Exercise–I (Conceptual Questions)

MAGNETIC FLUX

1. 'SI' unit of magnetic flux is :–

(1) ampere/meter^2 (2) weber (3) gauss (4) orested

Ans. **(2)**

2. A square coil of 0.01 m^2 area is placed perpendicular to the uniform magnetic field of 10^3 weber/metre^2. The magnetic flux linked with the coil is :–

(1) 10 weber (2) 10^5 weber (3) Zero (4) 100 weber

Ans. **(1)**

FARADAY LAW & LENZ'S LAW

3. According to Faraday's Laws of electro magnetic induction :

(1) The direction of the induced current is such that it oppose it self

(2) The induced emf in the coil is proportional to the rate of change of magnetic flux associated with it

(3) The direction of induced emf is such that it opposes it self

(4) None of these above

Ans. **(2)**

4. A coil having an area of 2 m^2 is placed in a magnetic field which changes from 1 Weber/m^2 to 4 Weber/m^2 in 2 seconds. The e.m.f. induced in the coil will be :–

(1) 4 volt (2) 3 volt (3) 2 volt (4) 1 volt

Ans. **(2)**

5. Magnetic field through a coil is changed with respect to time then emf induced init then select the incorrect regarding induced emf in coil :–

(1) Coil may be made up with wood

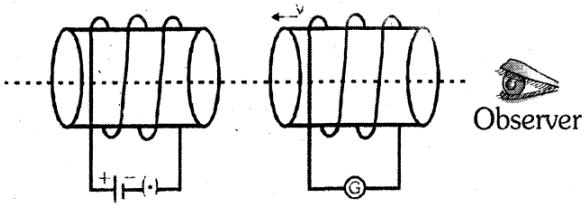
(2) Coil may be connected with an open circuit

(3) Coil must be of conducting nature

(4) Induced emf does not depends upon resistance of the coil

Ans. **(3)**

6. The current flows in a circuit as shown below. If a second circuit is brough near the first circuit then the current in the second circuit will be :–



(1) Clock wise (2) Anti clock wise
(3) Depending on the value of R_G (4) None of the above

Ans. (2)

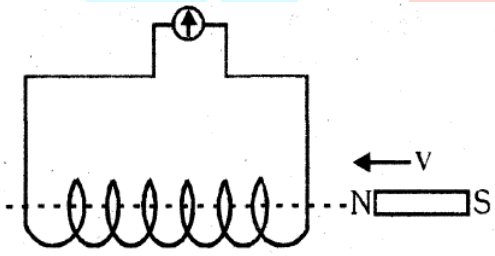
7. A coil of resistance 10Ω and 1000 turns have the magnetic flux line of 5.5×10^{-4} Wb. If the magnetic flux changed to 5×10^{-4} Wb. in 0.1 sec, then the induced charge in coil is :–
(1) 50 μC (2) 5 μC (3) 2 μC (4) 20 μC

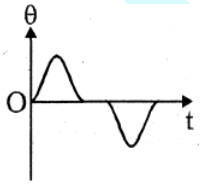
Ans. (2)

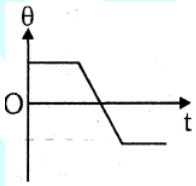
8. One coil of resistance 40Ω is connected to a galvanometer of 160Ω resistance. The coil has radius 6mm and turns 100. This coil is placed between the poles of a magnet such that magnetic field is perpendicular to coil. If coil is drag ged out then the charge through the galvanometer is 32μC. The magnetic field is :
(1) 6.55 T (2) 5.66 T (3) 0.655 T (4) 0.566 T

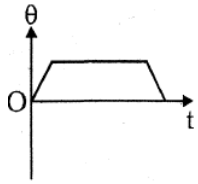
Ans. (4)

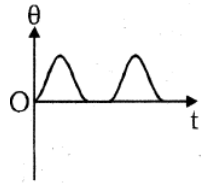
9. A short bar magnet passes at a steady speed right through a long solenoid. A galvanometer is connected across the solenoid. Which graph best represents the variation of the galvanometer deflection θ with time :–



(1) 

(2) 

(3) 

(4) 

Ans. (1)

