PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

ELECTROMAGNETIC INDUCTION

Mcqs

1. The rate of change of magnetic flux linked with the coil is equal to the magnitude of induced e.m.f.' this is the statement of

A. Lenz's law

B. Gauss's law

C. newton's law

D. Faraday's law

Answer: D

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2. The magnitude of induced emf during electromagnetic induction, is directly proportional to

A. electric flux

B. rate of change of magnetic flux

C. magnetic field

D. electric field

Answer: B

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3. Whenever the magnet flux linked with a coil changes, then is an induced emf in the circuit. This emf lasts

A. for ever

B. for a long time

C. for a short time

D. so long as the change in flux take place

Answer: D

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4. The induced emf can be produced by changing

A. strength of the magnetic field

B. area of the coil rotating in a field

C. direction of the magnetic field

D. either 'a' or 'b' or 'c'

Answer: D

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5. The magnitude of induced e.m.f. in a conductor, depends upon

A. resistance of the conductor

B. strength of the magnetic field

C. orientation of the conductor

D. rate of change of flux linkage with the conductor

Answer: D

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6. Faraday's law are consequence of conservation

A. energy

B. magnetic field

C. charge

D. both 'a' and 'b'

Answer: D

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7. When a coil is rotated in a magnetic field, with steady speed, then

A. no e.m.f. is induced

B. a periodic e.m.f. is induced

C. unidirectional e.m.f. is induced

D. multidirectional e.m.f. is induced

Answer: B

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8. The induced emf produced when a magnet is inserted into a coil does not depend upon the

A. resistance of the coil

B. number of turns in the coil

C. magnetic moment of the magnet

D. speed of the approach of the magnetic

Answer: C

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9. If a straight conductor is moved with a uniform velocity at right angle to a uniform magneti field then e.m.f. induced in it is

A. $e = -B/v$

B. $e = B/v^2$

C. $e = B/lv$

D. $e = l/vB$

Answer: A

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10. If a conductor is rotating about its one end in a uniform magnetic field then an emf induced in it is

A. $e = -BAf$

B. $e = +BAf^2$

C. $e = B/Af$

D. $e = B$

Answer: A

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11. The direction of the induced $e.m.f.$ is determined by

A. right hand rule

B. right hand screw rule

C. Flemings right hand rule

D. Flemings left hand rule

Answer: C

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12. The phenomenon of electromagnetic induction was discovered by

A. Fleming

B. Oersted

C. Faraday

D. Henry

Answer: C

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13. Magnetic flux through a coil depends upon

A. number of turns

B. area

C. magnetic field

D. all of these

Answer: D

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14. If any surface is parallel to magnetic lines of forces, then magnetic flux linked with it is

A. very small but not zero

B. infinite

C. large but not finite

D. zero

Answer: D

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15. Negative sign appearing in Faraday's law of electromagnetic induction indicates that

A. the induced e.m.f. is produced only when magnetic flux decreases

B. the induced emf is opposite to the direction of magnetic flux

C. the induced emf opposes the changes in magnetic flux

D. none of these

Answer: C

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16. A magnet is moved towards a coil (i) quickly (ii) slowly, then the induced e.m.f. is

A. larger in case (i)

B. smaller in case (i)

C. equal in both cases

D. cannot say

Answer: A

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17. A coil is being moved towards a stationary magnet (i) rapidly (ii) slowly. Induced current in the coil is

A. larger in case (i)

B. smaller in case (i)

C. equal in both cases

D. both 'a' and 'b'

Answer: D

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18. When a magnet is moved with its south pole towards the coil, then the nearer face of the coil behaves as a

A. N-pole

B. S-pole

C. $+ve$ charge

D. $-ve$ charge

Answer: B

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19. When a magnetic is moved with its N pole away from the coil, then the nearer face of the coil behaves as a

A. N-pole

B. S-pole

C. $+ve$ charge

D. $-ve$ charge

Answer: B

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20. Which of the following phenomenon makes use of electromagnetic induction?

A. Magnetising an iron piece with a bar magnet

B. Magnetising a soft iron by placing it inside a current carrying solenoid

C. charging a storage battery

D. Generation of hydro electricity

Answer: D

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21. Induced emf can be produced by

A. moving a magnet near a circuit

B. moving a circuit near a magnet

C. changing the current in one circuit near the other

D. all of these

Answer: D

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22. A copper rod moves parallel to the horizontal direction. The emf. Induced will be maximum at the

A. equator

B. latitude 30°

C. latitude 60°

D. poles

Answer: D

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

A. Lenz's law

B. Newton's law

C. Faraday's law

D. Biot savart's law

Answer: A

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24. Lenz's law is a consequence of law of conservation of

A. mass

B. charge

C. energy

D. momentum

Answer: C

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25. Lenz's law provides a relation between

A. current and magentic field

B. force on a conductor and magnetic field

C. induced emf and the magnetic flux

D. all of these

Answer: A

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26. When a magnet is moved towards a coil the direction of induced current is clockwise. If the magnet is moved away from the coil, the direction of induced current will be

A. clockwise

B. anticlockwise

C. zero

D. any direction

Answer: B

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27. A horizontal straight conductor along east-west direction falls under gravity, then there is

A. no induced emf along the length

B. no induced current along the length

C. an induced current from west to east

D. an induced current from east to west

Answer: C

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

A. rate of change of magentic flux

B. initial magnetic flux only

C. total change in magnetic flux

D. final magnetic flux only

Answer: C

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29. If the magnetic field is doubled through a coil of number of turns 'n' then the induced emf will be

A. 4 times

B. 3 times

C. two times

D. 1 times

Answer: C

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30. The 5×10^{-4} magnetic flux lines are passing through a coil of 100 turns. If the emf induced through the coil is 5mV, the time interval will be

A. 1 s

B. 0.1 s

C. 0.01 s

D. 0.001 s

Answer: B

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31. 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. 50 A

B. $5A$

C. $1A$

D. $0.5A$

Answer: D

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32. A coil of cross sectional area 100 cm^2 is placed in the magnetic field, which changes to $4 \times 10^{-2} Wb / cm^2$ within 5s. What will be the current across 5Ω resistance?

A. 0.016 A

B. 0.16 A

C. 1.6 A

D. 16.0 A

Answer: B

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33. The magnetic flux ϕ (in weber) in a closed circuit of resistance 10Ω varies with time t (in secnod) according to equation $\phi = 6t^2 - 5t + 1$. The magnitude of induced current at $t = 0.25$ s is

A. 1.2 A

B. 0.8 A

C. 0.6 A

D. 0.2 A

Answer: D

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34. A wire is moving ini the magnetic field of B, if the cross sectional area of wire becomes double, then what will be the direction of induced emf?

