Solution

168. Which of the following is not the unit of self inductance

A. Weber/Ampere

B. Ohm - Second

C. Joule A mpere

D. Joule Ampere^{-2}

Answer: C

Watch Video Solution

169. A coil of 100 turns carries a current of $5mA$ and creates a magnetic flux of 10^{-5}weber. The inductance is

A. $0.2mH$

B. $2.0mH$

C. $0.02mH$

D. None of these

Answer: B

Watch Video Solution

170. In circular coil, when no. of turns is doubled and resistance becomes $\frac{1}{4}th$ of initial, then inductance becomes

A. 4 times

B. 2 times

C. 8 times

D. No change

Answer: A

Watch Video Solution

171. The current in a coil of inductance $5H$ decreases at the rate of $2A / s$. The induced e.m.f. is

A. 2 V

B. 5 V

C. 10 V

D. $-10V$

Answer: C

Watch Video Solution

172. The self-induced e.m.f in a $0.1H$ coil when the current in it is changing at the rate of $200 ampere / \sec ond$ is

A. $8 \times 10^{-4} V$

B. $8 \times 10^{-5} V$

C. $20V$

D. $125V$

Answer: C

Watch Video Solution

173. Two circuits have mutual inductance of 0.1 H . What average e.m.f. is induced in one circuit when the current in the other circuit changes from 0 to 20 A in 0.02 s

A. 240 V

B. 230 V

C. 100 V

D. 300 V

Answer: C

Watch Video Solution

174. An air core solenoid has 1000turns and is one metre long. Its cross-sectional area is $10cm^2$. Its self-inductance is

A. 0.1256 mH

B. 12.56 mH

C. 1.256 mH

D. 125.6 mH

Answer: C

Watch Video Solution

175. The coefficient of mutual inductance of two coils is $6mH$. If the current flowing in one is 2 ampere, then the induced e.m.f. in the second coil will be

A. 3 mV

B. 2 m V

C. 3 V

D. Zero

Answer: D

Watch Video Solution

176. An L-R circuit has a cell of e.m.f. E , which is switched on at time t = 0. The current in the circuit after a long time will be

A. Zero

B. $\frac{E}{R}$

C. $\frac{E}{L}$

D. $\frac{E}{\sqrt{L^2 + R^2}}$

Answer: B

Watch Video Solution

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

A. The currents in the two coils

B. The rates at which currents are changing in the two coils

C. Relative position and orientation of the two coils

D. The materials of the wires of the coils

Answer: C

Watch Video Solution

178. When the current changes from $+2A \rightarrow -2A$ in 0.05 second, an e.m.f. of 8 V is induced in a coil. The coefficient of self - induction of the coil is

A. 0.1 H

B. 0.2 H

C. 0.4 H

D. 0.8 H

Answer: A

Watch Video Solution

179. A coil resistance 20Ω and inductance $5H$ is connected with a $100V$ battery. Energy stored in the coil will be

A. $41.5J$

B. $62.50J$

C. $125J$

D. $250J$

Answer: B

Watch Video Solution

180. Why the current does not rise immediately in a circuit containing inductance

A. Because of induced emf

B. Because of high voltage drop

C. Because of low power consumption

D. Because of Joule heating

Answer: A

Watch Video Solution

181. Two circular coils have their centres at the same point. The mutual inductance between them will be maximum when their axes

A. Are parallel to each other

B. Are at 60° to each other

C. Are at 45° to each other

D. Are perpendicular to each other

Answer: A

Watch Video Solution

182. The current in a coil decreases from 1 A to 0.2 A. In 10 sec. Calculate the coefficient of self inductance. If induced emf is 0.4 volt .

A. 5 H

B. 3H

C. 4 H

D. 2H

Answer: A

Watch Video Solution

183. The current through choke coil increases form zero to 6 A in 0.3 seconds and an induced e.m.f. of 30 V is produced. The inductance of the coil of choke is

A. 5 H

B. 2.5 H

C. 1.5 H

D. 2H

Answer: C

Watch Video Solution

184. the resistance and inductance of series circuit are 5Ω and $20H$ respectively. At the instant of closing the switch, the current is increasing at the rate $4A - s$. The supply voltage is

A. 20 V

B. 80 V

C. 120 V

D. 100 V

Answer: B

Watch Video Solution

185. A coil of $N = 100$ turns and area $1cm^2$ carries a current $I = 5A$ and creates a magnetic flux $\varphi = 10^{-5}Tm^{-2}$ .The value of its inductance L will be

A. $0.05mH$

B. $0.10mH$

C. $0.15mH$

D. $0.20mH$

Answer: D

Watch Video Solution

186. Two identicaly induction coils each of inductance L joined in series are placed very close to each other such that the winding direction of one is exactly opposite to that of the other, what is the net inductance?

A. L

B. 2L

C. $L/2$

D. Zero

Answer: D

Watch Video Solution

187. If the current $30A$ flowing in the primary coil is made zero in 0.1 sec. the emf induced in the secondary coil is 1.5 volt. The mutual inductance between the coil is

A. $0.05H$

B. $1.05H$

C. $0.1H$

D. $0.2H$

Answer: A

Watch Video Solution

188. Eddy currents are used in

A. Induction furnace

B. Electromagnetic brakes

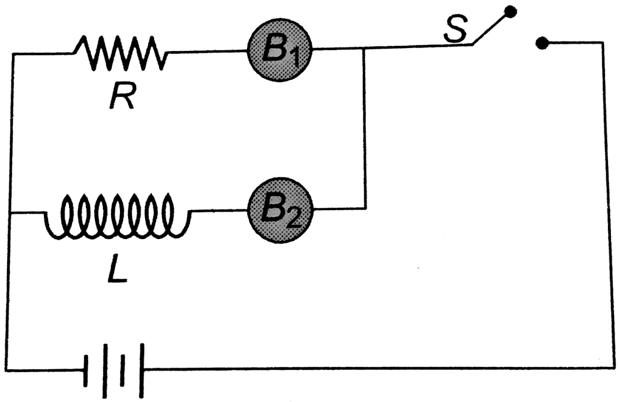
C. Speedometers

D. All of these

Answer: D

Watch Video Solution

189. The adjoining figure shows two bulbs B_1 and B_2 resistor R and an inductor and L. When the switch S is turned off



A. Both B_1 and B_2 die out promptly

B. Both B_1 and B_2 die out with some delay

C. B_1 dies out promptly but B_2 with some delay

D. B_2 dies out promptly but B_1 with some delay

Answer: C

Watch Video Solution

190. In L - R circuit, for the case of increasing current, the magnitude of current can be calculated by using the formula

A. $I = I_0 e^{-Rr/L}$

B. $I = I_0 \left(I - e^{-Rt/L}\right)$

C. $I = I_0 \left(I - e^{Rt/L}\right)$

D. $I = I_0 e^{Rt/L}$

Answer: B

Watch Video Solution

191. An inductance L and a resistance R are first connected to a battery. After some time the battery is disconnected but L and R remain connected in a closed circuit. Then the current reduces to 37% of its initial value in

A. RL sec

B. $\dfrac{R}{L}$ sec

C. $\dfrac{L}{2}$ sec

D. $\dfrac{1}{LR}$ sec

Answer: C

Watch Video Solution

192. In an LR-circuit, time constant is that time in which current grows from zero to the value (where I_0 is the steady state current)

A. $0.63I_0$

B. $0.50I_0$

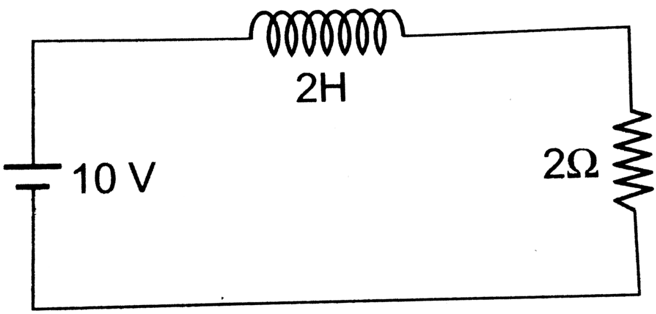
C. $0.37I_0$

D. I_0

Answer: A

Watch Video Solution

193. In the figure magnetic energy stored in the coil is



A. Zero

B. Infinite

C. 25 joules

D. None of the above

Answer: C

Watch Video Solution

194. A capacitor is fully changed with a battery. Then the battery is removed and a coil is connected with the capacitor in parallel, current varies as

A. Increases monotonically

B. Decreases monotonically

C. Zero

D. Oscillates indefinitely

Answer: D

Watch Video Solution

195. A coil of $40H$ inductance is connected in series with a resistance of 8 ohm and the combination is joined to the terminals of a $2V$ battery. The time constant of the circuit

A. 40 seconds

B. 20 seconds

C. 8 seconds

D. 5 seconds

Answer: D

Watch Video Solution

196. A solenoid has an inductance of 60 henrys and a resistance of 30 ohms. If it is connected to a 100 volt battery. How long will it take for the current to reach $\frac{e-1}{e} \cong 63.2\%$ of its final value

A. 1 second

B. 2 second

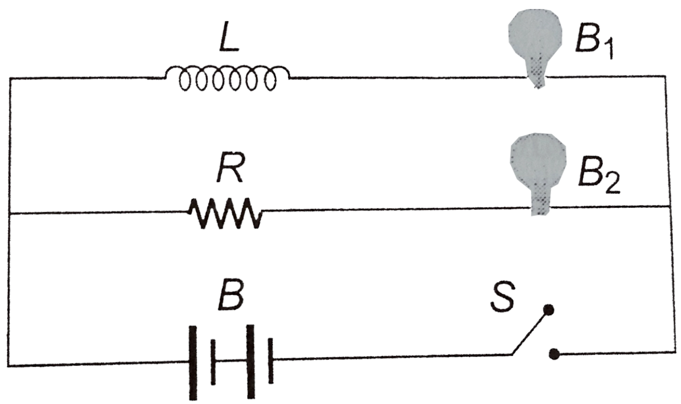
C. e second

D. 2e second

Answer: B

Watch Video Solution

197. An inductor L , a resistance R and two identical bulbs, B_1 and B_2 are connected to a battery through a switch S as shown in the figure. The resistance R is the same as that of the coil that makes L .Which of the following statement gives the correct description of the happenings when the switch S is closed



A. The bulb B_2 lights up earlier than B_1 and finally both the bulbs shine equally bright

B. B_1 light up earlier and finally both the bulbs acquire equal brightness

C. B_2 lights up earlier and finally B_1 shines brighter than B_2

D. B_1 and B_2 light up together with equal brightness all the time

Answer: C

Watch Video Solution

198. The time constant of an LR circuit represents the time in which the current in the circuit

A. Reaches a value equal to about 37% of its final value

B. Reaches a value equal to about 63% of its final value

C. Attains a constant value

D. Attains 50% of the constant value

Answer: B

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199. A LC circuit is in the state of resonance. If $C = 0.1 \mu F$ and $L = 0.25$ henry. Neglecting ohmic resistance of circuit what is the frequency of oscillations?

A. 1007 Hz

B. 100 Hz

C. 109 Hz

D. 500 Hz

Answer: A

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200. An oscillator circuit consists of an inductance of $0.5mH$ and a capacitor of $20\mu F$. The resonant frequency of the circuit is nearly

A. $15.92Hz$

B. $159.2Hz$

C. $1592Hz$

D. $15910Hz$

Answer: C

Watch Video Solution

201. A coil of inductance $300mh$ and resistance 2Ω is connected to a source of voltage $2V$. The current reaches half of its steady state value in

A. 0.15 s

B. 0.3 s

C. 0.05 s

D. 0.1 s

Answer: D

Watch Video Solution

202. A coil having an inductance of 0.5 H carries a current which is uniformly varying from zero to 10 ampere in 2 second. The e.m.f. (in volts) generated in the coil is

A. 10

B. 5

C. 2.5

D. 1.25

Answer: C

Watch Video Solution

203. The square root of the product of inductance and capacitance has the dimension of

A. Length

B. Mass

C. Time

D. No dimension

Answer: C

Watch Video Solution

204. Which of the following does not depend upon the magnetic effect of some sort

A. Moving coil galvanometer

B. Hot wire ammeter

C. Dynamo

D. Electric motor

Answer: B

Watch Video Solution

205. plane of eddy currents make an angle with the plane of magnetic lines of force equal to

A. 40°

B. 0°

C. 90°

D. 180°

Answer: C

Watch Video Solution

206. which of ther following is constructed on the principle of electromagnetic induction?

A. Galvanometer

B. Electric motor

C. Generator

D. Voltmeter

Answer: C

Watch Video Solution

207. The core of any transformaer is laminated so as to

A. Eddy currents

B. Hysteresis

C. Resistance in winding

D. None of these

Answer: A

Watch Video Solution

208. What is a dead beat galvanometer?

A. Eddy currents are produced in the conducting frame over which the coil is wound

B. Its magnet is very strong

C. Its pointer is very light

D. Its frame is made of abonite

Answer: A

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209. The device that does not work on the principle of mutual induction is

A. Induction coil

B. Motor

C. Tesla coil

D. Transformer

Answer: C

Watch Video Solution

210. Eddy currents are produced in a matterial when it is

A. A metal is kept in varying magnetic field

B. A metal is kept in the steady magnetic field

C. A circular coil is placed in a magnetic field

D. Through a circular coil, current is passed

Answer: A

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211. If rotational velocity of a dynamo armature is doubled, then induced e.m.f. will become

A. Half

B. Two times

C. Four times

D. Unchanged

Answer: B

Watch Video Solution

212. What type of dynamo is used in a bicycle?

A. Electrical energy into mechanical energy

B. Mechanical energy into electrical energy

C. Chemical energy into mechanical energy

D. Mechanical energy into chemical energy

Answer: B

Watch Video Solution

213. The working of dynamo is based on principle of

A. Electromagnetic induction

B. Conversion of energy into electricity

C. Magnetic effects of current

D. Heating effects of current

Answer: A

Watch Video Solution

214. Choke coil works on the principle of

A. Transient current

B. Self induction

C. Mutual induction

D. Wattless current

Answer: B

Watch Video Solution

215. when the speed of a dc motor increase the armature current

A. Increases

B. Decreases

C. Does not change

D. Increases and decreases continuously

Answer: B

Watch Video Solution

216. Dynamo core is laminated because

A. Magnetic field increases

B. Magnetic saturation level in core increases

C. Residual magnetism in core decreases

D. Loss of energy in core due to eddy currents decreases

Answer: D

Watch Video Solution

217. Armature current in dc motor will be maximum when

A. Motor has acquired maximum speed

B. Motor has acquired intermediate speed

C. Motor has just started moving

D. Motor is switched off

Answer: C

Watch Video Solution

218. The armature of dc motor has 20Ω resistance. It draws current of 1.5 ampere when run by 220 volts dc supply.

the value of back e.m.f. induced in it will be

A. 150 V

B. 170 V

C. 180 V

D. 190 V

Answer: D

Watch Video Solution

219. The number of turns in the coil of an ac genrator is 5000 and the area of the coil is $0.25m^2$. The coil is rotate at the rate of $100\text{cycles}/\text{sec}$ in a magnetic field of $0.2W/m^2$. The peak value of the emf generated is nearly

A. 786 kV

B. 440 kV

C. 220 kV

D. 15.71 kV

Answer: D

Watch Video Solution

220. In a dc motor, induced e.m.f. will be maximum

A. When motor takes maximum speed

B. When motor starts rotating

C. When speed of motor increases

D. When motor is switched off

Answer: A

Watch Video Solution

221. Work of electric motor is

A. To convert ac into dc

B. To convert dc into ac

C. Both (a) and (b)

D. To convert ac into mechanical work

Answer: D

Watch Video Solution

222. An electric motor operating on a $60V$ dc supply draws a currrent of $10A$. If the effeciency of the motor is 50%, the resistance of its winding is

A. 3Ω

B. 6Ω

C. 15Ω

D. 30Ω

Answer: A

Watch Video Solution

223. Name the device which converts electrical energy into mechanical energy.

A. Dynamo

B. generator

C. Electric motor

D. Induction coil

Answer: C

Watch Video Solution

224. An electric motor operating on a $50Vdc$ supply draws a current of $12A$. If the efficiency of the motor is 30% ,estimate the resistance of the windings of the motor.