10. A square loop of side 22 cm is changed to a circle in time 0.4 s. The magnetic field present is 0.2 T. The emf induced is :
(1) –6.6 mV (2) –13.2 mV (3) +6.6 mV (4) +13.2 mV

Ans. (1)

11. The magnetic flux in a coil of 100 turns increases by 12×10^3 Maxwell in 0.2 s due to the motion of a magnet. The emf induced in the coil will be :–
(1) 0.6 mV (2) 0.6 V (3) 6 V (4) 60 V

Ans. (1)

12. A closed coil consists of 500 turns on a rectangular frame of area 4.0 cm^2 and has a resistance of 50 ohms. The coil is kept with its plane perpendicular to a uniform magnetic field of 90.2 wb/m^2, the amount of charge flowing through the coil if it is turned over (rotated through 180°) :–

(1) 1.6×10^{-3} C (2) 16×10^{-3} C (3) 0.16×10^{-3} C (4) 160×10^{-3} C

Ans. (1)

13. A coil of mean area 500 cm^2 and having 1000 turns is held perpendicular to a uniform field of 0.4 gauss. The coil is turned through 180° in $\frac{1}{10}$ second. The average induced e.m.f. :–

(1) –0.04 V (2) 0.4 V (3) 4 V (4) 0.004 V

Ans. (1)

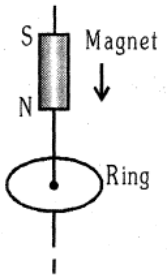
14. An emf induced in a coil, the linking magnetic flux

(1) Must decrease (2) Must increase

(3) Must remain constant (4) Can be either increased or decreased

Ans. (4)

15. Consider a metal ring kept on a horizontal plane. A bar magnet is held above the ring with its length along the axis of the ring. If the magnet is dropped freely the acceleration of the falling magnet is (g is acceleration due to gravity) :–



(1) More than g (2) Equal to g

(3) Less than g (4) Depend on mass of magnet

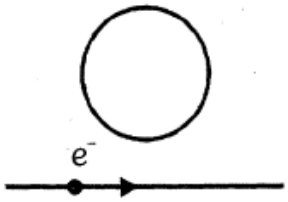
Ans. (3)

16. An electron beam is moving near to a conducting loop then the induced current in the loop :–

(1) clockwise

(2) anticlockwise

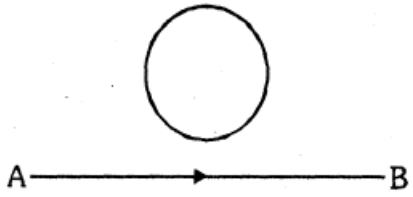
(3) both



(4) no current

Ans. (4)

17. The current flows from A to B as shown in the figure. The direction of the induced current in the loop is :–



(1) clockwise (2) anticlockwise (3) straight line (4) none of these

Ans. (4)

18. Faraday law represents :–

(1) relation between I and B

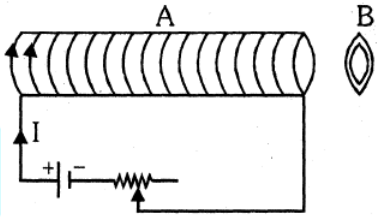
(2) relation between magnetic force and magnetic field

(3) relation between e.m.f. and rate of change of flux

(4) none of these

Ans. (3)

19. An aluminium ring B faces an electromagnet A. The current I through A can be altered. Then which of the following statement is correct :–



(1) If I decreases A will repel B

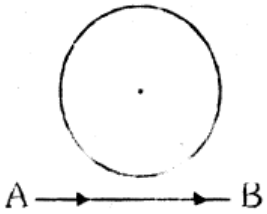
(2) Whether I increases or decreases, B will not experience any force

(3) If I increases, A will repel B

(4) If I increases, A will attract B

Ans. (3)

20. A charge particle moves along the line AB, which lies in the same plane of a circular loop of conducting wire as shown in the fig. Then :–



(1) No current will be induced in the loop
(2) The current induced in the loop will change its direction as the charged particle passes by
(3) The current induced will be anticlockwise
(4) The current induced, will be clockwise

Ans. (2)