A. No change

B. Reverse

C. Makes and angle θ

D. Both 'b' and 'c'

Answer: A

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35. A conductor is moving in the magnetic field B the induced current is I. if the magnetic field is doubled, the induced current will

A. remain the same

B. be half

C. be double

D. be four times

Answer: C

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36. 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 $0.1 V$, when it is removed from the field in time t. The value of t is

A. 0.01 s

B. 0.1 s

C. 1 s

D. 10 s

Answer: B

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37. Aconductor of lengfht 0.4 m is moving with a speed of 7 m/s perpendicular to a magnetic field of intensity$0.9Wb/m^2$ .The induced emf across the coduct is

A. 1.26 V

B. 2.52 V

C. 5.04 V

D. 25.2 V

Answer: B

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38. A conductor is moving with the velocity v in the magnetic field and induced current is I. If the velocity of conductor becomes double, the induced current will be

A. 0.5 I

B. $\sqrt{2}I$

C. $2I$

D. $4I$

Answer: C

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39. A wire is moving with velocity 12×10^{-2}m/s in a magnetic field of 0.5 T. if the induced emf is 9 mV, the length of wire is

A. 150 cm

B. 15 cm

C. 1.5 cm

D. 0.15 cm

Answer: B

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40. Induced emf produced in a coil rotating in a magnetic field will be maximum when the angle between the axis of coil and direction of magnetic field is

A. 0°

B. 90°

C. 45°

D. 180°

Answer: a

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41. If a conductor is moving in the north direction and magnetic field is applied vertically upwards, the change in flux is 2×10^{-4} Wb within 2s. Is the resistance of conductor is 5Ω, then the magnitude of induced current will be

A. 0.02 mA

B. 0.2 mA

C. 0.002 mA

D. 2 mA

Answer: A

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42. A straight conductor of length 4 m moves at a speed of 10 m/s when the conductor makes an angle of 30° with the direction of magnetic induction 0.1 T. then the induced emf is

A. 1 V

B. 2 V

C. 4 V

D. 8 V

Answer: B

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43. If the flux associated with a coil varies at the rate of 1 Wb/min, the induced emf is

A. 1 V

B. 1/60 V

C. 60 V

D. zero

Answer: B

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44. A metal disc of radius R rotates with an angular velcoity ω about an axis perpendiclar to its plane passing through its centre in a magnetic field B acting perpendicular to the plane of the disc. Calculate the induced emf between the rim and the axis of the disc.

A. $-\dfrac{BR^2\omega}{2}$

B. $-\dfrac{2B\pi^2R^2}{\omega^2}$

C. $-B\pi R^2\omega$

D. $-B\pi R^2$

Answer: A

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45. A coil of area 500 cm^2 having 1000 turns is put perpendicular to a magnetic field of intensity 4×10^{-5}T. if it is rotated by 180° in 0.1 s, the induced emf produced is

A. 20 mV

B. 40 mV

C. 60 mV

D. 80 mV

Answer: B

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46. The magnetic flux linked with the coil changes from 0.1 Wb to 0.04 Wb in 3 s. the emf induced in the coil is

A. 2 V

B. 0.2 V

C. 0.02 V

D. 0.002 V

Answer: C

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47. A metal rod of length 1m is rotated about one of its ends in a place at right angle to a uniform magnetic field of induction 5×10^{-3} T. if it makes 1800 rotations per minute, then the emf iniduced between its ends is

A. 0.471 V

B. 4.71 V

C. 4.17 V

D. 1.47 V

Answer: A

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48. A circular coil of radius 0.5 m and resistance 3.14 Ω is placed in a magneti induction with its plane perpendicular to the field. The rate of charnge of magnetic induction so as to produce a current of 50 mA in a coil is

A. 0.2 Wb/$m^2 s$

B. 0.2 T/s

C. 0.02 T/s

D. both 'a' and 'b'

Answer: D

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49. The induced emf across the secondary coil depends upon

(i) the number of turns n_1 and n_2 in primary and secondary coil respectively.

(ii) the permeability of the medium between the two coils

(iii) area of cross section of two coils

(iv) resistance of wire of two coils

Which of the above is/are true?

A. All are true

B. i,ii,iii

C. iii,iv

D. ii,iii,iv

Answer: B

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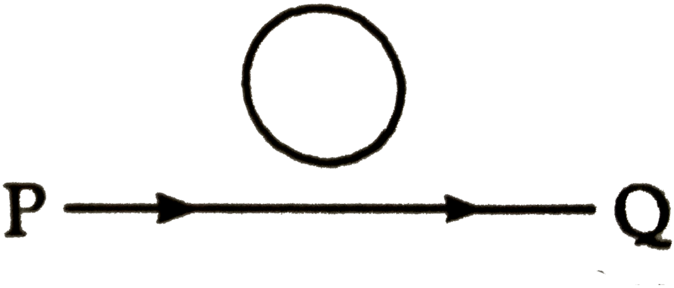
50. A current I is flowing througha straight conductor PQ shown in the figure. A circular loop of metal wire is placed as shown and is coplanar. If the current in the wire is reduced to zero value, there will be



A. no induced current in the loop

B. clockwise current in the loop

C. anticlockwise induced current

D. initially anticlockwise and then clockwise induced currents in the coil

Answer: C

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51. 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. $5A$

B. $0.5A$

C. $0.005A$

D. $500A$

Answer: A

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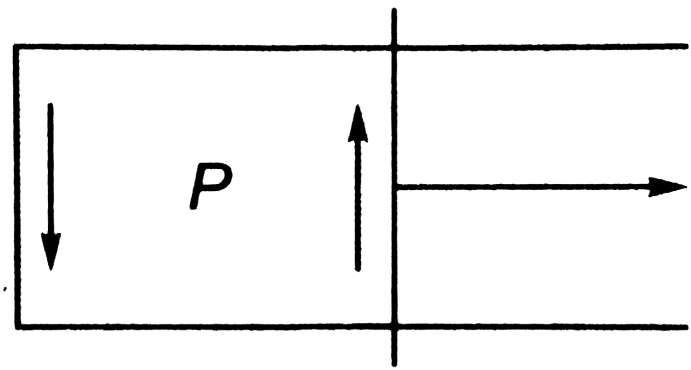
52. A movable wire is moved to the right crossing an anti-clockwise induced current, as shown in figure. The direction of magnetic induction in the region point P



A. to the right

B. to the left

C. up the paper

D. down into the paper

Answer: D

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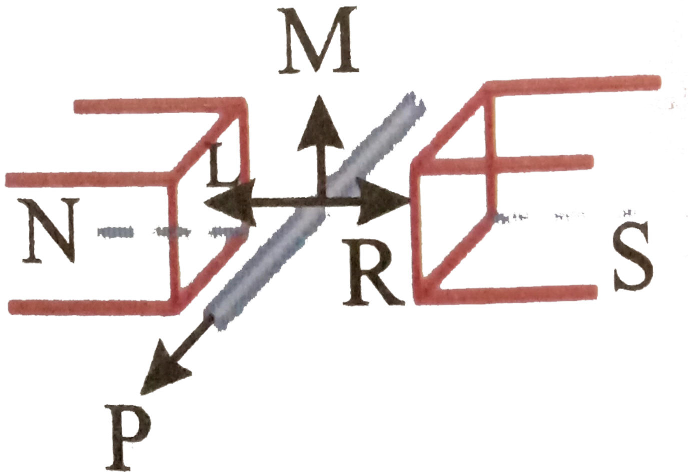
53. An electric potential difference will be induced between the ends of the conductor shown in the figure, if the conductor moves in the direction shown by