A. 6Ω

B. 4Ω

C. 2.9Ω

D. 3.1Ω

Answer: C

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225. A motor having an armature of resistance 2Ω is designed to operate at $220V$ mains. At full speed, it devlops a back e.m.f. of $210V$. When the motor is running at full speed, the current in the armature is

A. $5A$

B. 105A

C. 110A

D. 215 A

Answer: A

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226. Fan is based on

A. Electric Motor

B. Electric dynamo

C. Both

D. None of these

Answer: A

Watch Video Solution

227. A transformer is employed to

A. Obtain a suitable dc voltage

B. Convert dc into ac

C. Obtain a suitable ac voltage

D. Convert ac into dc

Answer: C

Watch Video Solution

228. What is increase in step-down transformer?

A. Voltage

B. Current

C. Power

D. Current density

Answer: B

Watch Video Solution

229. The core of any transformaer is laminated so as to

A. Ratio of voltage in the primary and secondary may be increased

B. Rusting of the core may be stopped

C. Energy losses due to eddy currents may be reduced

D. Change in flux is increased

Answer: C

Watch Video Solution

230. Why is soft iron preferred for making the core of a transformer?

A. Hysteresis losses

B. Eddy current losses

C. Force opposing electric current

D. None of the above

Answer: A

Watch Video Solution

231. The transformation ratio in the step-down transformer is

A. 1

B. Greater than one

C. Less than one

D. The ratio greater or less than one depends on the other factors

Answer: B

Watch Video Solution

232. In a transformer 220 ac voltage is increased to 2200 volts. If the number of turns in the secondary are `2000, then the number of turns in the primary will be

A. 200

B. 100

C. 50

D. 20

Answer: A

Watch Video Solution

233. The ratio of secondary to the primary turns in a transformer is $3:2$. If the power output be P, then the input power neglecting all loses must be equal to

A. $5P$

B. $1.5P$

C. P

D. $\frac{2}{5}P$

Answer: C

Watch Video Solution

234. The primary winding of a transformer has 100 turns and its secondary winding has 200 turns. The primary is connected to an ac supply of $120V$ and the current flowing in it is $10A$. The voltage and the current in the secondary are

A. $240V, 5A$

B. $240V, 10A$

C. $60V, 20A$

D. $120V, 20A$

Answer: A

Watch Video Solution

235. A step-down transformer is connected to 2400 volts line and 80 amperes of current is found to flow in output load. The ratio of the turns in primary and secondary coil is $20:1$. if transformer efficiency is 100%, then the current flowing in primary coil will be

A. $1600A$

B. $20A$

C. $4A$

D. $1.5A$

Answer: C

Watch Video Solution

236. A loss free transformer has 500 turns on its primary winding and 2500 in secondary. The meters of the secondary indicate 200 volts at 8 amperes under these condition. The voltage and current in the primary is

A. $100V, 16A$

B. $40V, 40A$

C. $160V, 10A$

D. $80V, 20A$

Answer: B

Watch Video Solution

237. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac is $28V$. The r.m.s. secondary voltage is nearest to

A. 50 V

B. 70 V

C. 100 V

D. 40 V

Answer: A

Watch Video Solution

238. A transformer is employed to reduce $220V$ to $11V$. The primary draws a current of $5A$ and the secondary $90A$. The efficiency of the transformer is

A. 20%

B. 40%

C. 70%

D. 90%

Answer: D

Watch Video Solution

239. in a step-up transformer, the turn ratio is $1:2$ leclanche cell (e.m.f. 1.5V) is connected across the primary. The voltage devloped in the secondary would be

A. $3.0V$

B. $0.75V$

C. $1.5V$

D. Zero

Answer: D

Watch Video Solution

240. What are eddy currents ? Give some applications of eddy currents. How can the eddy currents be minimised ?

A. By increasing the number of turns in secondary coil

B. By taking laminated core

C. By making step-down transformer

D. By using a weak ac at high potential

Answer: B

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241. A 100% efficient transformer has 100 turns in the primary and 25 turns in its secondary coil. Of the current in the secondary coil is 4 amp, then the current in the primary coil is

A. 1 amp

B. 4 amp

C. 8 amp

D. 16 amp

Answer: A

Watch Video Solution

242. In a lossless transformer an alternating current of 2 amp is flowing in the primary coil. The number of turns in the primary and secondary coils are 100 and 20 respectively. The value of the current in the secondary coil is

A. $0.08A$

B. $0.4A$

C. $5A$

D. $10A$

Answer: D

Watch Video Solution

243. A transformer connected to 220 volt line shows an output of $2A$ at 11000 volt. The efficiency is 100%. The current drawn from from the line is

A. $100A$

B. $200A$

C. $22A$

D. $11A$

Answer: A

Watch Video Solution

244. The coils of a step down transformer have 500 and 5000 turns. In the primary coil an ac of 4 ampere at 2200 volts is sent. The value of the current and potential difference in the secondary coil will be. (Assume $100\ \%$ efficiency for the transformer)

A. 20A, 220 V

B. 0.4 A, 22000 V

C. 40 A, 220 V

D. 40 A, 22000 V

Answer: C

Watch Video Solution

245. A power transformer is used to step up an alternating e.m.f. of $220V$ to $11kv$ to trannsmit $4.4kW$ of power. If the primary coil has 1000 turns, what is the current rating of the secondary?(Assume 100% efficiency for the transformer)

A. 4A

B. 0.4 A

C. 0.04A

D. 0.2 A

Answer: B

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246. A step up transformer connected to a $220 V AC$ line is to supply $22 kV$ for a neon sign in secondary circuit. In primary circuit a fuse wire is connected which is to blow when the current in the secondary circuit exceeds $10 mA$. The turn ratio of the transformer is

A. 50

B. 100

C. 150

D. 200

Answer: B

Watch Video Solution

247. In a transformer the primary has 500 turns and secondary has 50 turns . 100 volts are applied to the primary coil, the voltage developed in the secondary will b

A. 1 V

B. 10 V

C. 1000 V

D. 10000 V

Answer: B

Watch Video Solution

248. A transformer is used to step down a.c.voltage. What appliance do you use to step down d.c. voltage ?

A. Change the alternating potential

B. Change the alternating current

C. To prevent the power loss in alternating current flow

D. To increase the power of current source

Answer: A

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249. A step up transformer operates on a $230V$ line and a load current of 2 ampere. The ratio of the primary and secondary windings is $1:25$. What is the current in the primary?

A. $15A$

B. $50A$

C. $25A$

D. $12.5A$

Answer: B

Watch Video Solution

250. The number of turns in the primary coil of a transformer is 200 and the number of turns in the secondary coil is 10 if 240 volt AC is applied to the primary, the output from the secondary will be

A. $48V$

B. $24V$

C. $12V$

D. $6V$

Answer: C

Watch Video Solution

251. The primary winding of transformer has 500 turns whereas its secondary has 5000 turns. The primary is connected to an ac supply of $20V, 50Hz$. The secondary will have an output of

A. 200 V, 50 Hz

B. 2 V, 50 Hz

C. 200 V, 500 Hz

D. 2V, 5 Hz

Answer: A

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252. A step-up transformer has transformation ratio of $3:2$ what is the voltage in secondary if voltage in primary is $30V$?

A. $45V$

B. $15V$

C. $90V$

D. $300V$

Answer: A

Watch Video Solution

253. In a transformer, the number of turns in primary coil and secondary coil are 5 and 4 respectively. If 240 V is applied on the primary coil, then the ratio of current in primary and secondary coil is

A. $4:5$

B. $5:4$

C. $5:9$

D. $9:5$

Answer: A

Watch Video Solution

254. A step-down transformer is connected to main supply $200V$ to operate a $6V, 30W$ bulb. The current in primary is

A. 3A

B. $1.5A$

C. $0.3A$

D. $0.15A$

Answer: D

Watch Video Solution

255. the number of turns in primary and secondary coils of a transformer are 100 and 20 respectively. If an alternating potential of 200 volt is applied to the primary, the induced potential in secondary will be

A. 10 V

B. 40 V

C. 1000 V

D. 20, 000 V

Answer: B

Watch Video Solution

256. The ratio of secondry to the primary turns in a trans is $9:4$. If the power input be P, what will be the ratio of power output (neglect all losses) to power input

A. $4:9$

B. $9:4$

C. $5:4$

D. $1:1$

Answer: D

Watch Video Solution

257. The magnitude of the e.m.f. across the secondary of a transformer does not depend on

A. Voltage in the primary coil

B. Ratio of number of turns in the two coils

C. Frequency of the source

D. Both (a) and (b)

Answer: C

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258. A step down transformer has turn ration $100/1$. If secondary coil has $4amp$ current then current in primary coil is

A. $4A$

B. $0.04A$

C. $0.4A$

D. $400A$

Answer: B

Watch Video Solution

259. In a step-up transformer the turn ratio is $1:10$. A resistance of 200 ohm connected across the secondary is drawing a current of $0.5A$. What is the primary voltage and current?

A. 50 V, 1 amp

B. 10 V , 5 amp

C. 25 V , 4 amp

D. 20 V , 2 amp

Answer: B

Watch Video Solution

260. In a step-up transformer the voltage in the primary is $220V$ and the currrent is $5A$. The secondary voltage is found to be $22000V$. The current in the secondary (neglect losses)is

A. $5A$

B. $50A$

C. $500A$

D. $0.05A$

Answer: D

Watch Video Solution

261. In a transformer, number of turns in the primary coil are 140 and that in the secondry coil are 280. If current i primary ciol is 4A, then that in the secondary coil is

A. $4A$

B. $2A$

C. $6A$

D. $10A$

Answer: B

Watch Video Solution

262. A transformer has 100 turns in the primary coil and carries $8A$ current. If input power is one kilowatt, the number of turns required in the secondary coil to have $500V$ output will be

A. 100

B. 200

C. 400

D. 300

Answer: C

Watch Video Solution

263. An ideal transformer has 500 and 5000 turn in primary and secondary windings respectively. If the primary voltage is connected to a $6V$ battery then the secondary voltage is

A. 0

B. $60V$

C. $0.6V$

D. $6.0V$

Answer: A

Watch Video Solution

264. In a primary coil $5A$ current is flowing on 220 volts. In the secondary coil $2200V$ voltage produces. Then ratio of number of turns in secondary coil and primary coil will be

A. $1:10$

B. $10:1$

C. $1:1$

D. $11:1$

Answer: B

Watch Video Solution

265. A step up transformer has transformation ration $5:3$. What is voltage in secondary if voltage in primary is 60V

A. $20V$

B. $60V$

C. $100V$

D. $180V$

Answer: C

Watch Video Solution

266. In a step up transformers, $220V$ is converted into $200V$. The number of turns in primary coil is 600. What is the number of turns in the secondary coil?

A. 60

B. 600

C. 6000

D. 100

Answer: C

Watch Video Solution

267. The output voltage of a transformer connected to 220 voltl line is 1100 volt at 1amp current. Its efficiency is 100% the current coming from the line is

A. $20A$

B. $10A$

C. $11A$

D. $22A$

Answer: B

Watch Video Solution

268. Quantity that remains unchanged in a transformer is

A. Voltage

B. Current

C. Frequency

D. None of the above

Answer: C

Watch Video Solution

269. In a region of uniform magnetic induction $B=10^{2}$ tesla, a circular coil of radius $30cm$ and resistance π^{2} ohm is rotated about an axis which is perpendicular to the directon of B and which form a diameter of the coil. If the coil rotates at $200\mathrm{rpm}$ the amplitude of the alternating current induced in the coil is

A. $4\pi^{2}mA$

B. $30mA$

C. $6mA$

D. $200mA$

Answer: B

Watch Video Solution

270. In a transformer, the number of turns in primary and secondary are 500 and 2000 respectively. If current in primary is $48A$, the current in the secondary is

A. $12A$

B. $24A$

C. $48A$

D. $144A$

Answer: A

Watch Video Solution

271. In an inductor of inductance $L = 100 mH$, a current of $I = 10A$ is flowing. The energy stored in the inductor is

A. $5J$

B. $10J$

C. $100J$

D. $1000J$

Answer: A

Watch Video Solution

272. The turn ratio of a transformers is given as $2:3$. If the current through the primary coil is $3A$, thus calculate the current through load resistance

A. $1A$

B. $4.5A$

C. $2A$

D. $1.5A$

Answer: C

Watch Video Solution

273. Core of transformer is made up

A. Soft iron

B. Steel

C. Iron

D. Alnico

Answer: A

Watch Video Solution

274. The induction coil works on the principle of

A. Self-induction

B. Mutual induction

C. Ampere's rule

D. Fleming's right hand rule

Answer: B

Watch Video Solution

275. A transformer with efficiency 80% works at $4kW$ and $100V$. If the secondary voltage is $200V$, then the primary and secondary currents are respectively

A. $40A, 16A$

B. $16A, 40A$

C. $20A, 40A$

D. $40A, 20A$

Answer: A

Watch Video Solution

276. In a step up transformer, if ratio of turns of primary to secondary is $1:10$ and primary voltage si $230V$. If the load current is $2A$. Then the current in primary is

A. $20A$

B. $10A$

C. $2A$

D. $1A$

Answer: A

Watch Video Solution

277. If a coil made of conducting wires is rotated between poles pieces of the permanent magnet. The motion will generated a current and this device is called

A. An electric motor

B. An electric generator

C. An electromagnet

D. All of above

Answer: B

Watch Video Solution

278. A step-down transformer is used on a $1000V$ line to deliver $20A$ at $120V$ at the secondary coil. If the efficiency of the transformer is 80% the current drawn from the line is.