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

(1) $Q = \frac{\Delta\phi}{R}$ (2) $Q = \frac{\Delta\phi}{\Delta t}$ (3) $Q = R.\frac{\Delta\phi}{\Delta t}$ (4) $Q = \frac{1}{R}\cdot\frac{\Delta\phi}{\Delta t}$

Ans. (1)

22. If number of turns of $70cm^2$ coil is 200 and it is placed in a magnetic field of 0.8 Wb/m^2 which is perpendicular to the plane of coil and it is rotated through an angle 180° in 0.1 sec, then induced emf in coil :–

(1) 11.2 V (2) 1.12 V (3) 22.4 V (4) 2.24 V

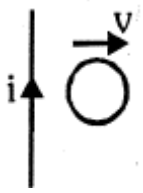
Ans. (3)

23. A circular loop of radius r is placed in a region where magnetic field increases with respect to time as B(t) = at then induced emf in coil :–

(1) $\pi r^2 a$ (2) $3\pi r^2 a$ (3) $2\pi r^2 a$ (4) $4\pi r^2 a$

Ans. (1)

24. A circular loop of radius r is moved away from a current carrying wire then induced current in circular loop will be :–



(1) Clockwise
(2) Anti clockwise
(3) Not induced
(4) None of them

Ans. (1)

SELF INDUCTION AND L–R DC CIRCUIT

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

(1) is a constant and is in the direction of the inducing current
(2) is a constant and is opposite to the direction of the inducing current
(3) increase with time and is in the direction of the inducing current
(4) increase with time and opposite to the direction of the inducing current

Ans. (2)

26. A solenoid of 10 henry inductance and 2 ohm resistance, is connected to a 10 volt battery. In how much time the magnetic energy will be reaches to $\frac{1}{4}$th of the maximum value:?

(1) 3.5 sec (2) 2.5 sec (3) 5.5 sec (4) 7.5 sec

Ans. (1)

27. An inductance coil have the time constant 4 sec, if it is cut into two equal parts and connected parallel then new time constant of the circuit :–

(1) 4 sec (2) 2 sec (3) 1 sec (4) 0.5 sec

Ans. (1)

28. Which statement is correct from following :–

(a) Inductor store energy in the form of magnetic field

(b) Capacitor store energy in the form of electric field

(c) Inductor store energy in the form of electric and magnetic field both

(d) Capacitor store energy in the form of electric and magnetic field both

(1) a, b (2) a, c (3) b, d (4) b, c

Ans. (1)

29. If a current of 2A give rise a magnetic flux of 5×10^{-5} weber/turn through a coil having 100 turns, then the magnetic energy stored in the medium surrounding by the coil is :–

(1) 5 joule (2) 5×10^{-7} joule (3) 5×10^{-3} joule (4) 0.5 joule

Ans. (3)

30. For a solenoid keeping the turn density constant its length makes halved and its cross section radius is doubled then the inductance of the solenoid increased by :–

(1) 200% (2) 100% (3) 800% (4) 700%

Ans. (2)

31. A constant current I maintained in a solenoid. Which of the following quantities will increases if an iron rod is inserted in the solenoid along its axis :–

(a) Magnetic field at the centre (b) Magnetic flux linked with the solenoid

(c) Self inductance of the solenoid (d) Rate of Joule heating

(1) a, b, c (2) c, d (3) a, b (4) Only b

Ans. (1)

32. The inductance of a solenoid is 5 henery and its resistance is 5Ω. If it is connected to a 10volt battery then time taken by the current to reach $9/10^{th}$ of its maximum will be :–

(1) 4.0 s (2) 2.3 s (3) 1.4 s (4) 1.2 s

Ans. **(2)**

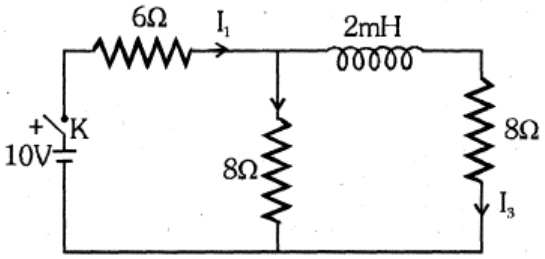
33. An LR circuit with a battery is connected at t = 0. Which of the following quantities is not zero just after the connection :–
(a) Current in circuit
(b) Magnetic potential energy in the inductor
(c) Power delivered by the battery
(d) Emf induced in the inductor
(1) a, b (2) a, c (3) c, d (4) Only d