A. P

B. Q

C. L

D. M

Answer: D

54. A bar magnet of length L is dropped inside a vertical copper pipe of length $l(l < L)$, it will experience an acceleration q such that

A. $q > g$

B. $q = g$

C. $q < g$

D. $q = lg/L$

Answer: C

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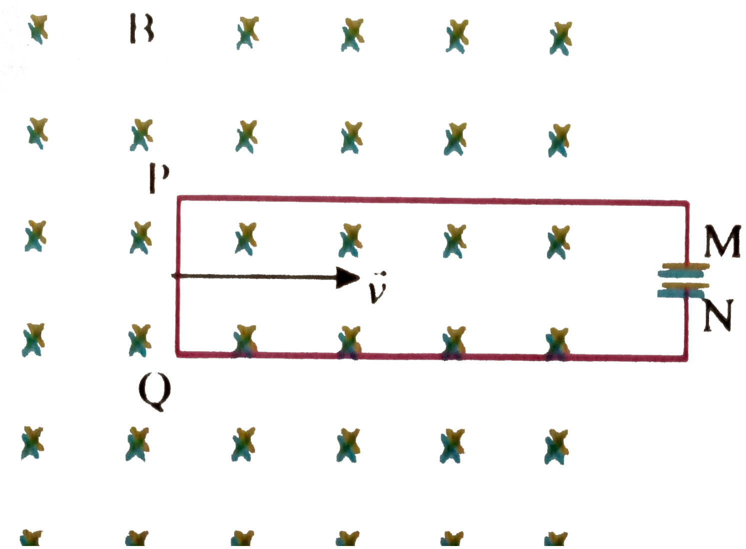
55. A rod PQ is connected to the capacitor plates. The rod is placed in a magnetic field (B) directed downwards perpendicular to the plane of the paper. If the rod is pulled out of magnetic field with velocity $\vec{v}$ as shown in Figure.



A. plate M will be positively charge

B. plate N will be positively charged

C. both plates will be similarly charged

D. no charge will be collected on plates

Answer: A

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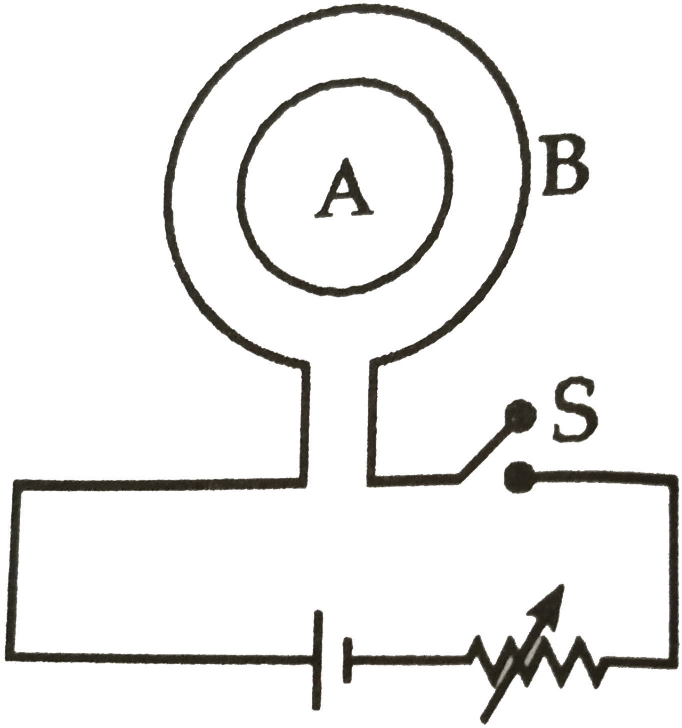

56.

A closed circular wire loop A lies in the plane of longer loop B, which is connected to the battery as shown in the figure. The direction of current induced in the loop A when the switch S is closed is

A. clockwise

B. anticlockwise

C. no current is induced in A and loop A remains stationary

D. no current is induced in A, but A rotates clockwise

Answer: B

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57. A car moves up on a plane road. The induced emf in the axle connecting the two wheel is maximum when it

A. moves at the poles

B. moves at equator

C. remains stationary

D. no emf is induced at all

Answer: A

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58. The magnetic flux linked with coil is proportional to

A. voltage

B. current

C. length of coil

D. resistance of coil

Answer: B

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59. The circulating induced current produced in a metal plate due to the change in magnetic flux are

A. eddy current

B. foucault's current

C. Amperes current

D. both 'a' and 'b'

Answer: D

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60. Which of the following is not an application of eddy currents?

A. Induction furnace

B. Dead beat galvanometer

C. speedometer

D. X-ray crystallography

Answer: D

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61. Induction furnace works on the principle of

A. self induction

B. mutual induction

C. eddy currents

D. Lenz's law

Answer: C

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62. Eddy currents are developed, when

A. conductor is kept in changing magnetic field

B. conductor is kept in steady magnetic field

C. conductor is kept in electric field

D. none of these

Answer: A

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63. Eddy currents do not produce

A. damping

B. heating

C. sparking

D. loss of energy

Answer: C

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

A. $45(\circ)$

B. 0°

C. 180°

D. 90°

Answer: D

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65. Production of induced emf in a coil due to the changes of current in the same coil is

A. self induction

B. mutual induction

C. dynamo

D. none of these

Answer: A

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66. When a rate of change of current in a circuit is unity, the induced emf is equal to

A. thickness of the coil

B. number of turns in the coil

C. coefficient of self induction

D. total flux linked with the coil

Answer: C

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67. The coefficient of self inductance of a coil is

A. $L = e\dfrac{dI}{dt}$

B. $L = e\dfrac{dI}{dr}$

C. $L = -\dfrac{dI}{dr}$

D. $L = -e\dfrac{dt}{dI}$

Answer: D

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68. The inductance of a coil depends on

A. number of turns of the coil

B. geometrical properties of the coil

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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69. In SI, Henry is the unit of

A. resistance

B. capacity

C. inductance

D. current

Answer: C

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70. If an emf of 1 volt is induced in the coil due to the change of current of 1A/s then the inductance is

A. a henry

B. a farad

C. a ohm

D. none of these

Answer: A

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71. The self inductance of a coil does not depend upon

A. the diameter of the coil

B. the length of the coil

C. the resistance of the wire of coil

D. the number of turns in the coil

Answer: C

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72. The self inductance of a coil does not depend upon