A. $3A$

B. $30A$

C. $0.3A$

D. $2.4A$

Answer: A

Watch Video Solution

279. A rod of length l rotates with a uniform angular velocity omega about its perpendicular bisector. A uniform magnetic field B exists parallel to the axis of rotation. The potential difference between the two ends of the lrod is

A. $\frac{1}{2}B\omega l^2$

B. $\frac{3}{4}B\omega l^2$

C. $B\omega l^2$

D. $2B\omega l^2$

Answer: A

Watch Video Solution

280. Two different coils have self-inductances $L_1 = 8mH$ and $L_2 = 2mH$. The current in one coil is increased at a constant rate. The current in the second coil is also increased at the same constant rate. At a certain instant of time, the power given to the two coil is the same. At that time, the current, the induced voltage and the energy stored in the first coil are i_1, V_1 and W_1 respectively. Corresponding values for the second coil at the same instant are i_2, V_2 and W_2 respectively. Then:

A. $\frac{i_1}{i_2} = \frac{1}{4}$

B. $\frac{i_1}{i_2} = 48$

C. $\frac{W_2}{W_1} = 4$

D. $\frac{V_2}{V_1} = \frac{1}{4}$

Answer: A::C::D

Watch Video Solution

281. An e.m.f. of 15 volt is applied in a circuit containing 5 henry inductance and 10 ohm resistance. The ratio of the current at time $t = \infty$ and at $t = 1$ second is

A. $\dfrac{e^{1/2}}{e^{1/2} - 1}$

B. $\dfrac{e^{2}}{e^{2} - 1}$

C. $1 - e^{-1}$

D. e^{-1}

Answer: B

Watch Video Solution

282. The conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 > > R_2$, the mutual inductance M between them will be directly proportional to

A. R_1 / R_2

B. R_2 / R_1

C. R_1^2 / R_2

D. R_2^2 / R_1

Answer: D

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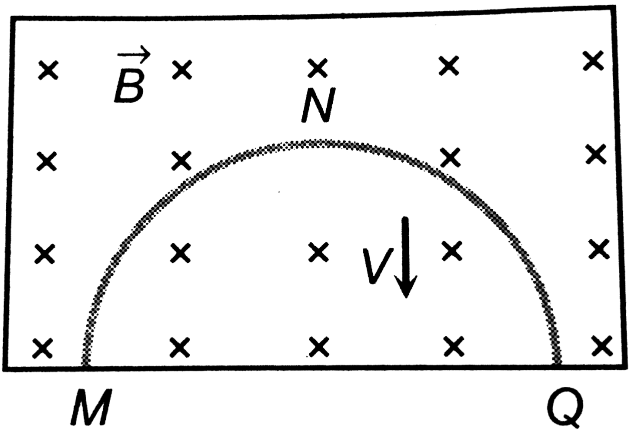
283. A thin semicircular conducting ring of radius R is falling with its plane verticle in a horizontal magnetic inducting B. At the position MNQ, the speed of the ring is V and the potential difference developed across the ring is



A. Zero

B. $Bv\pi R^2/2$ and M is at higher potential

C. πRBV and Q is at higher potential

D. 2 RBV and Q is at higher potential

Answer: D

Watch Video Solution

284. At a plane the value of horizontal component of the eart's magnetic field H is $3 \times 10^{-5} weber / m^2$. A metallic rod AB of length $2m$ placed in east-west direction, having the end A towards east, falls vertically downward with a constant velocity of $50m / s$. which end of the rod becomes positively charged and what is the value of induced potential difference between the two ends?

A. End A, $3 \times 10^{-3} mV$

B. End, A, $3mV$

C. End B, $3 \times 10^{-3} mV$

D. End B, $3mV$

Answer: B

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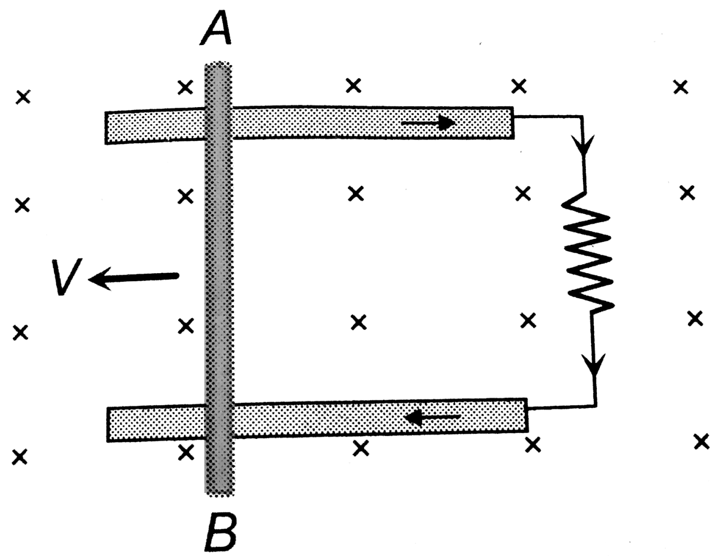
285. Consider the situation shown in the figure. The wire AB is sliding on the fixed rails with a constant velocity. If the wire AB is replaced by semicircular wire, the magnitude of the induced current will



A. Increase

B. Remain the same

C. Decrease

D. Increase or decrease depending on whether the semicircle bulges towards the resistance or away from it

Answer: B

Watch Video Solution

286. A circular loop of radius R, carrying current I, lies in $x-y$ plane with its center at origin. The total magnetic flux through $x-y$ plane is

A. Directly proportional to I

B. Directly proportional to R

C. Directly proportional to R^2

D. Zero

Answer: D

Watch Video Solution

287. Two identical circular loops of metal wire are lying on a table without touching each other. Loop-A carries a current which increases with time. In response, the loop-B

A. Remains stationary

B. Is attracted by the loop-A

C. Is repelled by the loop-A

D. Rotates about its CM, with CM fixed (CM is the centre of mass)

Answer: C

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288. Two coils have a mutual inductance $0.005H$. The current changes in the first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 10A$ and $\omega = 100\pi$ radian//sec`. The maximum value of e.m.f. in the second coil is

A. 2π

B. 5π

C. π

D. 4π

Answer: B

Watch Video Solution

289. A small square loop of wire of side l is placed inside a large square loop of wire of side $L(L > > l)$. The loops are coplanar and their centre coincide. What is the mutual inductance of the system ?

A. l / L

B. l^2 / L

C. L / l

D. L^2 / l

Answer: B

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290. A wire of length $1m$ is moving at a speed of $2ms^{-1}$ perpendicular to its length and a homogeneous magnetic field of $0.5T$. The ends of the wire are joined to a circuit of resistance 6Ω. The rate at which work is being done to keep the wire moving at constant speed is

A. $\frac{1}{12}W$

B. $\frac{1}{6}W$

C. $\frac{1}{3}W$

D. $1W$

Answer: B

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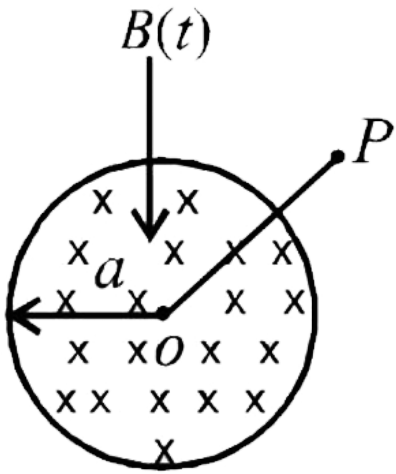
291. A uniform but time-varying magnetic field B(t) exists in a circular region of radius a and is directed into the plane of the paper, as shown. The magnitude of the induced electric field at point P at a distance r from the centre of the circular region



A. Is zero

B. Decreases as $\frac{1}{r}$

C. Increases as r

D. Decreases as $\frac{1}{r^2}$

Answer: B

Watch Video Solution

292. A coil of wire having inductance and resistance has a conducting ring placed coaxially within it. The coil is connected to a battery at time t=0, so that a time-dependent current $1_1(t)$ starts following through the coil. If $I_2(t)$ is the current induced in the ring, and B (t) is the magnetic field at the axis of the coil due to $I_1(t)$

then as a function of time $(t > 0)$, the product $I_2(t)B(t)$

A. Increases with time

B. Decreases with time

C. Does not vary with time

D. Passes through a maximum

Answer: D

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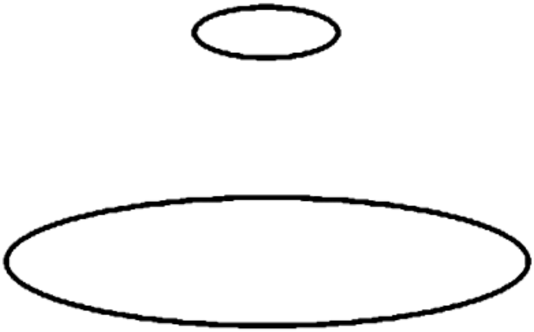
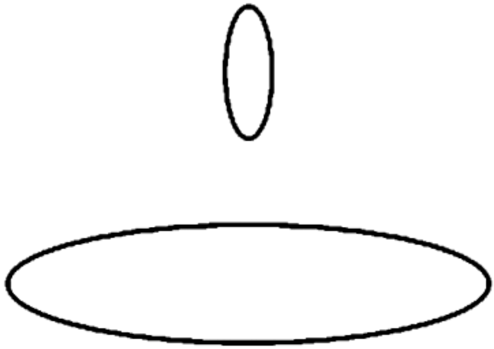
293. Two circular coils can be arranged in any of the three situation shown in the figure. Their mutual inductance will be



(a)

,



(b)

,

(c)

A. Maximum in situation (A)

B. Maximum in situation (B)

C. Maximum in situation (C)

D. The same in all situations

Answer: A

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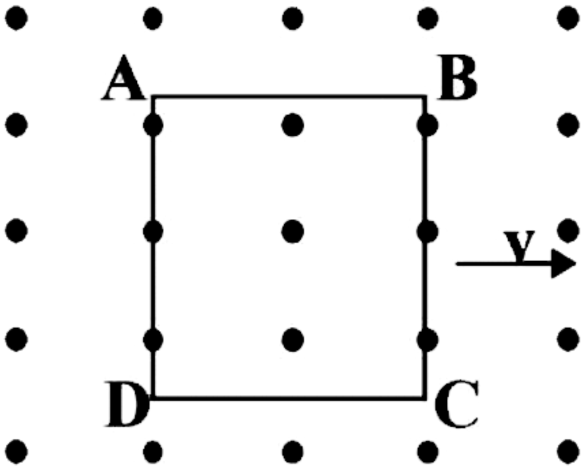
294. A metallic square loop ABCD is moving in its own plane with velocity v in a uniform magnetic field perpendicular to its plane as shown in the figure. An electric field is induced



A. In AD , but not in BC

B. In BC , but not in AD

C. Neither in AD nor in BC

D. In both AD and BC

Answer: D

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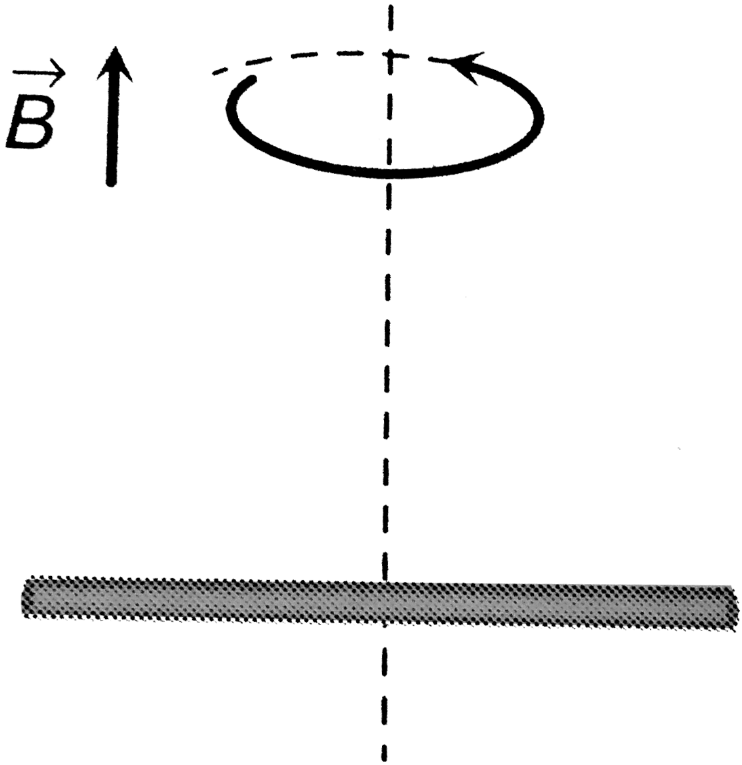
295. A conducting rod of length $2l$ is rotating with constant angular speed w about its perpendicular bisector. A uniform magnetic field B exists parallel to the axis of rotation. The e.m.f. induced between two ends of the rod is



A. $B\omega l$

B. $\frac{1}{2}B\omega l^2$

C. $\frac{1}{8}B\omega l^2$

D. Zero

Answer: D

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296. An inductor of 2 henry and a resistance of 10 ohms are connected in series with a battery of 5 volts. The initial rate of change of current is

A. $0.5 amp/\sec$

B. $2.0 amp/\sec$

C. $2.5 amp/\sec$

D. $0.25 amp/\sec$

Answer: C

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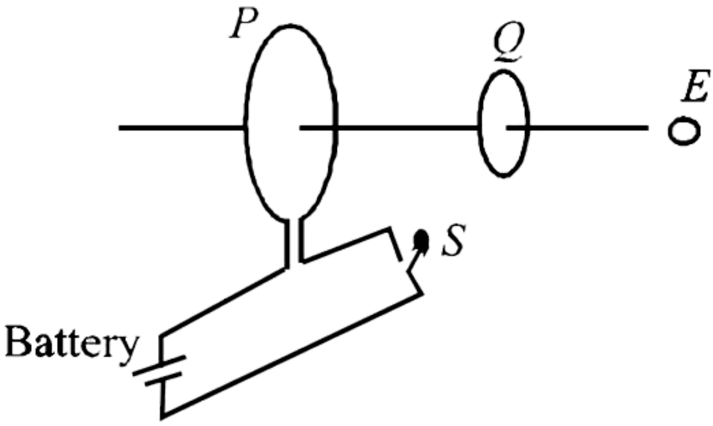
297. As shown in the figure, P and Q are two coaxial conducting loops separated by some distance. When the switch S is closed, a clockwise current I_P (as seen by E) and an induced current I_{Q1} flows in Q. The switch remains closed for a long time. when S is opened, a current I_{Q2} flows in Q. Then the direction

IQ_1 and IQ_2 (as seen by E) are



A. Respectively clockwise and anticlockwise

B. Both clockwise

C. Both anticlockwise

D. Respectively anticlockwise and clockwise

Answer: D

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298. A short-circuited coil is placed in a time-varying magnetic field. Electrical power is dissipated due to the current induced in the coil. If the number of turns were to be quadrupled and the wire radius halved, the electrical power dissipated would be

A. Halved

B. The same

C. Doubled

D. Quadrupled

Answer: B

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299. A physicist works in a laboratory where the magnetic field is $2T$. She wears a necklace enclosing area $0.01m^2$ in such a way that the plane of the necklace is normal to the field and is having a resistance $R = 0.01\Omega$. Because of power failure, the field decays to $1T$ in time 10^{-3} seconds.

The what is the total heat produced in her necklace? $(T = tesla)$

A. $10J$

B. $20J$

C. $30J$

D. $40J$

Answer: A

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300. A coil of inductance $8.4 mH$ and resistance $6\ \Omega$ is connected to a $12V$ battery. The current in the coil is $1.0A$ at approximately the time.