Ans. **(4)**

34. During 0.1s current in a coil increases from 1A to 1.5 A. If inductance of this coil is 60 μH, induced current in external resistance of 600 μΩ is :–
(1) 1A (2) 4/3A (3) 2/3 A (4) 1/2 A

Ans. **(4)**

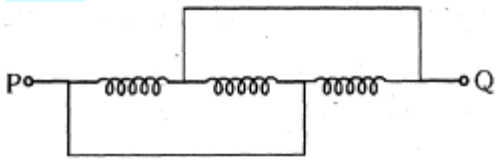
35. In the circuit shown in figure what is the value of I_1 just after pressing the key K?



(1) $\frac{5}{7}$A (2) $\frac{5}{11}$A (3) 1A (4) None of the above

Ans. **(1)**

36. Pure inductors each of inductance 3 H are connected as shown. The equivalent induction of the circuit is :–



(1) 1H (2) 2H (3) 3H (4) 9H

Ans. **(1)**

37. The time constant of an inductance coil is 2.0×10^{-3} s. When a 90 Ω resistance is joined in series, the time constant becomes 0.5×10^{-3} s. The inductance and resistance of the coil are :–
(1) 30 mH ; 30 Ω (2) 30 mH ; 60Ω (3) 60 mH ; 30Ω (4) 60 mH ; 60Ω

Ans. (3)

38. A toroidal solenoid with an air corer has an average radius of 15 cm, area of cross–section 12 cm^2 and 1200 turns. Ignoring the field variation across the cross–section of the toroid, the self–inductance of the toroid is :–

(1) 4.6 mH (2) 6.9 mH (3) 2.3 mH (4) 9.2 mH

Ans. (3)

39. A cylindrical iron core support N turns. If a current I produces a magnetic flux ϕ across the core's cross section, then the magnetic energy is :–

(1) 1ϕ (2) $\frac{1}{2}I\phi$ (3) $\frac{I^2\phi}{2}$ (4) $I^2\phi$

Ans. (2)

40. The self inductance of a toroid is :–

(1) $\frac{\mu_0 N^2 r^2}{2R_m}$ (2) $\frac{\mu_0 N^2 \pi r}{2R_m}$ (3) $\frac{\mu_0 N^2 r}{2R_m}$ (4) $\frac{\mu_0 N^2 r\pi}{R_m}$

Ans. (1)

41. An inductance L and a resistance R are joined to a battery. After some time, battery is disconnected but L and R remains connected to the closed circuit. The current strength will be reduced to 37% of its initial value in :

(1) RL sec (2) R/L sec (3) L/R sec (4) 1/LR sec

Ans. (3)

42. Energy is stored in the choke coil in the form of :–

(1) Heat (2) Electric field
(3) Magnetic field (4) Electro–magnetic field

Ans. (3)

43. When a current changes from 2A to 4A in 0.05 sec. in a coil, induced emf is 8 V. The self inductance of coil is :–

(1) 0.1 H (2) 0.2 H (3) 0.4 H (4) 0.8 H

Ans. (2)

44. An e.m.f. of 12 V is induced in a given coil when the current in it changes at the rate of 48 amp./min. The induced of the coil is :–

(1) 0.5 henry (2) 15 henry (3) 1.5 henry (4) 9.6 henry

Ans. (2)

45. Two conducting coils are placed co–axially now a cell is connected in one coil then they will :–

(1) attract to each other (2) repel to each other

(3) both (1) & (2) (4) they will not experience any force

Ans. **(2)**

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

(1) 125 erg (2) 125 J (3) 250 erg (4) 250 J

Ans. **(4)**

47. The energy density in magnetic field B is proportional to :–

(1) $\frac{1}{B}$ (2) $\frac{1}{B^2}$ (3) B (4) B^2

Ans. **(4)**

48. Inductance of a solenoid is 3H and it consist of 500 turns. If number of turn make twice, then the value of self inductance becomes :–

(1) 1.5 H (2) 3 H (3) 9 H (4) 12 H

Ans. **(4)**

49. A coil of 40 henry inductance is connected in series with a resistance of 8 ohm and the combination is joined to the terminals of a 2 volt battery. The time constant of the circuit is :