A. current

B. time

C. induced voltage

D. resistance of coil

Answer: D

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73. The coils in resistance boxes are made from doubled insulated wire to nullify the effect of

A. heating

B. magnetism

C. pressure

D. self induced emf

Answer: D

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74. If the number of turns per units length of a coils of solenoid is doubled , the self- inductance of the soleniod will

A. become double

B. become half

C. become four times

D. remain unchanged

Answer: C

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75. A coil of insulated wire is connected to a battery. If it is connected to galvanometer, its pointer is deflected, because

A. induced current is set up

B. no induced current is set up

C. the coil behaves as a magnet

D. the number of turns is changed

Answer: A

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76. If the rate of change of current of 1A/s in one coil, induced an emf of 1 V in the neighbouring coil, the mutual inductance of two coils is

A. 1 H

B. 1.5 H

C. 2 H

D. 2.5 H

Answer: A

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77. If the rate of change of current in primary coil is doubled, the induced emf in secondary coil become

A. half

B. same

C. double

D. 4 times

Answer: C

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78. Mutual induction is the produced of induced emf in a coil due to the change of current in the

A. same coil

B. neighbouring coil

C. both a and b

D. neigher a nor b

Answer: B

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79. The mutual inductance depends upon

A. number of turns of a coil

B. geometrical properties of a coil

C. medium between the two coil

D. all of these

Answer: D

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80. The self inductance of a coil is a measure of

A. electrical inertia

B. electrical friction

C. induced emf and the magnetic flux

D. induced current

Answer: A

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81. If $'N'$ is the number of turns in a coil, the value of self inductance varies as

A. N^0

B. N^1

C. N^2

D. N^{-2}

Answer: C

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82. An inductor may store energy in

A. its electric field

B. its coils

C. its magnetic field

D. both in electric and magentic fields

Answer: C

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83. One henry is equal to

A. 1 weber/ampere

B. 1 weber/volt

C. 1 weber ampere

D. 1 weber volt

Answer: A

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84. 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. double

C. halved

D. squared

Answer: B

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

A. L

B. 2 L

C. L/2

D. L/4

Answer: B

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86. The inductance of a coil is proportional to

A. its length

B. the resistance of the coil

C. the number of turns

D. square of number of turns

Answer: D

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87. When the current in a coil charges from 2A to 4A in 0.05 s, emf of 8 volt is induced in the coil. The coefficient of self induction of the coil is -

A. 0.1 H

B. 0.2 H

C. 0.3 H

D. 0.4 H

Answer: B

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88. What id the self -inductance of a coil which produce 5 V when the current changes from 3 A to

2 A in one millisecond ?

A. 5 mH

B. 50 mH

C. 5 H

D. 50 H

Answer: A

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89. If the rate of change of current is 1A per second in one coil induces an emf of 2 V in the neighbouring coil, the mutual inductance of two coils is

A. 2 H

B. 1.5 H

C. 1 H

D. 2.5 H

Answer: A

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90. If the current increases from zero to 1A in 0.1 s in a coil of 5 mH then magnitude of induced emf will be

A. 5 V

B. 0.5 V

C. 0.05 V

D. 0.005 V

Answer: C

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91. The self inductance of the coil of 100 turns, in which a current of 4A produces a flux of 40 Wb is

A. 10 H

B. 1 H

C. 0.1 H

D. 0.01 H

Answer: A

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92. A current of 3A, in one coil, causes a flux in the second coil of 2000 turns to change by $6 \times 10^{-4} Wb$ per turns of the secondary coil. The mutual inductance of the pair of coils is

A. 6 H

B. 2 H

C. 0.4 H

D. 4 H

Answer: C

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93. A coil with air inside it has a self inductance of 0.05 H. A soft iron rod of relative permeabiilty 100 is introduced inside the coil. The value of self inductance is

A. 5 H

B. 0.05 H

C. 2.5 H

D. 10 H

Answer: A

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

A. 1 J

B. 0.5 J

C. 0.05 J

D. 0.1 J

Answer: C

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95. When a wheel with metal spokes 1.2 m long rotates in a magnetic field of flux density 5×10^{-5} T normal to the plane of the wheel, an e.m.f. of 10^{-2} V is induced between the rim and the axle. Find the rate of rotation of the wheel.

A. 44 rps

B. 88 rps

C. 22 rps

D. 11 rps

Answer: A

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96. A choke coil has.

A. high inductance and high resistance

B. high inductance and low resistance

C. low inductance and high resistance

D. low inductance and low resistance

Answer: B

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97. AMPERE'S CIRCUITAL LAW

A. inductor

B. resistor

C. condenser

D. diode

Answer: C

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98. The displacement current was first postulated by

A. Coulomb

B. Faraday

C. Maxwell

D. Van-de Graff

Answer: C

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99. A current which comes into play in a region where the electric field is changing with time is called..........

A. displacement current

B. eddy current

C. alternating current

D. convenction current

Answer: A

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100. The displacement current is

A. $I_D = \varepsilon_0 \frac{d\phi_E}{dt}$

B. $I_D = \frac{1}{\varepsilon_0} \frac{d\phi_E}{dt}$

C. $I_D = \varepsilon_0 \frac{d^2\phi_E}{dt}$

D. $I_D = \frac{1}{\varepsilon_0} \frac{d^2\phi_E}{dt}$

Answer: A

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101. Which one of the following equations represents the modified from of Ampere's circuital law?

A. $\oint \overrightarrow{B} \cdot \overrightarrow{d} l = \mu_0 I$

B. $\oint \overrightarrow{B} \cdot \overrightarrow{d} l = \frac{I}{\mu_0}$

C. $\oint \overrightarrow{B} \cdot \overrightarrow{d} l = \mu_0 \left[I + e_0 \frac{d\phi_E}{dt} \right]$

D. $\oint \overrightarrow{B} \cdot \overrightarrow{d} l \left[I - e_0 \frac{d\phi_E}{dt} \right]$

Answer: C

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102. A magnetic field can be produced by

A. steady conduction current

B. time varying electric field

C. both 'a' and 'b'

D. neigher 'a' nor 'b'

Answer: C

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103. the wave of electric and magnetic field both varying in space and time is

A. matter wave

B. sound wave

C. longitudinal wave

D. electromagnetic wave

Answer: D

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104. A transformer is based on the principle of