A. $500\ \text{sec}$

B. $20\ \text{sec}$

C. 35 milli sec

D. 1 milli sec

Answer: D

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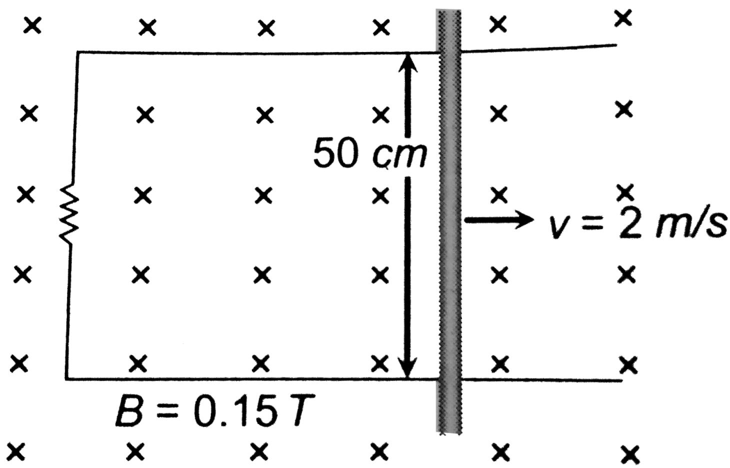
301. As shown in the figure a metal rod makes contact and complete the circuit. The circuite is perpendicular to the magnetic field with $B = 0.15$tesla. If the resistance is 3Ω force needed to move the rod as indicated with a constant speed of $2m / \sec$ is



A. $3.75 \times 10^{-3} N$

B. $3.75 \times 10^{-2} N$

C. $3.75 \times 10^{2} N$

D. $3.75 \times 10^{-4} N$

Answer: A

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302. Two identical coaxial circular loops carry a current i each circulating int the same direction. If the loops approch each other the current in

A. Current in each loop increases

B. Current in each loop remains the same

C. Current in each loop decreases

D. Current in one-loop increases and in the other it decreases

Answer: C

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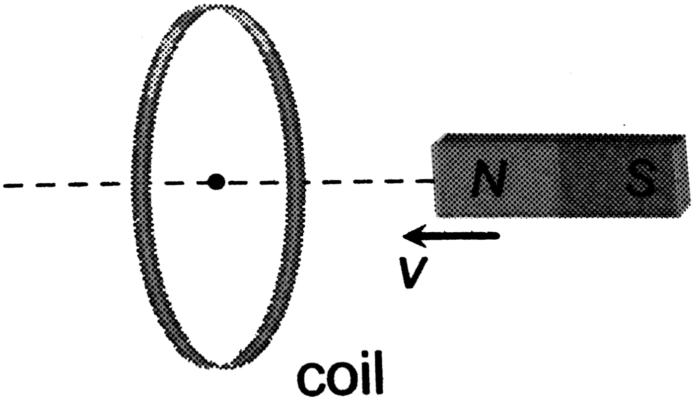
303. In the following figure, the magnet is moved towards the coil with a speed v and induced emf is e. if magnet and coil reced away from one another each moving with speed v, the induced emf in the coil will be



A. e

B. 2e

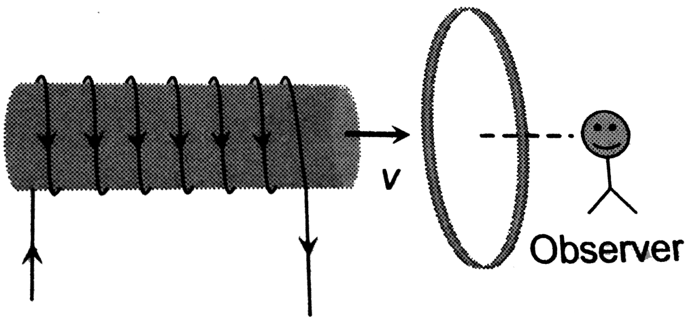
C. $e/2$

D. 4e

Answer: B

Watch Video Solution

304. A current carrying solenoid id approaching a conducting loop as shown in the figure. The direction of induced current as observed by an observer on the other side of the loop will be



A. Anticlockwise

B. Clockwise

C. East

D. West

Answer: B

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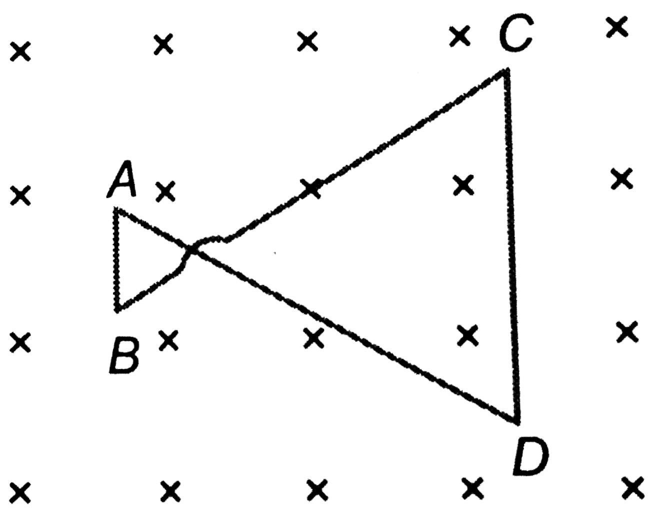
305. A conducting wire frame is placed in a magnetic field which is directed into the paper. The magnetic field is increasing at a constant rate. The direction of induced current in wire AB and CD are



A. B to A and D to C

B. A to B and C to D

C. A to B and D to C

D. B to A and C to D

Answer: A

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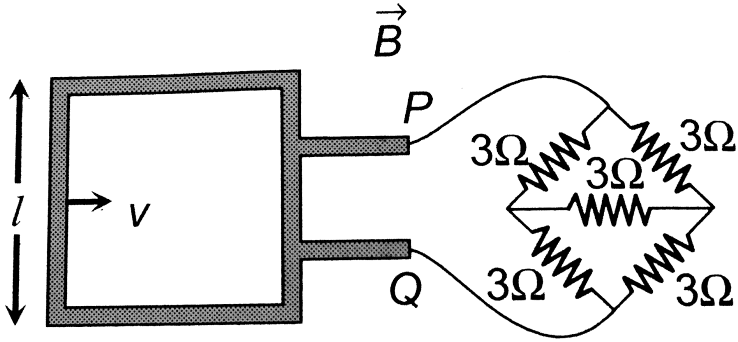
306. A square metallic wire loop of side 0.1 m and resistance of 1Ω is moved with a constant velocity in a magnetic field of $2wb/m^2$ as shown in figure. The magnetic field field is perpendicular to the plane of the loop, loop is coonected to a network of resistances.

what should be the velocity of loop so as to have a steady current of $1mA$ in loop?



A. $1cm/\sec$

B. $2cm/\sec$

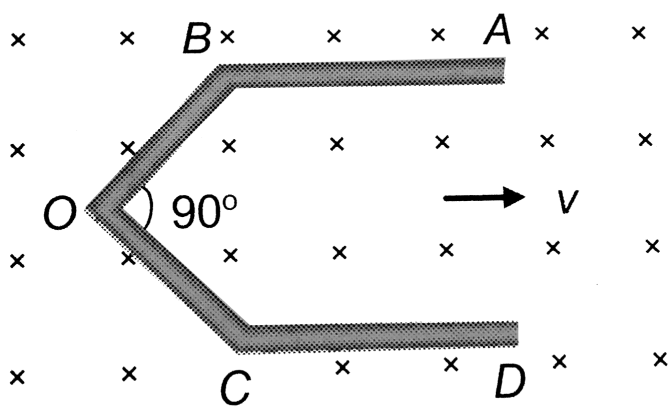
C. $3cm/\sec$

D. $4cm/\sec$

Answer: B

Watch Video Solution

307. A conductor $ABOCD$ moves along its bisector with a velocity of $1m/s$ through a perpendicular magnetic field of $1wb/m^2$, as shown in fig. if all the four sides are of $1m$ length each, then the induced emf between points A and D is



A. 0

B. 1.41 volt

C. 0.71 volt

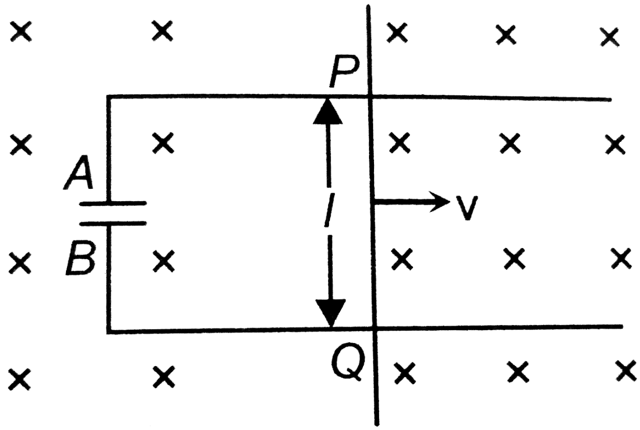
D. None of the above

Answer: B

Watch Video Solution

308. A conducting rod PQ of length $l = 1.0m$ is moving with a uniform speed $v2.0m/s$ in a uniform magnetic field $B = 4.0T$ directed into the paper.

A capacitor of capacity $C = 10\mu F$ is connected as shown in figure. Then



A. $q_A = +80\mu C$ and $q_B = -80\mu C$

B. $q_A = -80\mu C$ and $q_B = +80\mu C$

C. $q_A = 0 = q_B$

D. Charge stored in the capacitor increases exponentially with time

Answer: A

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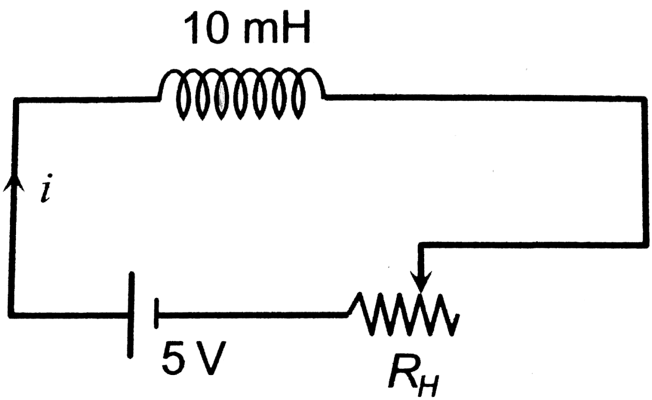
309. The resistance in the following circuit is increase at a particle instant. At this instant the value of resistanc eis 10Ω. The current in the circuit will be now



A. $i = 0.5A$

B. $i > 0.5A$

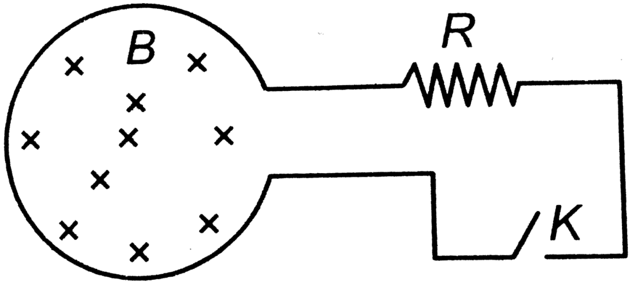
C. $i < 0.5A$

D. $i = 0$

Answer: B

Watch Video Solution

310. Shown in the figure is a circular loop of radius r and resistance R. A varible magnetic field of induction $B = B_0 e^{-t}$ is established inside the coil. If the key (K) is closed, the electrical power devloped right after closing the switch is equal to



A. $\dfrac{B_0^2 \pi r^2}{R}$

B. $\dfrac{B_0 10 r^3}{R}$

C. $\dfrac{B_0^2 \pi^2 r^4 R}{5}$

D. $\dfrac{B_0^2 \pi^2 r^4}{R}$

Answer: D

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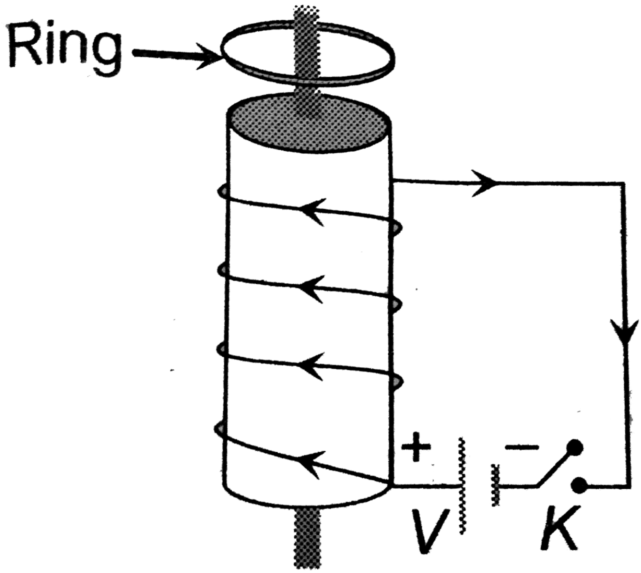
311. A conducting ring is placed around the core of an electromagnet as shown in fig. qhen key K is pressed, the ring



A. Remain stationary

B. Is attracted towards the electromagnet

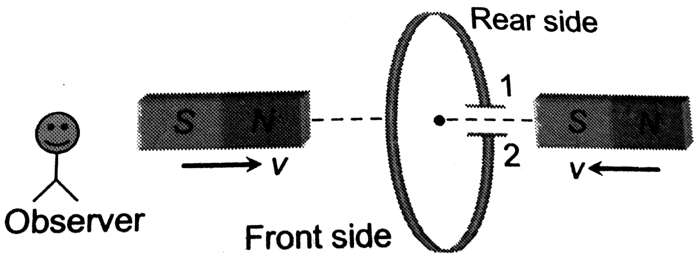
C. Jumps out of the core

D. None of the above

Answer: C

Watch Video Solution

312. The north and south poles of two indential magnets approach a coil, containing a condenser,with equal speeds from opposite sides. Then



A. Plate 1 will be negative and plate 2 positive

B. Plate 1 will be positive and plate 2 negative

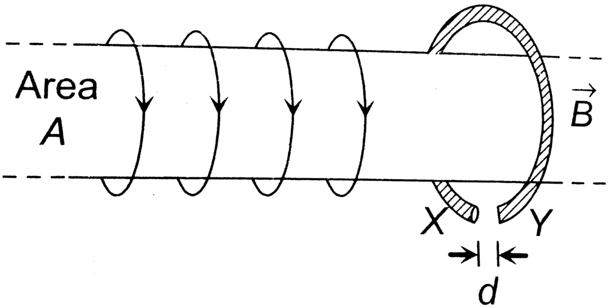
C. Both the plates will be positive

D. Both the plates will be negative

Answer: B

Watch Video Solution

313. A highly conucting ring of radius R is perpendicular to and concentric with the axis of a long solenoid as shown in fig. the ring has a narrow gap of width d in its circumference. The solenoid has cross sectional area A and a uniform internal field of magnitude B_0. Now beginning at $t = 0$, the solenoid current is steadily increased to so that the field magnitude at any time t is given by $B(t) = B_0 + \alpha t$ where $\alpha > 0$. Assuming that no charge can flow across the gap, the end of ring which has excess of positive charge and the magnitude of induced e.m.f. in the ring are respectively



A. $X, A\alpha$

B. $X, \pi R\alpha$

C. $Y, \pi A\alpha$

D. $Y, \pi R\alpha$

Answer: A

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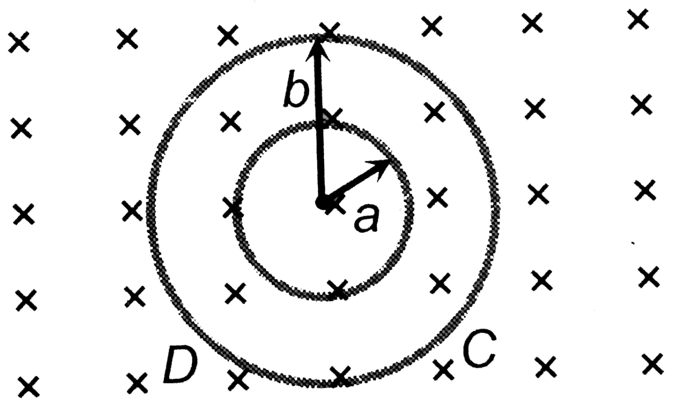
314. Plane figures made of thin wires of resistance $R = 50$ milliohm//metre are located in a uniform magnetic field perpendicular into the plane of the figures and which decrease at the rate $dB/dt = 0.1mT/s$. Then currents in the inner and outer boundary are. (The inner radius $a = 10cm$ and outer radius $b = 20cm$)



A. 10^{-4} (Clockwise), $2 \times 10^{-4} A$ (Clockwise)

B. $10^{-4} A$ (Anticlockwise), $2 \times 10^{-4} A$ (Clockwise)

C. $2 \times 10^{-4} A$ (clockwise), $10^{-4} A$ (Anticlockwise)

D. $2 \times 10^{-4} A$ (Anticlockwise), $10^{-4} A$ (Anticlockwise)

Answer: A

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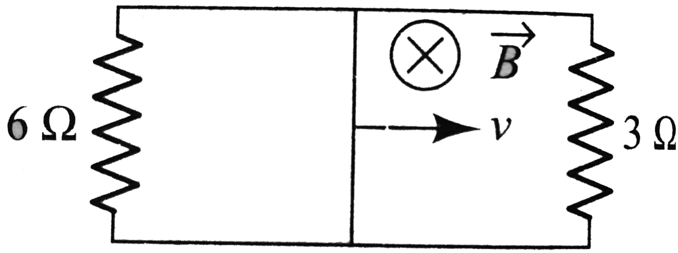
315. A rectangular loop with a sliding connector of length $l = 1.0m$ is situated in a uniform magnetic field $B = 2T$ perpendicular to the plane of loop. Resistance of connector is $r = 2\Omega$. Two resistances of 6Ω and 3Ω are connected as shown in . The external force required to keep the connetor moving with a constant velocity