(1) $\frac{1}{5}$sec (2) 40 sec (3) 20 sec (4) 5 sec

Ans. **(4)**

50. When current in a coil is reduced from 2A to 1A in 1 ms, the induced emf is 5V. The inductance of coil is :–

(1) 5 H (2) 5000 H (3) 5 mH (4) 50 H

Ans. **(3)**

51. 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 :–

(1) 0.3 s (2) 0.15 s (3) 0.1 s (4) 0.05 s

Ans. **(3)**

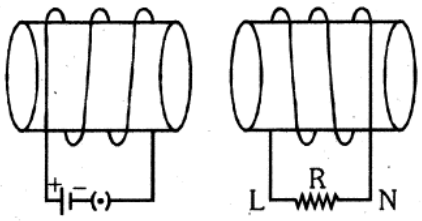
52. An ideal coil of 10H is connected in series with a resistance of 5Ω and a battery of 5V. 2 seconds after the connection is made, the current flowing in amperes in the circuit is :

(1) e (2) e^{-1} (3) $(1-e^{-1})$ (4) (1–e)

Ans. (3)

MUTUAL INDUCTION, TRANSFORMER AND EDDY CURRENTS

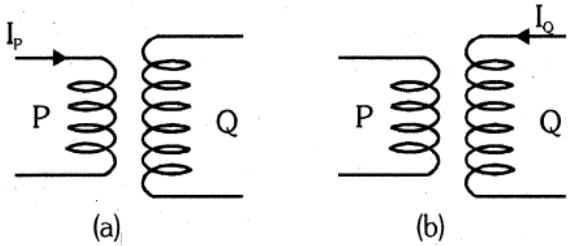
53. Two co–axial solenoids shown in figure. If key of primary suddenly opened then direction of instantaneous induced current in resistance 'R' which connected in secondary:



(1) L to N (2) N to l (3) Alternating (4) Zero

Ans. (1)

54. In figure (a) and figure (b) two air–cored solenoids P and Q have been shown. They are placed near each other. In figure (a), when I_P, the current in P, changes at the rate of 5 As^{-1}, an emf of 2 mV is induced in Q. The current in P is then switched off, and a current changing at 2 As^{-1} is fed through Q as shown in diagram. What emf will be induced in P :–



(1) 8×10^{-4} V (2) 2×10^{-8} V (3) 5×10^{-3} V (4) 8×10^{-2} V

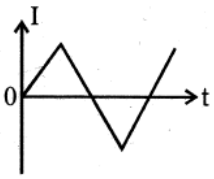
Ans. (1)

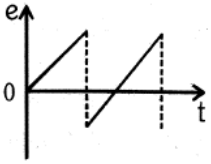
55. A small square loop of wire of side *l* is placed inside a large square loop of wire of side L (L >> *l*). The loops are coplanar and their centres coincide. The mutual inductance of the system is proportional to :–

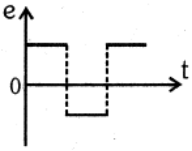
(1) $\frac{l}{L}$ (2) $\frac{l^2}{L}$ (3) $\frac{L}{l}$ (4) $\frac{L^2}{l}$

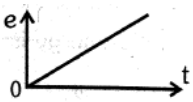
Ans. (2)

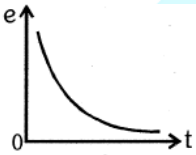
56. A current time curve is shown in the following diagram. This type of current is passed in the primary coil of transformer. The nature of induced emf in the secondary coil will be:–



(1) 

(2) 

(3) 

(4) 

Ans. **(2)**

57. Two coil have a mutual inductance 0.005 H. The current changes in first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 2A$ and $\omega = 100\pi$ rad/sec. The maximum value of induced emf in second coil is :–

(1) 4π V (2) 3π V (3) 2π V (4) π V

Ans. **(4)**

58. The electric power is transferred to a far distance at high potential because :–

(1) It stops the wire theft
(2) To minimise power loss
(3) Generator gives only high potential
(4) Electric power is transferred early due to high potential