A. mutual induction

B. self induction

C. Ampere's law

D. X-ray crystallography

Answer: A

Watch Video Solution

105. The core of a transformer is laminated to reduce

A. eddy current

B. hysteresis

C. resistance in winding

D. none of these

Answer: A

Watch Video Solution

106. 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

107. A transfomer is employed to

A. obtain a suitble dc voltage

B. convert dc into ac

C. obtain a suitable ac voltage

D. convert ac into dc

Answer: C

Watch Video Solution

108. What is increase in step-down transformer?

A. voltage

B. current

C. power

D. current density

Answer: B

Watch Video Solution

109. A device which converts low ac voltage at high current into high ac voltage at low current is

A. electrochemical cell

B. photo cell

C. transformer

D. rectifier

Answer: C

Watch Video Solution

110. Why are electromagnets made of soft iron?

A. hysteresis losses

B. eddy current losses

C. force opposing electric current

D. none of these

Answer: A

Watch Video Solution

111. The transformation ratio in the step -up transformer is

A. one

B. greater than one

C. less than one

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

Answer: B

Watch Video Solution

112. 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

113. 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. 1.5 P

C. P

D. 2/5 P

Answer: C

Watch Video Solution

114. 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. 240 V, 5A

B. 240 V, 10 A

C. 60 V, 20 A

D. 120 V, 20 A

Answer: A

Watch Video Solution

115. 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. 1600 A

B. 20 A

C. $4A$

D. 1.5 A

Answer: C

Watch Video Solution

116. 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. 100 V, 16 SA

B. 40 V, 40 A

C. 160 V, 10 A

D. 80 V, 20 A

Answer: B

Watch Video Solution

117. 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

118. 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 transfomer

Answer: B

Watch Video Solution

119. We can reduce eddy currents in the core of transformer

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

Watch Video Solution

120. 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

121. The efficiency of transfomer is very high because

A. there is no moving part in a transfomer

B. it produces very high voltage

C. it produces very low voltage

D. none of these

Answer: A

Watch Video Solution

122. 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. 0.08 A

B. 0.4 A

C. $5A$

D. $10A$

Answer: D

Watch Video Solution

123. 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. 100 A

B. 200 A

C. 22 A

D. 11A`

Answer: A

Watch Video Solution

124. 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. $0.4A$

C. $0.04A$

D. $0.2A$

Answer: B

Watch Video Solution

125. A step up transformer connected to a $220V\,AC$ line is to supply $22kV$ 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 $10mA$. The turn ratio of the transformer is

A. 50

B. 100

C. 150

D. 200

Answer: B

Watch Video Solution

126. A transformer is employed to

A. change the alternating potential

B. change the alternating current

C. to prevent the power loss in alternating current flow

D. to increases the power of current source

Answer: A

Watch Video Solution

127. 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. 48 V

B. 24 V

C. 12 V

D. 6 V

Answer: C

Watch Video Solution

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

A. 45 V

B. 15 V

C. 90 V

D. 300 V

Answer: A

Watch Video Solution

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

A. $3A$

B. 1.5 A

C. 0.3 A

D. 0.15 A

Answer: D

Watch Video Solution

130. Voltage in the secondary coil of a transfomer does not depend upon

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

Watch Video Solution

131. 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 these

Answer: C

Watch Video Solution

132. 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

133. 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

134. 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

135. 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. 20 A

B. $10A$

C. $11A$

D. $5A$

Answer: B

Watch Video Solution

136. Quantity that remains unchanged in a transformer is

A. voltage

B. current

C. frequency

D. none of these

Answer: C

Watch Video Solution

137. 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. $48A$

C. $192A$

D. $144A$

Answer: A

Watch Video Solution

138. 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: B

Watch Video Solution

139. Core of transformer is made up

A. soft iron

B. steel

C. iron

D. alnico

Answer: A

Watch Video Solution

140. 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. 40 A, 16 A

B. 16 A, 40 A

C. 20 A, 40 A

D. 40 A, 20 A

Answer: A

Watch Video Solution

141. 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. 20 A

B. $10A$

C. $2A$

D. $1A$

Answer: A

Watch Video Solution

142. 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

143. Alternating currents can be produced by a

A. dynamo

B. choke coil

C. transformer

D. electric motor

Answer: A

Watch Video Solution

144. An emf induced in a coil rotating in a uniform magnetic field is given by

A. $e = e_0 \sin \omega t$

B. $e_0 = e \sin \omega t$

C. $e = \sin \omega t$

D. $e = e_0 \sin \omega$

Answer: A

Watch Video Solution

145. The maximum value of emf indued in a coil rotating in a uniform magnetic field is called as

A. peak emf

B. rms emf

C. D.C. emf

D. all of these

Answer: A

Watch Video Solution

146. The alternaing current of equivalent value of $I_0 / \sqrt{2}$ is

A. peak current

B. rms current

C. D.C. current

D. all of these

Answer: B

Watch Video Solution

147. The peak value of the a.c. current flowing throw a resistor is given by

A. $I_0 = e_0 / R$

B. $I = e / R$

C. $I_0 = e_0$

D. $I_0 = R / e_0$

Answer: A

Watch Video Solution

148. Alternating current can be measured with the help of

A. hot wire ammeter

B. hot wire voltmeter

C. moving magnet galvanometer

D. suspended coil type galvanometer

Answer: A

Watch Video Solution

149. D.C. ammeter is connected in a circuit through which an a.c. emf of 50 Hz is flowing. The ammeter will read

A. zero

B. maximum current

C. peak value of current

D. r.m.s. value of the current

Answer: A

Watch Video Solution

150. The r.m.s. value of an alternating current is

A. less than zero

B. equal to its peak value

C. less than its peak value

D. greater than its peak value

Answer: C

Watch Video Solution

151. The maximum value of A.C. emf in a complete cycle is

A. $2nAB\omega$

B. $nAB\omega$

C. $nAB\omega/2$

D. $3nAB\omega$

Answer: B

Watch Video Solution

152. A voltmeter reads V volts in an A.C. circuit then V is

A. peak value of the voltage

B. peak value of the current

C. r.m.s. value of the current

D. r.m.s. value of the voltage

Answer: D

Watch Video Solution

153. AC measuring instruments measures

A. peak value

B. rms value

C. rms value of the current

D. rms value of the voltage

Answer: B

Watch Video Solution

154. In an AC circuit, the mass value of the current I_{rms} is related to the peak current I_0 as

A. $I_{rms} = I_0 / \pi$

B. $I_{rms} = I_0 / \sqrt{2}$

C. $I_{rms} = \pi I_0$

D. $I_{rms} = \sqrt{2} I_0$

Answer: B

Watch Video Solution

155. If an AC ammeter reads I A in an AC circuit, then the peak value of the current is

A. $I / \sqrt{2}$

B. I

C. $\sqrt{2}I$

D. $2I$

Answer: C

Watch Video Solution

156. The average value of alternating current over a complete cycle is

A. 0

B. $2I_0$

C. $I_0 / \sqrt{2}$

D. $I_0 / 2$

Answer: A

Watch Video Solution

157. Alternating current can not be measured by D.C. Ammeter because

A. AC is virtual

B. AC changes its direction

C. AC can bot pass through DC ammeter

D. average value of AC for complete cycle is zero

Answer: D

Watch Video Solution

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

A. dynamo

B. generator

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

159. In a simple circuit with resistance, phase between AC emf and AC current is

A. 0°

B. 90°

C. 180°

D. 270°

Answer: A

Watch Video Solution

160. The working of dynamo is based on principle of

A. electromagnetic induction

B. self induction

C. mutual induction

D. none of these

Answer: A

Watch Video Solution

161. A coil of cross-sectional area A having n turns is placed in uniform magnetic field B. When it is rotated with an angular velocity ω, the maximum e.m.f. induced in the coil will be :