$v = 2ms^{-1}$ is



A. $6N$

B. $4N$

C. $2N$

D. $1N$

Answer: C

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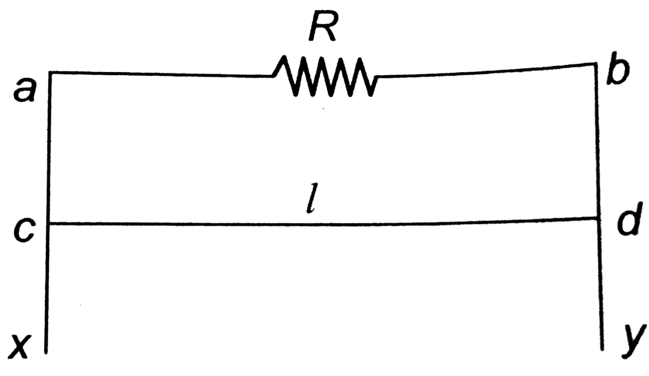
316. A wire cd of length l and mass m is sliding without friction on conducting rails ax and by as shown. The verticle rails are connected to each other with a resistance R between a and b. A uniform magnetic field B is applied perpendicular to the plane $abcd$ such that cd moves with a constant velocity of



A. $\frac{mgR}{Bl}$

B. $\frac{mgR}{B^2 l^2}$

C. $\frac{mgR}{B^3 l^3}$

D. $\frac{mgR}{B^2l}$

Answer: B

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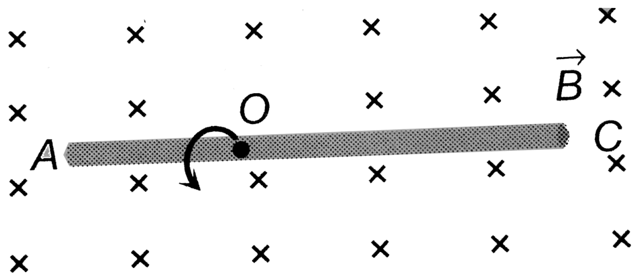
317. A conducting rod AC of length $4l$ is rotate about a point O in a uniform magnetic field $\vec{B}$ directed into the paper. $AO = l$ and $OC = 3l$. Then



A. $V_A - V_O = \frac{B\omega l^2}{2}$

B. $V_O - V_C = \frac{7}{2} B\omega l^2$

C. $V_A - V_C = 4B\omega l^2$

D. $V_C - V_O = \frac{9}{2} B\omega l^2$

Answer: C

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318. How much length of a very thin wire is required to obtain a solenoid of length l_0 and inductance L

A. $\sqrt{\frac{2\pi L l_0}{\mu_0}}$

B. $\sqrt{\frac{4\pi L l_0}{\mu_0^2}}$

C. $\sqrt{\dfrac{4\pi L l_0}{\mu_0}}$

D. $\sqrt{\dfrac{8\pi L l_0}{\mu_0}}$

Answer: C

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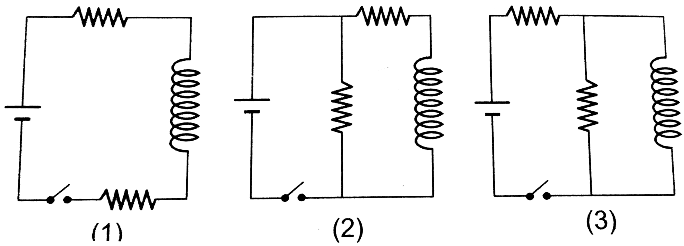
319. The figure shows theree cirrcuit with idential batteries, inductors, and resistors. Rank the circuit according to the current through the battery (i) just after the switch is closed and (ii) a long time later, greatest first



A. (i) $i_2 > i_3 > i_1 (i_1 = 0)$ (ii) $I_2 > i_3 > i_1$

B. (i) $i_2 < i_3 < i_1 (i_1 \neq 0)$ (ii) $I_2 > i_3 > i_1$

C. (i) $i_2 = i_3 = i_1 (i_1 = 0)$ (ii) $i_2 < i_3 < i_1$

D. (i) $i_2 = i_3 > i_1 (i_1 \neq 0)$ (ii) $i_2 > i_3 > i_1$

Answer: A

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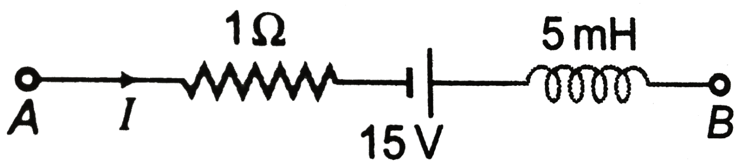
320. The network shown in the figure is a part of complete circuit. What is the potential difference $V_B - V_A$ when the current I is $5A$ and is decreasing at a rate of $10^3 A/s$?



A. $5V$

B. $10V$

C. $15V$

D. $20V$

Answer: C

Watch Video Solution

321. A50 volt potential difference is suddenly applied to a coil with $L = 5 \times 10^{-3}$ henry and $R = 180 ohm$. The rate of increase of current after 0.001 second is

A. $27.3 amp / \sec$

B. $27.8 amp / \sec$

C. $2.73 amp / \sec$

D. None of the above

Answer: D

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322. The current in a LR circuit builds up to $\frac{3}{4}th$ of its steady state value in 4s . The time constant of this circuit is

A. $\frac{1}{\ln 2}s$

B. $\frac{2}{\ln 2}s$

C. $\frac{3}{\ln 2}s$

D. $\frac{4}{\ln 2}s$

Answer: B

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323. A Conducting ring of radius 1 meter is placed in an uniform magnetic field B of 0.01 tesla oscillating with frequency $100 Hz$ with its plane at right angles to B. What will be the induced electric field?

A. $\pi \text{volt} / m$

B. $2 \text{volt} / m$

C. $10 \text{volt} / m$

D. $62 \text{volt} / m$

Answer: B

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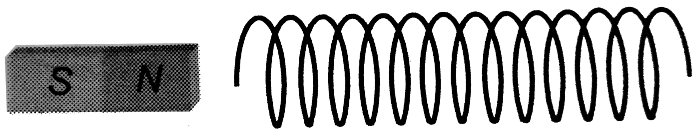
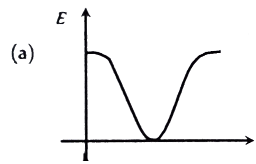
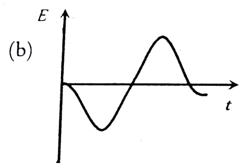
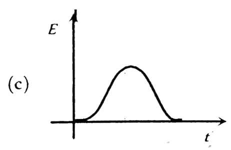
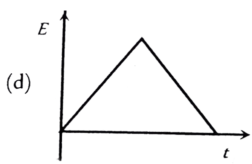
324. The variation of induced emf (E) with time (t) in a coil if a short bar magnet is moved along its axis with a constant velocity is best represent as



A. 

B. 

C. 

D. 

Answer: A

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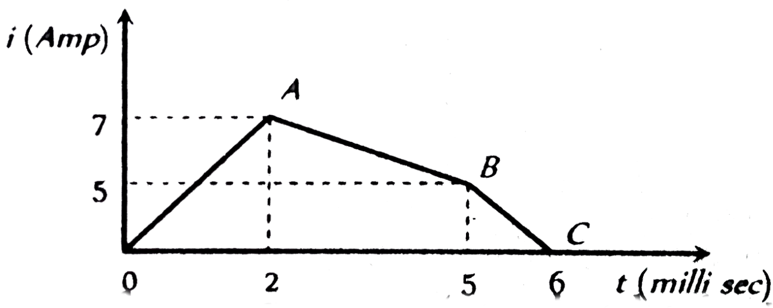
325. The current through a 4.6 H inductor is shown in the following graph. The induced emf during the time interval t = 5 milli - sec to 6 milli - sec will be



A. $10^3 V$

B. $-23 \times 10^3 V$

C. $23 \times 10^3 V$

D. Zero

Answer: C

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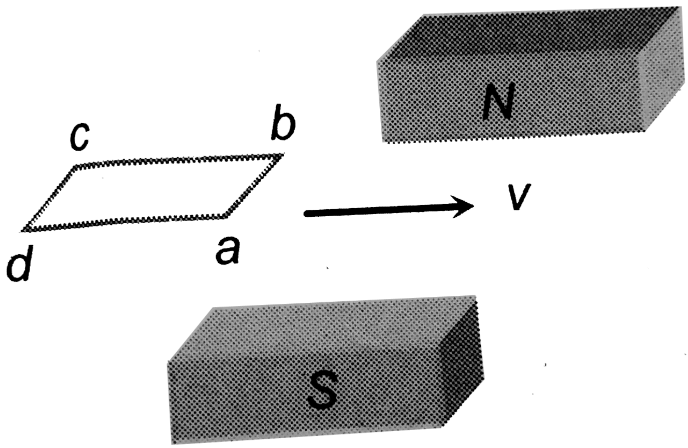
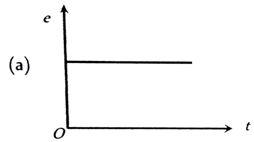
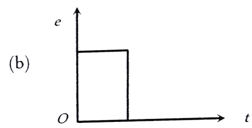
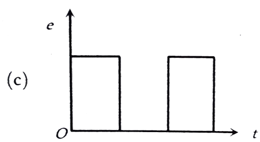
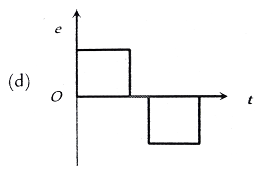
326. A horizontal loop $abcd$ is moved across the pole pieces of a magnet as shown in fig. with a constant speed v. When the edge ab of the loop enters the pole pieces at time $t = 0$ sec. which one of the following graphs represents correctly the induced e.m.f. in the coil?



A. 

B. 

C. 

D. 

Answer: D

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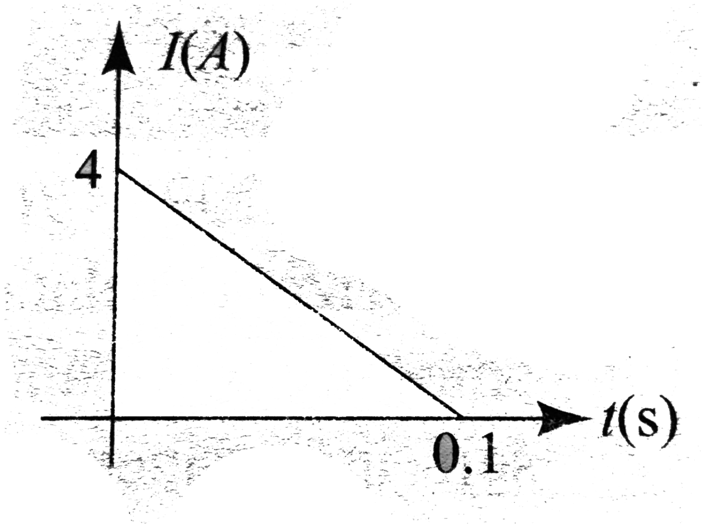
327. Some magnetic flux is changed from a coil of resitance 10Ω. As a result, an induced current is developed it, which varies with time as shown in Fig. 3.213. Find the magnitude of the change in flux through ythe coil in weber.



A. 2

B. 4

C. 6

D. None of these

Answer: A

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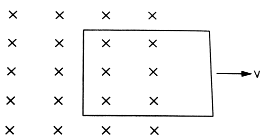
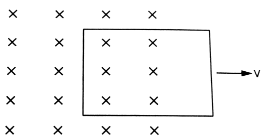
328. shows a conducting loop being pulled out of a magnetic field with a speed v. Which of lthe four plots shown in may represent the power delivered by the pulling agent as a function of the speed v ?





A. a

B. b

C. c

D. d

Answer: B

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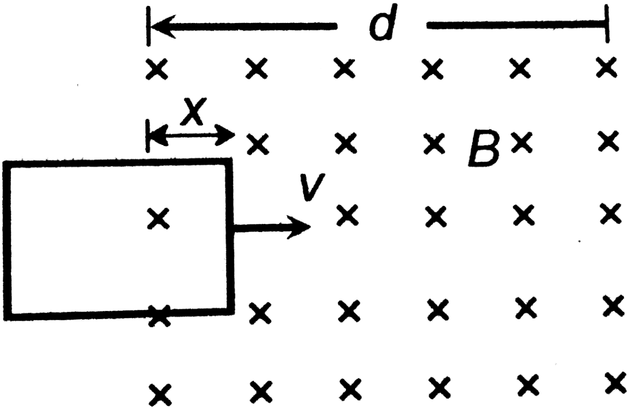
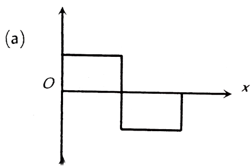
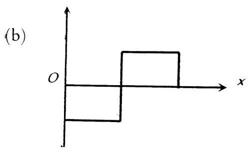
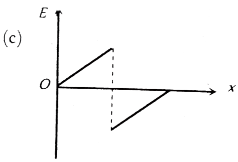
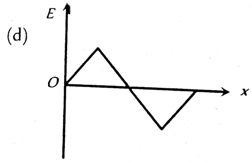
329. A rectangular loop is being pulled at a constant speed v, through a region of certain thickness d, in which a uniform magnetic field B is set up. The graph between position x of the right hand edge of the loop and the induced e.m.f. E will be



A. 

B. 

C. 

D. 

Answer: B

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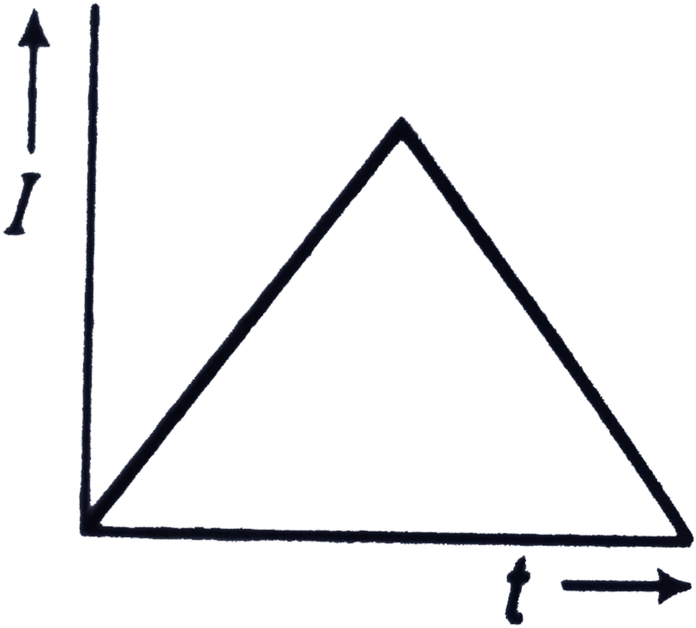
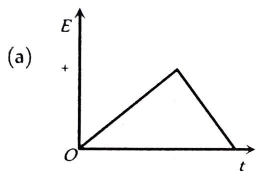
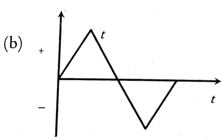
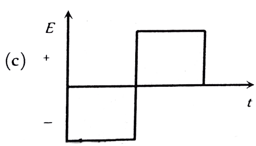
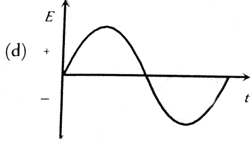
330. An alternating current I in an inductance coil varies with time t according to the graph as shown: Which one of the following graph gives the variation of voltage with time?