Ans. **(2)**

59. If primary winding of a transformer were connected to a battery, the current in it will :–

(1) Increase (2) Remain constant (3) Decrease (4) First (1) then (3)

Ans. **(2)**

60. Which types of losses does not occur in transformer :–

(1) mechanical losses (2) copper losses (3) hysteresis losses (4)eddy current losses

Ans. **(1)**

61. Then efficiency of a transformer is maximum, because :–

(1) No part of the transformer is in motion
(2) It creates maximum voltage
(3) It creates minimum voltage
(4) None of the above

Ans. **(1)**

62. In order to avoid eddy currents in the core of a transformer :–

(1) The number of turns in the secondary coil is made considerably large

(2) A laminated core is used
(3) A step down transformer is used
(4) A high voltage alternating weak current is used

Ans. (2)

63. The mutual inductance of two coils when magnetic flux changes by 2×10^{-2} Wb and current changes by 0.001 A is :–

(1) 2 H (2) 3 H (3) 4 H (4) 8 H

Ans. (1)

64. Primary winding and secondary winding of a transformer has 100 and 200 turns respectively. If its input power is 60 W then output power of the transformer will be :–

(1) 240 W (2) 180 W (3) 60 W (4) 20 W

Ans. (3)

65. The ratio of the secondary to the primary turns in a transformer is 3 : 2 and the output power is P. Neglecting all power losses, the input power must be :–

(1) $\frac{P}{2}$ (2) P (3) $\frac{2P}{3}$ (4) $\frac{3P}{2}$

Ans. (2)

66. Mutual inductance of two coils depends on their self inductance L_1 and L_2 as :–

(1) $M_{12} = L_1/L_2$ (2) $M_{12} = L_2/L_1$ (3) $M_{12} = \sqrt{L_1 L_2}$ (4) $M_{12} = \sqrt{L_1 / L_2}$

Ans. (3)

67. In transformer, power of secondary coil is :–

(1) less than primary coil
(2) more than primary coil
(3) more in step up and less in step down than primary coil
(4) more in step down and less in step up than primary coil

Ans. (1)

68. If the input voltage of a transformer is 2500 volts and output current is 80 ampere. The ratio of number of turns in the primary coil to that in secondary coil is 20 : 1. If efficiency of transformer is 100%, then the voltage in secondary coil is :–

(1) $\frac{2500}{20}$ volt (2) 2500 × 20 volt (3) $\frac{2500}{80 \times 20}$ volt (4) $\frac{2500 \times 20}{80}$ volt

Ans. (1)

69. A step up transformer has turn ratio 10 : 1. A cell of e.m.f. 2 volts is fed to the primary. Secondary voltage developed is :–

(1) 20 V (2) 10 V (3) 2 V (4) Zero

Ans. **(4)**

70. The flux linked with a coil at any instant 't' is given by $\phi = 10t^2 - 50t + 250$. The induced emf at t = 3 s is :–

(1) 190 V (2) – 190 V (3) – 10 V (4) 10 V

Ans. **(3)**

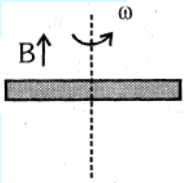
71. Two coaxial solenoids are made by winding thin Cu wire over a pipe of cross–section area A = 10 cm^2 and length = 20 cm. If one of the solenoids has 300 turns and the other 400 turns, their mutual inductance is :–

(1) $2.4\pi \times 10^{-5}$ H (2) $4.8\pi \times 10^{-4}$ H (3) $4.8\pi \times 10^{-5}$ H (4) $2.4\pi \times 10^{-4}$ H

Ans. **(4)**

DYNAMIC & ROTATIONAL E.M.F. GENERATOR

72. A conducting rod of length $2l$ is rotating with constant angular speed ω about its perpendicular bisector. A uniform magnetic field $\vec{B}$ exists parallel to the axis of rotation. The emf induced between two ends of the rod is :–



(1) $B\omega l^2$ (2) $\frac{1}{2}B\omega l^2$ (3) $\frac{1}{8}B\omega l^2$ (4) Zero

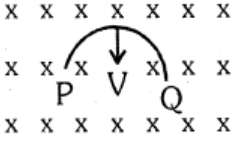
Ans. **(4)**

73. A conducting rod is 1m length rotating with a frequency of 50 rev/sec. about its one of end inside the uniform magnetic field of 6.28 mT. The value of induced emf between end of rod is :–