A. $nAB\omega$

B. nAB/ω

C. $nA\omega/B$

D. $B\omega/nA$

Answer: A

Watch Video Solution

162. If the instantaneous current in a circuit is given by $I = 2\cos(\omega t + \phi)$ amperes, the rms value of the current is

A. 2A

B. $\sqrt{2}A$

C. $2\sqrt{2}A$

D. 0A

Answer: B

Watch Video Solution

163. The frequency of ac mains in India is

A. 30 Hz

B. 50 Hz

C. 60 Hz

D. 120 Hz

Answer: B

Watch Video Solution

164. The peak value of alternating voltage is 423 V. its root mean square value is

A. 300 V

B. 423 V

C. $423\sqrt{2}V$

D. zero

Answer: A

Watch Video Solution

165. A generator produces a time varying voltage given by $V = 240 \sin 120t$, where t is in second. The rms voltage and frequency are

A. 60 Hz and 240 V

B. 19 Hz and 120 V

C. 19 Hz and 170 V

D. 754 Hz and 170 V

Answer: C

Watch Video Solution

166. The rms value of an ac of 50Hz is 10A. The time taken by an alternating current in reaching from zero to maximum value and the peak value will be

A. 0.02 s and 14.14 A

B. 0.01 s and 7.07 A

C. 0.005 s and 7.07 A

D. 0.005 s and 14.14 A

Answer: D

Watch Video Solution

167. Alternating current shows which of the following effects?

A. Chemical effect

B. Magnetic effect

C. Heating effect

D. All of these

Answer: D

Watch Video Solution

168. Alternating current shows which of the following effects?

A. Chemical effect

B. Magnetic effect

C. Heating effect

D. all of these

Answer: C

Watch Video Solution

169. An alternating emf, e=300 sin$100\pi t$ volt, is applied to a pure resistance of 100 Ω. The rms current through the circuit is

A. 2.12 A

B. 0.212 A

C. 20.12 A

D. 0.0212 A

Answer: A

Watch Video Solution

170. What would be the equation of sinusoidal voltage of amplitude 5V, frequency 1 kHz and phase difference zero?

A. e=5 sin 6080 t

B. e=5 sin 6284 t

C. e=0.5 sin 3140 t

D. e=5 sin 314 t

Answer: B

Watch Video Solution

171. A coil of 50 turns, each of area 0.12 m^2 is rotated at a constant speed of 600 revolutioins per minute in a uniform magnetic field of induction 0.02 T about an axis in the plane of the coil and perpendicular to the direction of the field. The maximum emf induced in a coil is

A. 7.536 V

B. 0.75 V

C. 0.075 V

D. 0.0075 V

Answer: A

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172. The opposition offered by an inductance to flow of AC current through it is

A. inductive reactance

B. capacitive reactance

C. impedance

D. all of these

Answer: A

Watch Video Solution

173. The opposition offered by capacitance to flow of A.C. current through it is

A. inductive reactance

B. capacitive reactance

C. impedane

D. all of these

Answer: A

Watch Video Solution

174. The opposition offered by ohmic and non ohmic components is

A. inductive reactance

B. capacitive reactance

C. impedance

D. all of these

Answer: C

Watch Video Solution

175. A ohm is S.I. unit of

A. resistance

B. reactance

C. impedance

D. all of these

Answer: D

Watch Video Solution

176. The inductive reactance of an inductor of inductance L is

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

B. $\frac{1}{2\pi fL}$

C. $2\pi fC$

D. $2\pi fL$

Answer: D

Watch Video Solution

177. The capacitivie reactance of a condenser of capacitance C is

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

B. $\frac{1}{2\pi fL}$

C. $2\pi fC$

D. $2\pi fL$

Answer: A

Watch Video Solution

178. What do you mean by the impedance of LCR-circuit

A. $\sqrt{R^2+(X_L-X_C)^2}$

B. $\sqrt{R^2+(X_L+X_C)^2}$

C. $\sqrt{R+(X_L+X_C)^2}$

D. $\sqrt{X_L-X_C+R}$

Answer: A

Watch Video Solution

179. What will be the phase difference between current and emf when 220 V, 50 Hz ac source is connected to a circuit containing pure resistor?

A. current lags behind voltage in phase

B. current and voltage are in same phase

C. current leads ahead of voltage in phase

D. current and voltage are in opposite phase

Answer: B

Watch Video Solution

180. In a purely inductive circuit, the current is

A. lead the applied emf by $\pi/2$

B. lags behind of applied emf by $\pi/2$

C. in same phase of applied emf

D. none of these

Answer: B

Watch Video Solution

181. In a purely capacitive circuit, the current

A. lead the applied emf by $\pi / 2$

B. lags behind of applied emf by $\pi / 2$

C. in same phase of applied emf

D. none of these

Answer: A

Watch Video Solution

182. Current in the circuit is wattless, if

A. current is alternating

B. resistance in the circuit is zero

C. inductance in the circuit is zero

D. resistance and inductance both are zero

Answer: B

Watch Video Solution

183. With increase in frequency of an AC supply, the inductive reactance:

A. increases

B. decreases

C. remains constant

D. decreases sharply

Answer: A

Watch Video Solution

184. With an increase in the frequency of an AC supply the capacitive reactance

A. increases

B. decreases

C. remains constant

D. decreases sharply

Answer: B

Watch Video Solution

185. Resistance of a resistor is independent on

A. length

B. area of cross section

C. temperature

D. frequency

Answer: D

Watch Video Solution

186. An alternating current of frequency $'f'$ is flowing in a circuit containing a resistance R and a choke L in series. The impedence of this circuit is

A. $R+f$

B. $R=2fL$

C. $R=2\pi fL$

D. $\sqrt{R^2+4\pi^2f^2L^2}$

Answer: D

Watch Video Solution

187. An AC of frequency f is flowing in a circuit containing a resistance R and capacitance C in series. The impedance of the circuit is equal to