A. 

B. 

C. 

D. 

Answer: C

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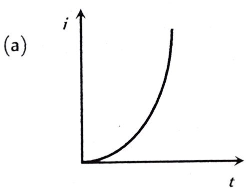
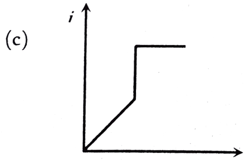
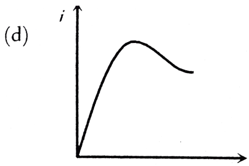
331. When a battery is connected across a series combination of self inductance L and resistance R , the variation in the current i with time t is best represented by

A. 

B. 

C. 

D. 

Answer: B

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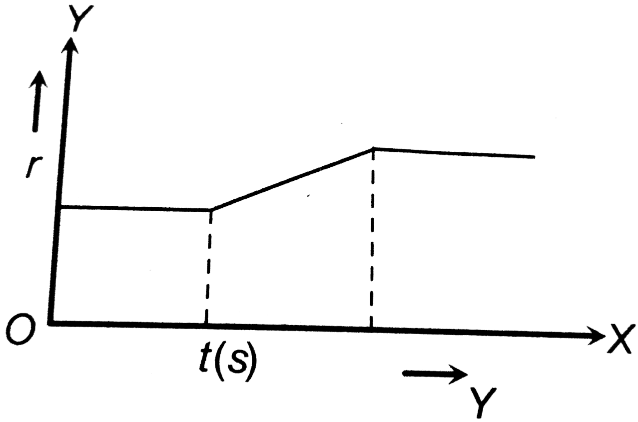
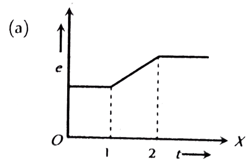
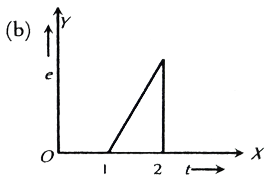
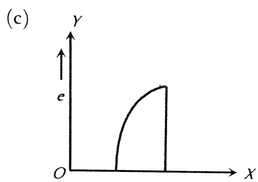
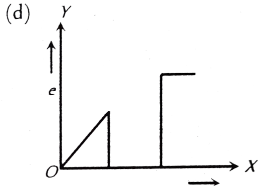
332. A flexible wire bent in the form of a circle is placed in a uniform magnetic field perpendicular to the plane of the coil. The radius of the coil changing as shown in figure. The graph of induced emf in the coil is represented by



A. 

B. 

C. 

D. 

Answer: B

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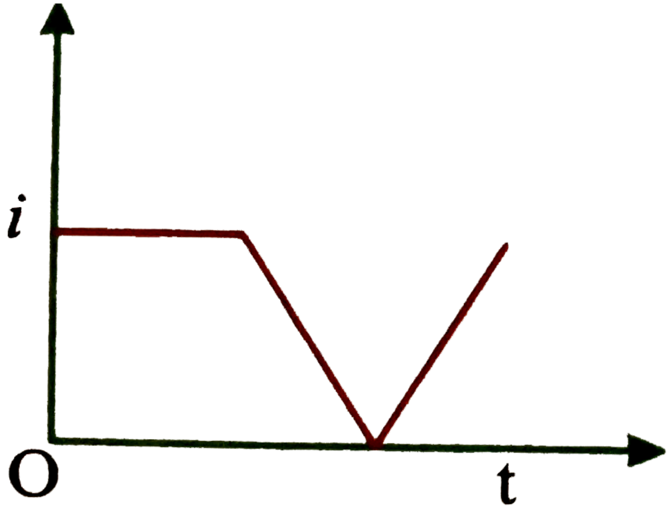
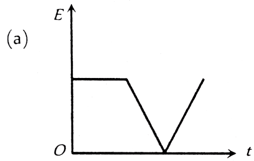
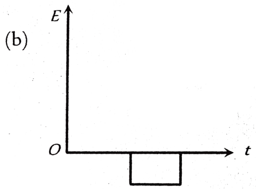
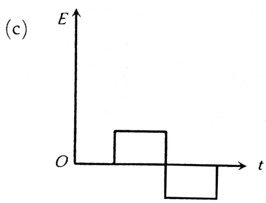
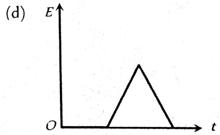
333. The current is an induction coil varies with time t, according to the graph shown in figure. Which of the following graphs shows the induced emf (e) in the coil with time.



A. 

B. 

C. 

D. 

Answer: C

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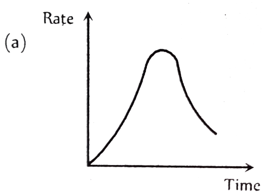
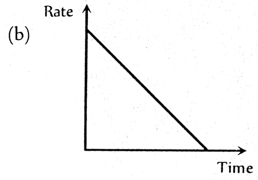
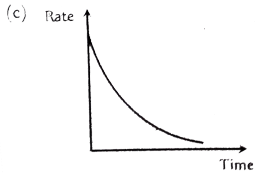
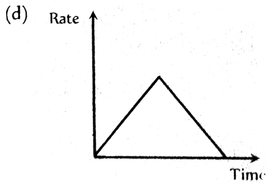
334. In an LR circuit connected to a battery, the rate at which energy is stored in the inductor is plotted against time during the growth of current in the circuit. Which of the following best represents the resulting curve?

A. 

B. 

C. 

D. 

Answer: A

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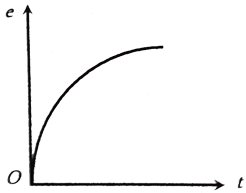
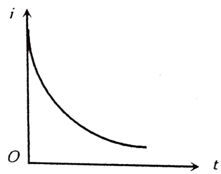
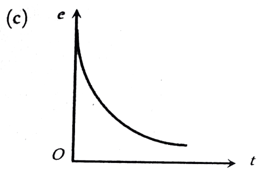
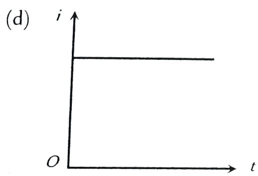
335. Switch S of the circuit shows in Fig is closed at $t = 0$. If e denotes the induced emf in L and I is the current flowing through the circuit at time t, which of the following graphs is//are correct?

A. 

B. 

C. 

D. 

Answer: C

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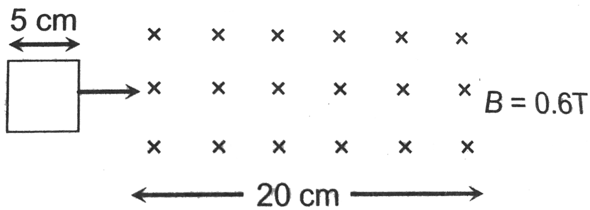
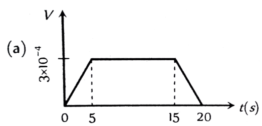
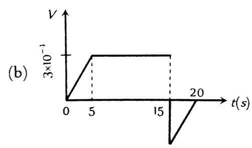
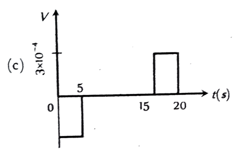
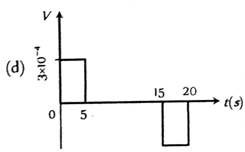
336. A square loop of side 5 cm enters a magnetic field with $1 cms^{-1}$. The front edge enters the magnetic emf?



A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

337. Assertion: Eddy current is produced in any metallic conductor when magnetic flux is changed aroundn it.

Reason: Electric potential determines the flow of charges

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

Watch Video Solution

338. Assertion: The quantity L/R possesses dimensions of time.

Reason: To reduce the rate of increases of current through a solenoide should increase the time constant (L/R).

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

Watch Video Solution

339. Assertion: Faraday's laws are consequences of conservation of energy.

Reason: In a purely resistive AC circuit, the current lags behind the e.m.f. in phase

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

340. Assertion: Only a charge in magnetic flux will maintain an induced current in the coil.

Reason: The presence of large magnetic flux through a coil maintains a current in the coil if the circuit is continuous.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

341. Asseration:Magnetic flux can produce induce e.m.f.

Reason:Faraday establishid induced e.m.f. experimentally.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

Watch Video Solution

342. Statement-1 : The induced e.m.f. and current will be same in two identical loops of copper and aluminium, when rotated with same speed in the same magnetic field.

Statement-2 : Induced e.m.f. is proportional to rate of change of magnetic field while induced current depends on resistance of wire.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

Watch Video Solution

343. Asseration:Induced coil are made of copper.

Reason:Induced current is more in wire having less resistance.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

344. Asseration:Self-inductance is called the inertia of electricity.

Reason:self-inductance is the phenomenon, according to which an opposing induced e.m.f. is produced in a coil as a result of change in current or magnetic flux linked in the coil.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

Watch Video Solution

345. Asseration: When two coils are wound on each other, the mutual induction between the coils is maximum.

Reason: Mutual induction does not depend on the orientation of the coils.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

346. Asseration: Acceleration of a magnet falling through a long soleneoid decreases.

Reason: the induced current produced in a circuit always flow in such direction that it opposes the change or the cause the produced it.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

347. Statement-1 : An aircraft flies along the meridian, the potential at the ends of its wings will be the same.

Statement-2 : Whenever there is change in the magnetic flux e.m.f. induces.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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348. Asseration:A spark occure between the poles of a switch when the switch is opened.

Reason:current flowing in the conductor produces magnetic field.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

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349. Assertion : In the phenomenon of mutual induction, self induction of each of the coils persists.

Reason : Self induction arises when strength of current in same coil changes. In mutual induction, current is changing in both the individual coils.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are fal se

Answer: A

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350. Asseration:Lenz's law violates the principle of conservation of energy.

Reason: Induced e.m.f. opposes always the change in magnetic flux responsible for its production.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

Watch Video Solution

351. Asseration: The induced emf in a conducting loop of wire will be non zero when it rotates in a uniform magnetic field.

Reason: The emf is induced due to change in magnetic flux.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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352. Asseration: A metal piece and a non-metal (stone) piece are dropped from the same height near earth's surface. Both will reach the earth's surface simultaneousely.

Reason: There is no effect of earth's magnetic field on freely falling body.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

353. Statement-1 : A transformer cannot work on dc supply.

Statement-2 : dc changes neither in magnitude nor in direction.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

354. Assertion: Soft iron is used as transformer core.

Reason: Soft iron has narrow hysteresis loop.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

355. Assertion : An electric motor will have maximum efficiency when back emf becomes equal to half of applied emf.

Reason : Efficiency of electric motor depends only on magnitude of back emf.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are fal se.

Answer: D

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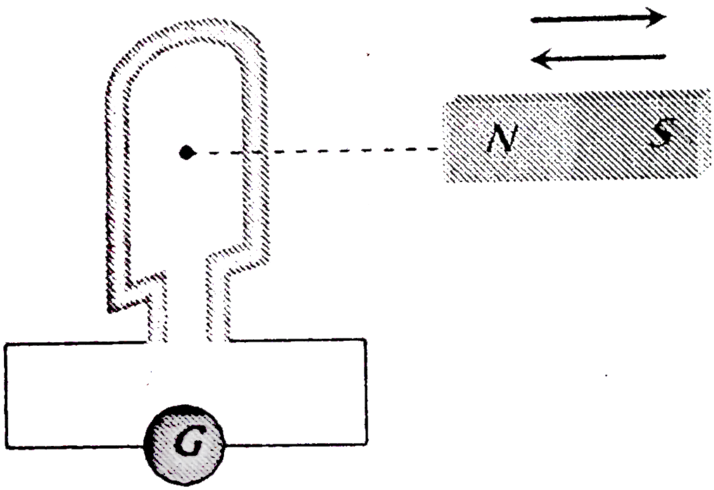
OT

1. When a magnet is pushed in and out of a circular coil C connected to a very sensitive galvanometer G as shown in the adjoining diagram with a frequency v , then



A. Constant deflection is observed in the galvanometer

B. Visible small oscillations will be observed in the galvanometer if v is about 50 Hz

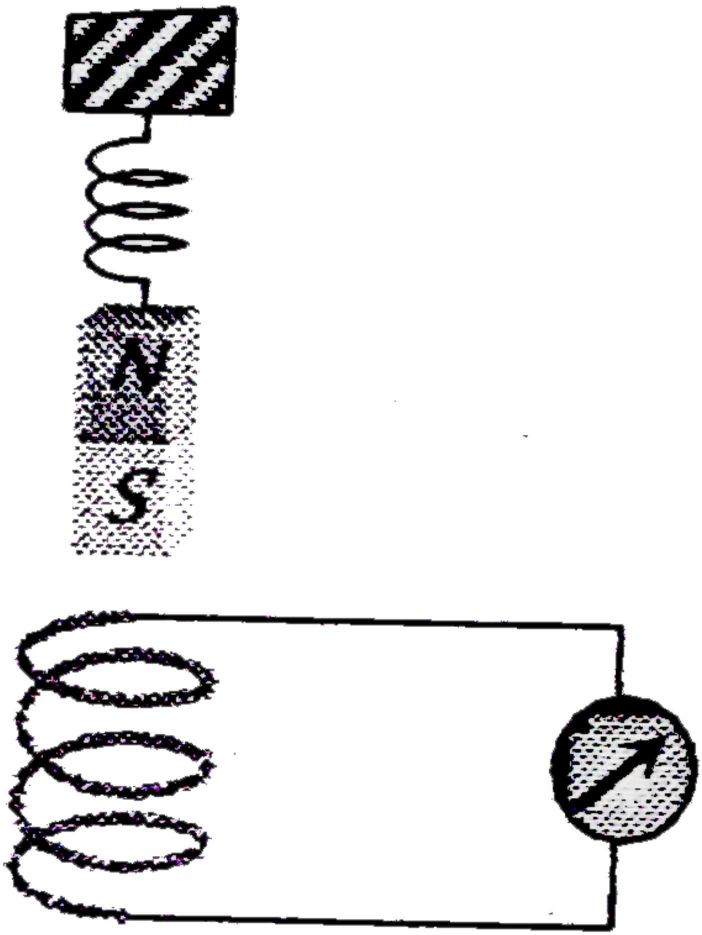
C. Oscillations in the deflection will be observed clearly if $v = 1$ or 2 Hz

D. No variation in the deflection will be seen if $v = 1$ or 2 Hz

Answer: C

View Text Solution

2. A magnet NS is suspended from a spring and while it oscillates, the magnet moves in and out of the coil C. The coil is connected to a galvanometer G. Then as the magnet oscillates,



A. G shows deflection to the left and right with constant amplitude

B. G shows deflection on one side

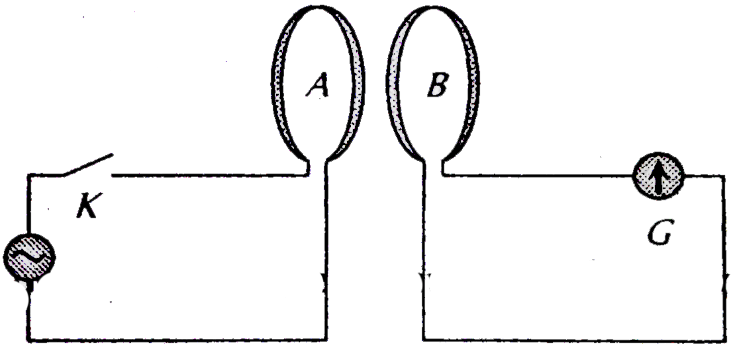
C. G shows no deflection.