(1) 1 V (2) 2 V (3) 0.5 V (4) 0.25 V

Ans. **(1)**

74. A semici8rcle loop PQ of radius 'R' is moved with velocity 'v' in transverse magnetic field as shown in figure. The value of induced emf. between the ends of loop is :–

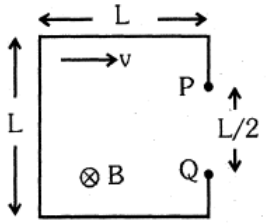


(1) Bv (πr), end 'P' at high potential (2) 2 BRv, end P at high potential

(3) 2 BRv, end Q at high potential (4) $B\frac{\pi R^2}{2}v$, end P at high potential

Ans. (3)

75. The loops shown moves with a constant velocity 'v' in a uniform magnetic field of magnitude 'B' directed into the paper. The potential difference between P and Q is 'e' :–



(1) $e = \frac{BLv}{2}$, Q is positive with respect to P

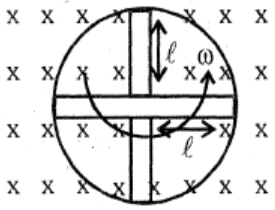
(2) $e = \frac{BLv}{2}$, P is positive with respect to Q

(3) e = 0

(4) e = BLv, Q is positive with respect to P

Ans. (2)

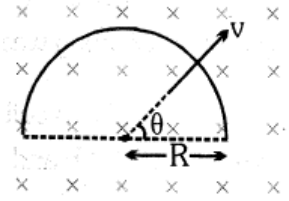
76. A conducting wheel in which there are four rods of length *l* as shown in figure is rotating with angular velocity ω in a uniform magnetic field B. The induced potential difference between its centre and rim will be :–



(1) $2B\omega l^2$ (2) $\sqrt{Bl^2\omega}$ (3) $\frac{Bl\omega}{2}$ (4) $\frac{Bl2\omega}{2}$

Ans. (4)

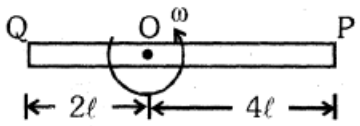
77. A semi circular loop of radius R is placed in a uniform magnetic field as shown. It is pulled with a constant velocity. The induced emf in the loop is :–



(1) Bv (πR) cosθ (2) Bv(πR) sinθ (3) Bv(2R) cosθ (4) Bv(2R) sinθ

Ans. (4)

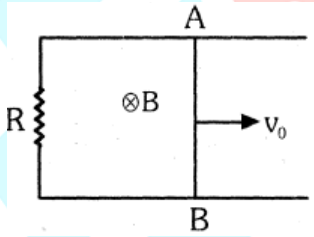
78. A conducting rod rotates with a constant angular velocity 'ω' about the axis which passes through point 'O' and perpendicular to its length. A uniform magnetic field 'B' exists parallel to the axis of the rotation. Then potential difference between the two ends of the rod is :–



(1) $6B\omega l^2$ (2) $B\omega l^2$ (3) $10B\omega l^2$ (4) Zero

Ans. (1)

79. Two long parallel metallic wires with a resistance 'R' form a horizontal plane. A conducting rod AB is one the wires shown in figure. The space has magnetic field pointing vertically downwards. The rod is given an initial velocity 'v_0'. There is no friction in the wires and the rod. After a time 't' the velocity v of the rod will be such that :–



(1) $v > v_0$ (2) $v < v_0$ (3) $v = v_0$ (4) $v = -v_0$

Ans. (2)

80. The armature coil of dynamo is rotating. The generated induced emf varies and the number of magnetic lines of force also varies. Which of the following condition is correct:–

(1) lines of flux will be minimum, but induced emf will be zero.

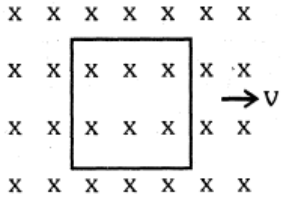
(2) lines of flux will be maximum, but the induced emf will be zero

(3) lines of flux will be maximum, but induced emf will be not be zero

(4) the lines of flux will be maximum, and the induced emf will be also maximum.