A. $R+f$

B. $R+2\pi fC$

C. $R+\frac{1}{2\pi fC}$

D. $\sqrt{R^2+X_C^2}$

Answer: D

Watch Video Solution

188. When the frequency of AC is doubled, the impedance of an RC circuit is

A. doubled

B. halved

C. increases

D. decreases

Answer: D

Watch Video Solution

189. When the frequency of AC is doubled, the impedance of an LCR, circuit is

A. halved

B. doubled

C. increases

D. decreases

Answer: CD

Watch Video Solution

190. The average power dissipated in an AC circuit containing a resistance along is

A. $e_{rms}I_{rms}$

B. $e_{rms}I_{rms}\cos\phi$

C. 0

D. none of these

Answer: A

Watch Video Solution

191. Power consumed in an AC circuit is zero if it is purely

A. resistive circuit

B. inductive circuit

C. capacitive circuit

D. Both 'b' and 'c'

Answer: D

Watch Video Solution

192. The term $\cos \phi$ in an AC circuit is called

A. phase factor

B. power factor

C. frequency factor

D. resonance factor

Answer: B

Watch Video Solution

193. The ratio of tru epower to apparent power, is

A. phase factor

B. power factor

C. frequency factor

D. Q factor

Answer: B

Watch Video Solution

194. The product $e_{rms}I_{rms}$ is called as

A. true power

B. apparent power

C. power factor

D. Q factor

Answer: B

Watch Video Solution

195. The power factor in the circuit is unity, when the circuit contains an ideal

A. resistance

B. conductance

C. capacitance

D. reactance

Answer: A

Watch Video Solution

196. Power in an AC circuit is rated per second at which

A. charge flows

B. work is done

C. energy is spent

D. current alternates

Answer: B

Watch Video Solution

197. In an AC circuit, the electrical energy is consumed in

A. L

B. C

C. R

D. L' and 'C'

Answer: C

Watch Video Solution

198. The average power in LCR series circuit is

A. $e_{rms} I_{rms} \cos \phi$

B. $e_{rms} I_{rms} \sin \phi$

C. $e_{rms} I_{rms}$

D. $e_{rms} I_{rms} \tan \phi$

Answer: A

Watch Video Solution

199. For purely reactive circuit containing only L or C, power factor is

A. 0

B. 1

C. 2

D. 4

Answer: A

Watch Video Solution

200. An inductor of 0.5 H is connected across a 100 V, 50 Hz supply. The reactance of the circuit is

A. 157Ω

B. 1.57Ω

C. 15.7Ω

D. 0.157Ω

Answer: A

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201. An inductance of 100 mH and a resistance of 100 Ω are connected in series and an alternating emf of peak value 100 V, 50 Hz is applied across the combination. The power factor of the circuit is

A. 0.954

B. 9.54

C. 95.4

D. 0.845

Answer: A

Watch Video Solution

202. A resistance of 50Ω is connected in series with a 10 μF capacitance and these are connected to a 20 V, 50 Hz a.c. supply. The total impedance is

A. 121.5 Ω

B. 155.6 Ω

C. 322 Ω

D. 195.5 Ω

Answer: C

Watch Video Solution

203. A capacitor of capacitive reactance 79.62 Ω and a resistance of 100 Ω are connected in series across a.c. source. The phase difference between applied emf and current is

A. $38^\circ 32'$

B. 58°

C. 30°

D. $45^\circ 42'$

Answer: A

Watch Video Solution

204. An inductance of 0.5 H, a capacitance of $1\mu F$ and a resistance of 100 Ω are connected in series and a source of A.C. emf of r.m.s. value 20 V and frequency 50 Hz is connected across the combination. The average power consumed over one cycle is

A. 0.0044 W

B. 0.255W

C. 2.55 W

D. 5.25 W

Answer: A

Watch Video Solution

205. The current flowing through a circuit of resistance 109Ω and an inductance of 0.5 H connected to an A.C. supply of 1`00 V and 50 Hz in series is

A. 0.25 A

B. 0.5232 A

C. 0.75 A

D. 0.85 A

Answer: B

Watch Video Solution

206. In an LCR circuit, inductive reactance and capacitive reactance was found to be equal. The resistance was found to be 20Ω. The probable impedance of the combination is

A. zero

B. 20Ω

C. $40\sqrt{2}\Omega$

D. 400Ω

Answer: B

Watch Video Solution

207. In an AC circuit, the current is given by $i = 5\sin\left(100t - \frac{\pi}{2}\right)$ and the AC potential is $V = 200\sin(100t)$volt. Then the power consumption is

A. 1000 W

B. 40 W

C. 20 W

D. 0 W

Answer: D

Watch Video Solution

208. A $100W200V$ bulb is connected to a $160V$ power supply. The power consumption would be

A. 64 W

B. 80 W

C. 100 W

D. 125 W

Answer: A

Watch Video Solution

209. In an AC circuit voltage applied is e=220 sin 100 t. if the impedance is 110Ω and phase difference between the current and voltage is 60° the power consumption is equal to

A. 55 W

B. 110 W

C. 220 W

D. 330 W

Answer: B

Watch Video Solution

210. An a.c. emf of $e=220 \sin \omega t$ is applied across the capacitor, the power consumption is

A. 0

B. 55 W

C. 110 W

D. 220 W

Answer: A

Watch Video Solution

211. An a.c. emf of e=220 sin $100\pi t$ is passed through the resistance of 1 $k\Omega$. The average power of the a. c. circuit is

A. 48.4 W

B. 34.2 W

C. 24.2 W

D. 12.1 W

Answer: C

Watch Video Solution

212. In an AC circuit with voltage V and current I, the power dissipated is

A. $VI/2$

B. $VI/\sqrt{2}$

C. VI

D. depends on phase voltage V and current I

Answer: D

Watch Video Solution

213. The reactance of capacitor at $50Hz$ is 10Ω. What will be its reactance at $200Hz$?

A. 10 Ω

B. 40 Omega`

C. 2.5Ω

D. 20Ω

Answer: B

Watch Video Solution

214. Power factor of the AC circuit varies between

A. 0 to 0.l5

B. 0.5 to 1

C. 0 to 1

D. 1 to 2

Answer: C

Watch Video Solution

215. The capacitive reactance of a capacitor is d.c. circuit in ohm is

A. zero

B. ωC

C. $1/\omega C$

D. ∞

Answer: D

Watch Video Solution

216. The graph between inductive reactance and frequency is

A. parabola

B. straight line

C. hyperbola

D. an arc of a circle

Answer: B

Watch Video Solution

217. The alternating emf of $e = e_0 \sin \omega t$ is applied across LR series circuit. The impedance and phase angle between current and voltage is

A. $\sqrt{R^2 + X_L^2}, \tan^{-1}\left(\frac{X_L}{R}\right)$

B. $\sqrt{R^2 - X_L^2}, \tan^{-1}\left(\frac{X_L}{R}\right)$

C. $R + X_L, \tan^{-1}\left(\frac{R}{X_L}\right)$

D. $R - X_L, \tan^{-1}\left(\frac{R}{X_L}\right)$

Answer: A

Watch Video Solution

218. The alternating emf of $e = e_0$ sin ωt is applied across capacitor C. the current through the circuit is given by

A. $I = I_0 \sin \omega t$

B. $I = I_0 \sin\left(\omega t + \frac{\pi}{2}\right)$

C. $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$

D. $I = I_0 \sin(\omega t - \pi)$

Answer: B

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219. The current leads the voltage by an angle ϕ which is given by