D. G shows deflection to the left and right but the amplitude steadily decreases.

Answer: D

View Text Solution

3. The diagram below shows two coils A and B placed parallel to each other at a very small distance. Coil A is connected to an ac supply. G is a very sensitive galvanometer. When the key is closed



A. Constant deflection will be observed in the galvanometer for 50 Hz supply

B. Visible small variations will be observed in the galvanometer for 50 Hz input

C. Oscillations in the galvanometer may be observed when the input ac voltage has a frequency of 1 to 2 Hz

D. No variation will be observed in the galvanometer even when the input ac voltage is 1 or 2 Hz

Answer: C

View Text Solution

Motional EMI

1. A conducting wire is dropped along east-west direction, then

A. No emf is induced

B. No induced current flows

C. Induced current flows from west to east

D. Induced current flows from east to west

Answer: C

View Text Solution

Static EMI

1. The equivalent quantity of mass in electricity is

A. Charge

B. Potential

C. Inductance

D. Inductance

Answer: C

View Text Solution

2. When the current through a solenoid increases at a constant rate, the induced current

A. Is constant and is in the direction of the inducing current

B. Is a constant and is opposite to the direction of the inducing current

C. Increases with time and is in the direction of the inducing current

D. Increases with time and opposite to the direction of the inducing current

Answer: B

View Text Solution

Application of EMI

1. Use of eddy currents is done in the following except

A. Moving coil galvanometer

B. Electric brakes

C. Induction motor

D. Dynamo

Answer: D

View Text Solution

2. A transformer is based on the principle of

A. Mutual inductance

B. Self inductance

C. Ampere's law

D. Lenz's law

Answer: A

View Text Solution

3. Which of the following is not an application of eddy currents

A. Induction furnace

B. Galvanometer damping

C. Speedometer of automobiles

D. X -ray crystallography

Answer: D

View Text Solution

4. The output of a dynamo using a splitting commutator is

A. dc

B. ac

C. Fluctuating dc

D. Half-wave rectified voltage

Answer: C

View Text Solution

5. Which of the following statement is incorrect

A. Both ac and dc dynamo have a field magnet

B. Both ac and dc dynamo have an armature

C. Both ac and dc dynamo convert mechanical energy into electrical energy

D. Both ac and dc dynamo have slip rings

Answer: D

View Text Solution

6. The coil of dynamo is rotating in a magnetic field. The developed induced e.m.f. changes and the number of magnetic lines of force also changes. Which of the following condition is correct

A. Lines of force minimum but induced e.m.f. is zero

B. Lines of force maximum but induced e.m.f. is zero

C. Lines of force maximum but induced e.m.f. is not zero

D. Lines of force maximum but induced e.m.f. is also maximum

Answer: B

View Text Solution

7. In an induction coil, the secondary e.m.f. is

A. Zero during break of the circuit

B. Very high during make of the circuit

C. Zero during make of the circuit

D. Very high during break of the circuit

Answer: D

View Text Solution

8. In an induction coil with resistance, the induced emf will be maximum when

A. The switch is put on due to high resistance

B. The switch is put off due to high resistance

C. The switch is put on due to low resistance

D. The switch is put off due to low resistance

Answer: B

View Text Solution

9. The alternating voltage induced in the secondary coil of a transformer is mainly due to

A. A varying electric field

B. A varying magnetic field

C. The vibrations of the primary coil

D. The iron core of the transformer

Answer: B

View Text Solution

10. The efficiency of transformer is very high because

A. There is no moving part in a transformer

B. It produces very high voltage

C. It produces very low voltage

D. None of the above

Answer: A

View Text Solution

11. Large transformers, when used for some time, become hot and are cooled by circulating oil. The heating of transformer is due to

A. Heating effect of current alone

B. Hysteresis loss alone

C. Both the hysteresis loss and heating effect of current

D. None of the above

Answer: C

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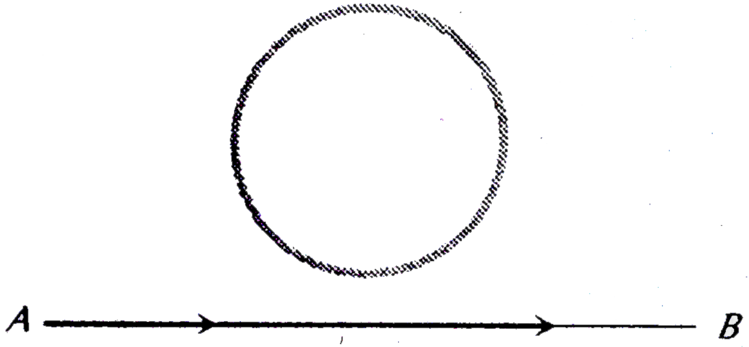
CT

1. An electron moves along the line AB , which lies in the same plane as a circular loop of conducting wires as shown in the diagram. What will be the direction of current induced if any, in the loop



A. No current will be induced

B. The current will be clockwise

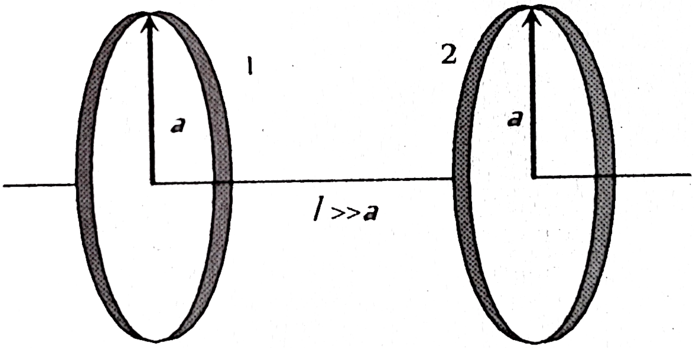
C. The current will be anticlockwise

D. The current will change direction as the electron passes by

Answer: D

View Text Solution

2. What is the mutual inductance of a two-loop system as shown with centre separation l



A. $\frac{\mu_0 \pi a^4}{8l^3}$

B. $\frac{\mu_0 \pi a^4}{4l^3}$

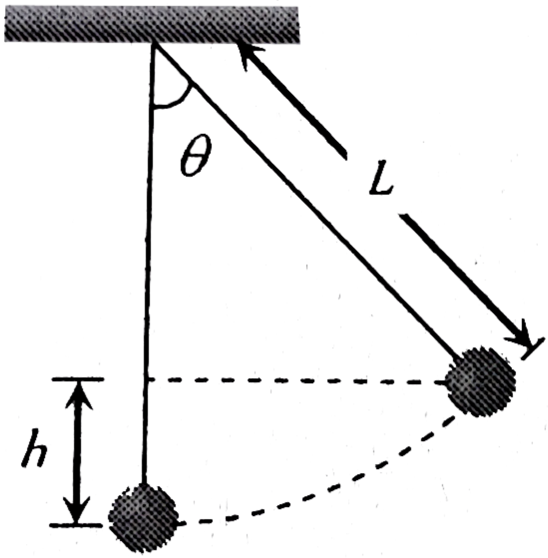
C. $\frac{\mu_0 \pi a^4}{6l^3}$

D. $\frac{\mu_0 \pi a^4}{2l^3}$

Answer: D

View Text Solution

3. A simple pendulum with bob of mass m and conducting wire of length L swings under gravity through an angle 2θ. The earth's magnetic field component in the direction perpendicular to swing is B . Maximum potential difference induced across the pendulum is



A. $2BL\sin\left(\frac{\theta}{2}\right)(gL)^{1/2}$

B. $BL\sin\left(\frac{\theta}{2}\right)(gL)$

C. $BL\sin\left(\frac{\theta}{2}\right)(gL)^{3/2}$

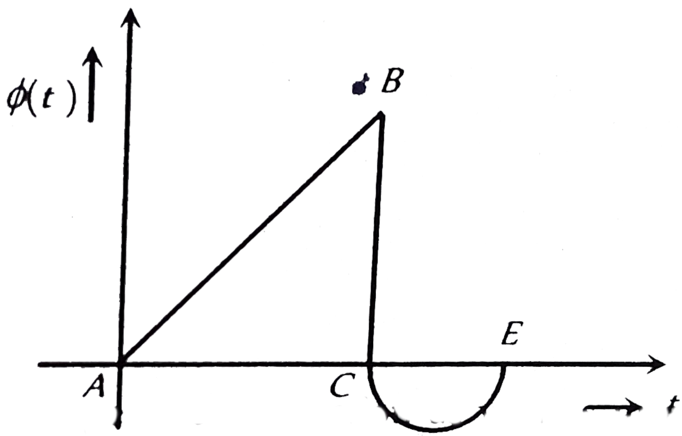
D. $BL\sin\left(\frac{\theta}{2}\right)(gL)^{2}$

Answer: A

View Text Solution

GQ

1. The graph Shows the variation in magnetic flux $\phi(t)$ with time through a coil. Which of the statements given below is not correct



A. There is a change in the direction as well as magnitude of the induced emf between B and D

B. The magnitude of the induced emf is maximum between B and C

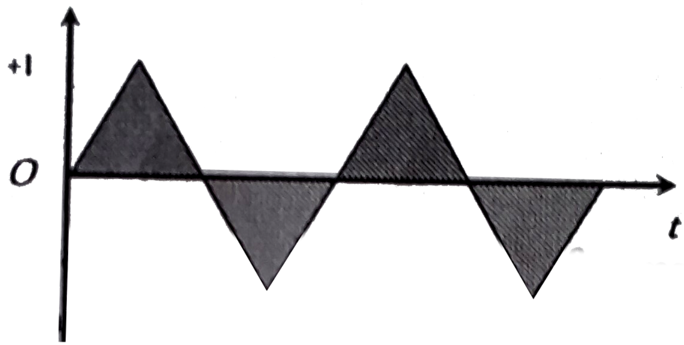
C. There is a change in the direction as well as magnitude of induced emf between A and C

D. The induced emf is zero at B

Answer: D

View Text Solution

2. An alternating current of frequency 200 rad/sec and peak value 1 A as shown in the figure, is applied to the primary of a transformer. If the coefficient of mutual induction between theprimary and the secondary is 1.5 H , the voltage induced in the secondary will be



A. $300V$

B. $191V$

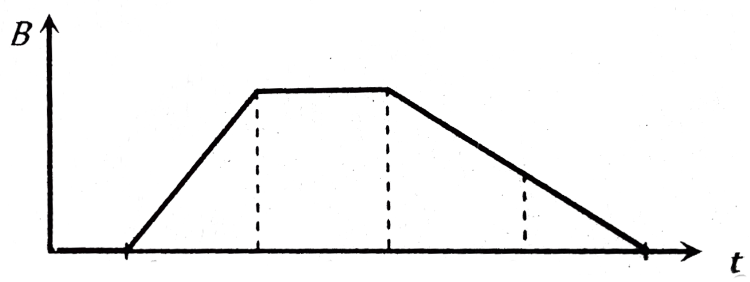
C. $200V$

D. $471V$

Answer: B

View Text Solution

3. The graph gives the magnitude B (t) of a uniform magnetic field that exists throughout a conducting loop, perpendicular to the plane of the loop. Rank the five regions of the graph according to the magnitude of the emf induced in the loop, greatest first



A. $b > (d = e) < (a = c)$

B. $b < (d = e) > (a = c)$

C. $b < d < e < c < a$

D. $b > (a = c) > (d = e)$

Answer: B

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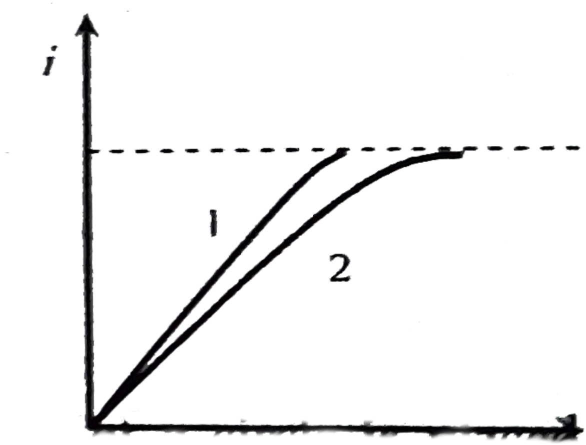
4. When a certain circuit consisting of a constant e.m.f. E an inductance L and a resistance R is closed, the current in, it increases with time according to curve 1. After one parameter (E , L or R) is changed, the increase in current follows curve 2 when the circuit is closed second time. Which parameter was changed and in what direction



A. L is increased

B. L is decreased

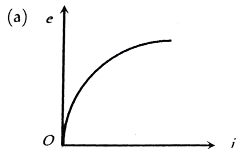
C. R is increased

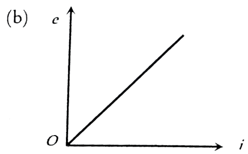
D. R is decreased

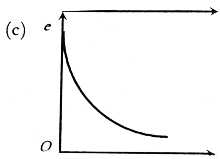
Answer: A

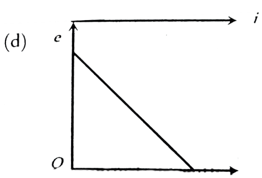
View Text Solution

5. For previous objective, which of the following graphs is correct

A. 

B. 

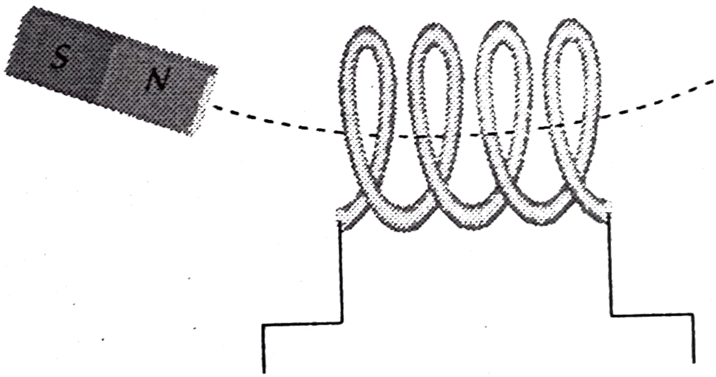
C. 

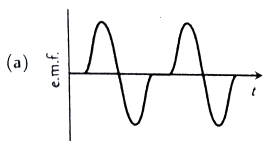
D. 

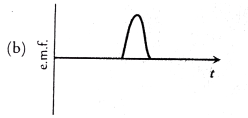
Answer: D

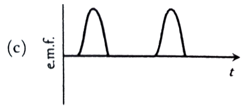
View Text Solution

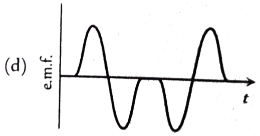
6. A magnet is made to oscillate with a particular frequency, passing through a coil as shown in figure. The time variation of the magnitude of e.m.f. generated across the coil during one cycle is



A. 

B. 

C. 

D. 

Answer: A

View Text Solution

Assertion & Reason

1. Assertion : An induced emf is generated when magnet is withdrawn from the solenoid.

Reason : The relative motion between magnet and solenoid induces emf.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

View Text Solution

2. Assertion : An artificial satellite with a metal surface is moving above the earth in a circular orbit. A current will be induced in satellite if the plane of the orbit is inclined to the plane of the equator.

Reason : The current will be induced only when the speed of satellite is more than $8km / \sec$.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: C

View Text Solution

3. Assertion : A bar magnet is dropped into a long vertical copper tube. Even taking air resistance as negligible, the magnet attains a constant terminal velocity. If the tube is heated, the terminal velocity gets increased.

Reason : The terminal velocity depends on eddy current produced in bar magnet.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

View Text Solution

4. Assertion : An ac generator is based on the phenomenon of self-induction.

Reason : In single coil, we consider self-induction only.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

View Text Solution

5. Assertion : The back emf in a dc motor is maximum when the motor has just been switched on.

Reason : When motor is switched on it has maximum speed.