Ans. (2)

81. A conducting square loop of side *l* and resistance R moves in its plane with a uniform velocity perpendicular to one of its sides. A uniform and constant magnetic field B exists along the perpendicular to the plane of the lop as shown in the figure. The current induced in the loop is :–



(1) B*l*v/R, clockwise
(2) B*l*v/R, anticlockwise
(3) 2 B*l*v/R, anticlockwise
(4) zero

Ans. (4)

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

(1) half (2) two times (3) four times (4) unchanged

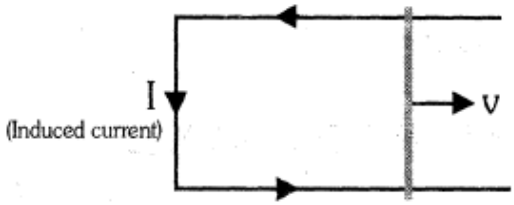
Ans. (2)

83. Dynamo which produces electricity, is a source of :

(1) gravity (2) magnetism (3) e.m.f. (4) electrolysis

Ans. (3)

84. For given arrangement (in horizontal plane) the possible direction of magnetic field :–



(1) towards right (2) towards left
(3) vertically upward (4)vertically downward

Ans. (4)

85. A metallic disc of radius 'R' is rotating about its geometrical axis with constant angular speed 'ω' in external magnetic field B which is perpendicular to the plane of the disc then induced emf between the centre and any peripherical point of the disc is given by :–

(1) $\pi\omega BR^2$ (2) ωBR^2 (3) $\frac{\pi\omega BR^2}{2}$ (4) $\frac{\omega BR^2}{2}$

Ans. (4)

86. Which of the following is correct for periodic electromagnetic induction :–

(1) maximum flux, zero emf (2) zero flux, maximum emf
(3) zero flux, zero emf (4) (1) & (2) both

Ans. (4)

87. Dynamo is based on the principle of :–

(1) electro magnetic induction (2) induced current
(3) induced magnetism (4) Faraday effect

Ans. (1)

88. Phase difference between induced emf and flux for a coil rotating in magnetic field :–

(1) 0 (2) $\pi/2$ (3) π (4) 2p

Ans. (2)

89. In an AC generator, a coil with N turns, all of the same area A and total resistance R, rotates with frequency ω in a magnetic field B. The maximum value of emf generated in the coil is :–

(1) NABω (2) NABRω (3) NAB (4) NABR

Ans. (1)

90. The electric generator produce electric current based on which principle :–

(1) Ohm's law (2) Faraday's law of EMI

(3) Ampere's law (4) Biot – savart's law

Ans. (2)

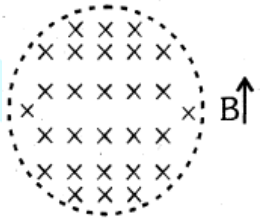
91. A rectangular loop of sides a & b is placed in magnetic field B. The emf induced in coil when normal of coil makes angle ωt with B :–

(1) BAωcosωt (2) BAωsinωt (3) –BAωsinωt (4) –BAωcosωt

Ans. (2)

INDUCED ELECTRIC FIELD

92. In this given figure if magnetic field increases with time then pattern of induced electric field lines will be :–



(1) A.C.W. concentric circular field lines in the plane of the paper

(2) C.W. concentric circular field lines in the plane of the paper

(3) A.C.W. concentric circular field lines, perpendicular to the plane of the paper

(4) C.W. concentric circular field lines, perpendicular to the plane of the paper

Ans. (1)

93. A nonconducting circular ring of radius 4 cm is placed in a time varing magnetic field with rate of 0.2T/s. If 2C charge placed at its circumference then electric force on this charge will be :–

(1) 4×10^{-3} N (2) 8×10^{-3} N (3) 6×10^{-2} N (4) 8×10^{-2} N

Ans. (2)

94. As a result of change in the magnetic flux linked to the closed loop shown in the figure, an e.m.f. V volt is induced in the lop. The work done (joules) in taking a charge Q coulomb once along the loop is :–

(1) QV (2) QV/2 (3) 2QV (4) Zero

Ans. (1)