A. If both assertion and reason are t rue and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

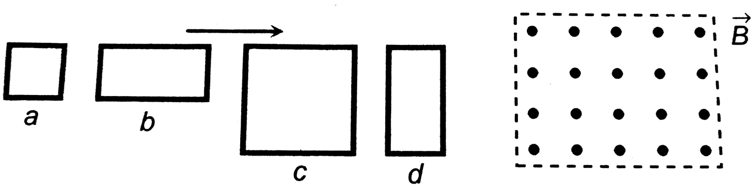
D. If the assertion and reason both are fal se.

Answer: D

View Text Solution

SET

1. The figure shows four wire loops, with edge length of either L or $2L$. All four loops will move through a region of uniform magnetic field $\overrightarrow{B}$ (directed out of the page) at the same constant velocity . Rank the four loops according to the maximum magnitude of the e.m.f. induced as they move through the field, greatest first



A. $(e_c = e_d) < (e_a = e_b)$

B. $(e_c = e_d) > (e_a = e_b)$

C. $e_c > e_d > e_b > e_a$

D. $e_c < e_d < e_b < e_a$

Answer: B

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2. A circular coil and a bar magnet placed nearby are made to move in the same direction. The coil covers a distance of $1m$ in $0.5 \sec$ and the magnet a distance of $2m$ in $1 \sec$. The induced emf produced in the coil

A. Zero

B. 1 V

C. 0.5 V

D. Cannot be determined from the given information

Answer: A

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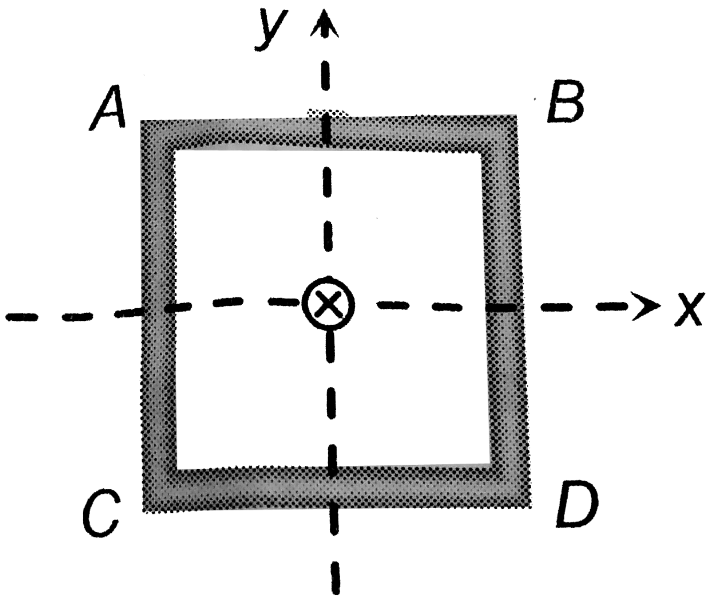
3. A square coil ABCD lying in $x - y$ plane with its centre at origin. A long straight wire passing through origin carries a current $i = 2t$ in negative z-direction.

The induced current in the coil is



A. Clockwise

B. Anticlockwise

C. Alternating

D. Zero

Answer: D

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4. A short magnet is allowed to fall from rest along the axis of a horizontal conducting ring. The distance fallen by the magnet in one second may be

A. 4 m

B. 5 m

C. 6 m

D. 7 m

Answer: A

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5. The horizontal component of the earth's magnetic field at a place is $3 \times 10^{-4} T$ and the dip is $\tan^{-1}\left(\frac{4}{3}\right)$. A metal rod of length $0.25 m$ placed in the north - south position and is moved at a constant speed of $10 cm / s$ towards the east. The emf induced in the rod will be

A. Zero

B. $1 \mu V$

C. $5 \mu V$

D. $10 \mu V$

Answer: D

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6. A copper disc of radius $0.1m$ rotates about its centre with 10 revolutuion per second in a uniform magnetic field of 0.1 tesla. The emf induced across the radius of the disc is

A. $\frac{\pi}{10}V$

B. $\frac{2\pi}{10}V$

C. $10\pi mV$

D. $20\pi mV$

Answer: C

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7. A coil of Cu wire (radius r, self-inductance L) is bent in two concentric turns each having radius $\frac{r}{2}$. The self-inductance now

A. 2 L

B. L

C. 4 L

D. $L/2$

Answer: A

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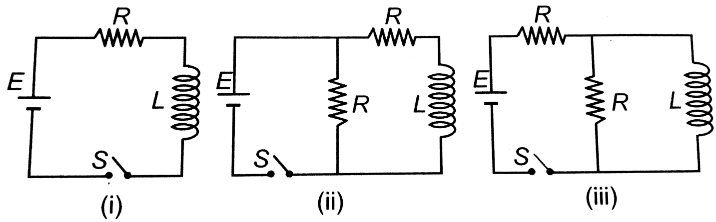
8. In which of the following circuits is the current maximum just after the switch S is closed?



A. (i)

B. (ii)

C. (iii)

D. Both (ii) and (iii)

Answer: B

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9. A small coil is introduced between the poles of an electromagnet so that its axis coincides with the magnetic field direction. The number of turns is n and the cross sectional area of the coil is A. When the coil turns through 180° about its diameter, the charge flowing through the coil is Q. the total resistance of the circuit is R. what is the magnitude of the magnetic induction?

A. $\frac{QR}{nA}$

B. $\frac{2QR}{nA}$

C. $\frac{Qn}{2RA}$

D. $\frac{QR}{2nA}$

Answer: D

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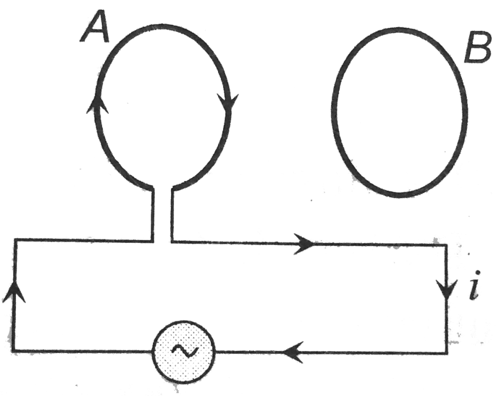
10. Two circular coils A and B are facing each other as shown in figure. The current i through A can be altered



A. There will be repulsion between A and B if i is increased

B. There will be attraction between A and B if i is increased

C. There will be neither attraction nor repulsion when i os charged

D. Attraction or repulsion between A and B depends on the direction of current. If does not depend whether the current is increased or decreased

Answer: A

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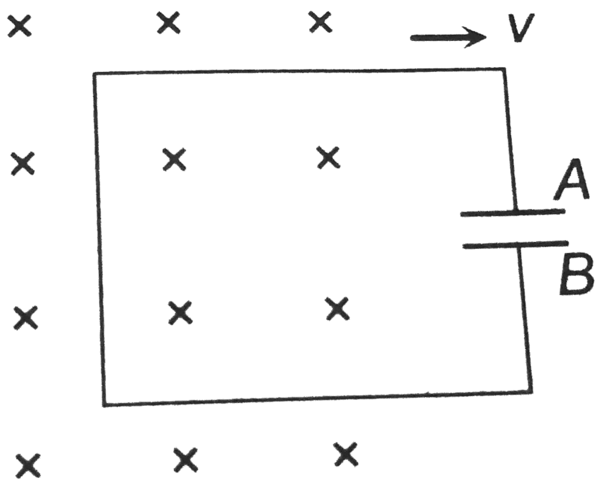
11. A conductuing loop having a capacitor is moving outward from the magnetic field. Which plate of the capacitor will be positive?



A. Plate – A

B. Plate – B

C. Plate – A and Plate – B both

D. None

Answer: A

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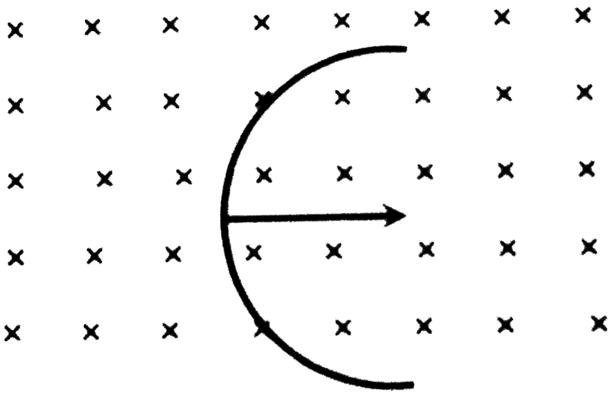
12. A straight wire of length L is bent into a semicircle. It is moved in a uniform magnetic field with speed v with diameter perpendicular to the field. The induced emf between the ends of the wire is



A. BLv

B. $2BLv$

C. $2\pi BLv$

D. $\frac{2BvL}{\pi}$

Answer: D

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13. If in a coil rate of change of area is $\frac{5meter^2}{milli \sec ond}$ and current become $1amp$ from $2amp$ in 2×10^{-3} sec. if magnetic field is 1 Tesla then self-inductance of the coil is

A. 2 H

B. 5 H

C. 20 H

D. 10 H

Answer: D

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14. In series with $20 ohm$ resitor a 5 henry inductor is placed. To the combination an e.m.f. of 5 volt is applied. What will be the rate of increase of current at $t = 0.25 \sec?$

A. e

B. e^{-2}

C. e^{-1}

D. None of these

Answer: C

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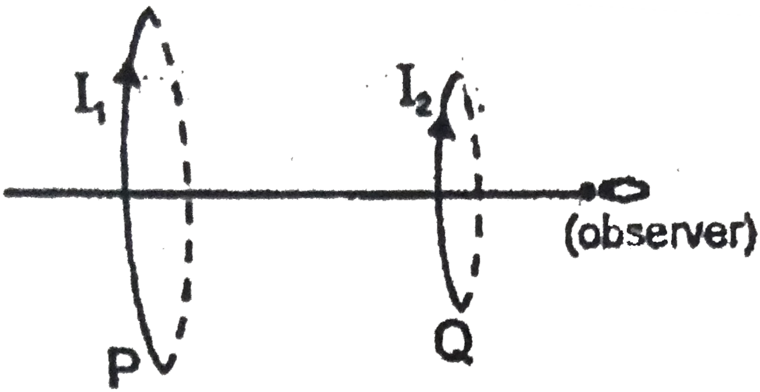
15. Two circular coils P & Q are coaxially & carry currents I_1 and I_2 respectively (all direction are w.r.t. the observer)



A. If $I' = 0$ and P moves towards Q , a current in the same direction as I is induced in Q

B. If $I = 0$ and Q moves towards P , a current opposite in direction to that of I' is induced in P

C. When $I \neq 0$ and $I' \neq 0$ are in the same direction, then two coil tend to move apart

D. None of these

Answer: B

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16. The phase difference between the flux linkage and the induced e.m.f. in a rotating coil in a uniform magnetic field

A. π

B. $\pi / 2$

C. $\pi / 4$

D. $\pi / 6$

Answer: B

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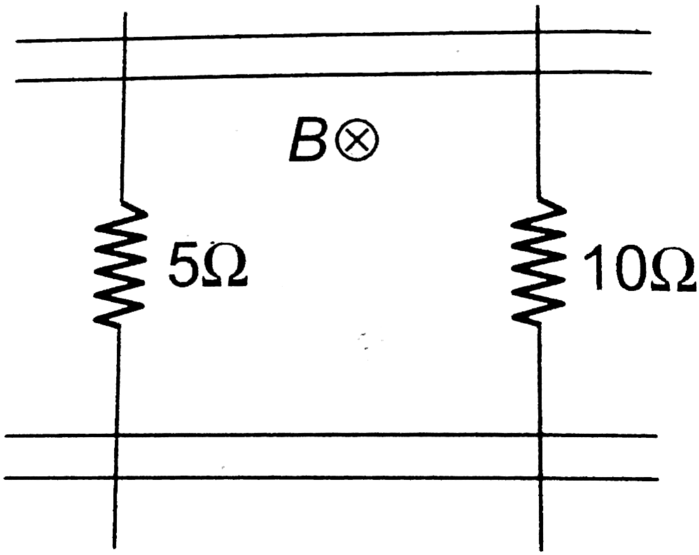
17. A pair of parallel conducting rails lie at right angle to a uniform magnetic field of $2.0T$ as shown in the fig. two resistor 10Ω and 5Ω are to slide without friction along the rail. The distance between the conducting rails is $0.1m$. Then



A. Induced current $= \frac{1}{150} A$ directed clockwise if 10Ω resistor is pulled to the right with speed 0.5 ms and 5Ω resistor is held fixed

B. Induced current $= \frac{1}{300} A$ directed anti-clockwise if 10Ω resistor is pulled to the right with speed $0.5 ms^{-1}$ and 5Ω resistor is held fixed

C. Induced current $= \frac{1}{300} A$ directed clockwise if 5Ω resistor is pulled to the left at $0.5 ms^{-1}$ and 10Ω resistor is held at rest

D. Induced current $= \frac{1}{150} A$ directed anti-clockwise if 5Ω resistor is pulled to the left at $0.5 ms^{-1}$ and 10Ω resistor is held at rest

Answer: D

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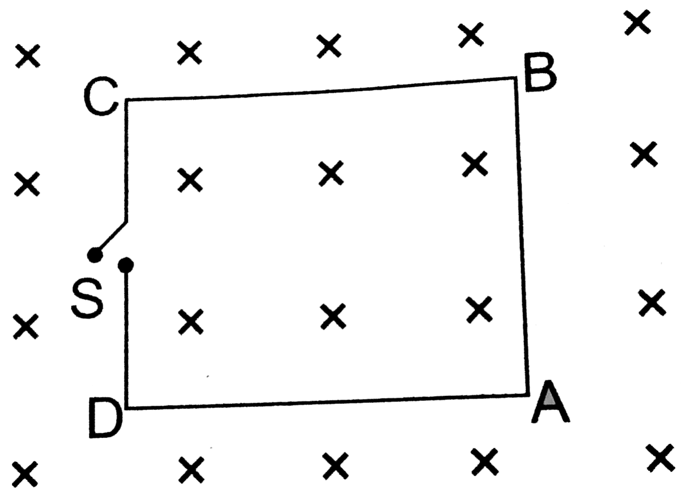
18. The magnetic field in the cylindrical region shown in figure increase at a constant rate of $20mT / \sec$. Each side of the square loop $ABCD$ has a length of $1cm$ and resistance of 4Ω. Find the current in the wire AB if the switch S is closed



A. $1.25 \times 10^{-7} A$, (anti-clockwise)

B. $1.25 \times 10^{-7} A$ (clockwise)

C. $2.5 \times 10^{-7} A$ (anti clockwise)

D. $2.5 \times 10^{-7} A$ (clockwise)

Answer: A

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19. An aircraft with a wingspan of 40 m flies a speed of 1080 km hr_1 in the eastward direction at a constant altitude in the northern hemisphere, where the vertical component of earth's magnetic fieldis 1.75×10^{-5} T.

Find the e.m.f. that develops between the tips of the wings.

A. 0.5 V

B. 0.35 V

C. 0.21 V

D. 2.1 V

Answer: C

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20. A hundred turns of insulated copper wire are wrapped around an iron cylinder of area $1 \times 10^{-3} m^2$

and are connected to a resistor. The total resistance in the circuit is 10 ohms. If the longitudinal magnetic induction in the iron changes from 1 weber m^{-2}, in one direction to 1 weber m^{-2} in the opposite direction, how much charge flows through the circuit

A. $2 \times 10^{-2}C$

B. $2 \times 10^{-3}C$

C. $2 \times 10^{-4}C$

D. $2 \times 10^{-5}C$

Answer: A

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