A. $\tan^{-1}\left(\frac{1}{\omega CR}\right)$

B. $\tan^{-1}(\omega CR)$

C. $\tan^{-1}\left(\frac{\omega C}{R}\right)$

D. $\tan^{-1}\left(\frac{R}{\omega C}\right)$

Answer: A

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220. The power dissipated in alternating circuit with voltage $e = e_0$ sin ωt and current $I = I_0 \sin(\omega t - \phi)$ is

A. $e_0 I_0$

B. $e_{rms} I_{rms} \cos \phi$

C. $e_{rms} I_{rms}$

D. 0

Answer: B

Watch Video Solution

221. The powerr factor in CR circuit is given by

A. $\frac{R}{\omega C}$

B. $\frac{1}{\omega CR}$

C. $\frac{R}{\sqrt{R^2 + \left(\frac{1}{\omega C}\right)^2}}$

D. $\frac{R}{R + \frac{1}{\omega C}}$

Answer: C

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222. For minimum dissipation energy in the circuit, the power factor should be

A. large

B. small

C. moderate

D. can not say

Answer: A

View Text Solution

223. Two electric appliances of power rating W_1 and W_2 at 220 V are connected in series with a source of alternating voltage $e = 220\sqrt{2}\sin\omega t$. The resultant power consumed is

A. $W_1 + W_2$

B. $W_1 - W_2$

C. $\frac{1}{W_1} + \frac{1}{W_2}$

D. $\frac{W_1 W_2}{W_1 + W_2}$

Answer: D

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224. Two electric appliances of power rating W_1 and W_2 t 240 V are connected in parallel with a source of alternating voltage$e = 240\sqrt{2}\sin\omega t$. The resultant power consumed is

A. $W_1 + W_2$

B. $W_1 - W_2$

C. $\frac{1}{W_1} + \frac{1}{W_2}$

D. $\frac{W_1 W_2}{W_1 + W_2}$

Answer: A

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225. The rms value of alternating current which when passed through a resistor produces heat energy four times that produced by directed current of 2 A through the same resistor in same time is

A. 2A

B. 4A

C. 8A

D. 16A

Answer: B

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226. The applied emf lags behind the current by an angle of 45° in the circuit which contains

A. resistance only

B. resistance and inductance

C. capacitance only

D. capacitance and resistance

Answer: D

Watch Video Solution

227. The values of current and voltage in an AC circuits are respectively I=4 sin ωt and $e = 100 \cos[\omega t + (\pi / 3)]$. The phase difference between voltage and current is

A. $\frac{7\pi}{6}$

B. $\frac{6\pi}{5}$

C. $\frac{5\pi}{6}$

D. $\frac{\pi}{3}$

Answer: C

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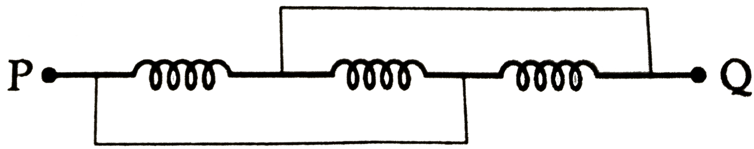
228. Pure inductors each of inductance 3 H are connected as shown in figure. The equivalent inductance of the circuit is



A. 1H

B. 2H

C. 3H

D. 9H

Answer: A

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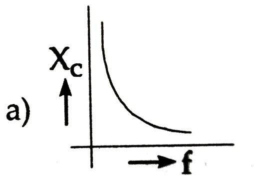
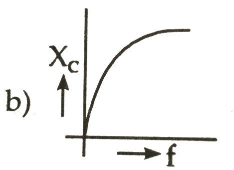
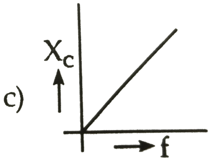
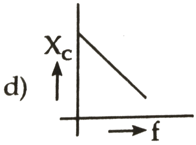
229. Which one of the follwing represents the variation of capacitive reactance (X_C) with the frequency (v) of the voltage source ? .

A. 

B. 

C. 

D. 

Answer: A

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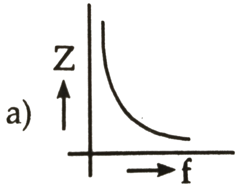
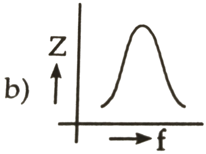
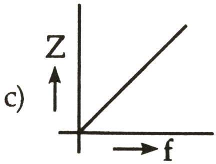
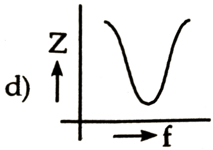
230. Which of the following curves represents the variation of impedence (Z) with frequency f in series LCR circuit?

A. 

B. 

C. 

D. 

Answer: D

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231. The phase angle between current and potential difference in an AC circuit contianing of resistance 4Ω and reactance 3Ω will be

A. $\cos^{-1}(3/5)$

B. $\cos^{-1}(3/4)$

C. $\sin^{-1}(4/5)$

D. $\cos^{-1}(4/5)$

Answer: D

Watch Video Solution

232. Electric power is transmitted over long distances through conducting wires at high voltage because

A. it reduces the possibility of theft of wire

B. this entails less power losses

C. AC generators produce electric power at high voltages

D. AC signal of high voltage travels faster

Answer: B

Watch Video Solution

233. The parallel combination of inductor and capacitor is called as

A. rectifier circuit

B. tank circuit

C. acceptor circuit

D. filter circuit

Answer: B

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234. When a charged condenser is allowed to discharge through inductor the electrical oscillations are produced called as

A. LC oscillations

B. RC oscillations

C. RL oscillations

D. none of these

Answer: A

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235. The frequency of LC oscillation is given by

A. $f = \frac{1}{2\pi\sqrt{LC}}$

B. $f = 2\pi\sqrt{LC}$

C. $f = \frac{1}{\pi\sqrt{LC}}$

D. $f = \frac{1}{4\pi\varepsilon_0}\sqrt{LC}$

Answer: A

Watch Video Solution

236. The system in which energy of the system continuously changes between electric field of capacitor and magnetic field of oscillator to produce oscilaltions is

A. acepter circuit

B. tank circuit

C. rectifier circuit

D. amplifier circuit

Answer: B

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237. In an LCR series circuit the current is

A. in phase with applied emf

B. lags the applied voltage

C. lead the applied voltage

D. may lead or lag behind the applied voltage

Answer: D

Watch Video Solution

238. At resonance, the source current is

A. maximum in a LCR series circuit

B. minimum in a parallel LCR circuit

C. maximum in both series and parallel LCR circuit

D. both 'a' and 'b'

Answer: A

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239. In an LCR series ac circuit the voltage across L, C and R are V_1, V_2 and V_3 respectively The voltage of the source is .

A. $e_R + e_L + e_C$

B. $\sqrt{e_R^2 + (e_L - e_C)^2}$

C. $e_R + e_C - e_L$

D. $\sqrt{(e_R + e_L)^2 + e_C^2}$

Answer: B

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240. Which increase in frequency of an AC supply , the impedance of an L-C-R series circuit

A. remains constant

B. increases

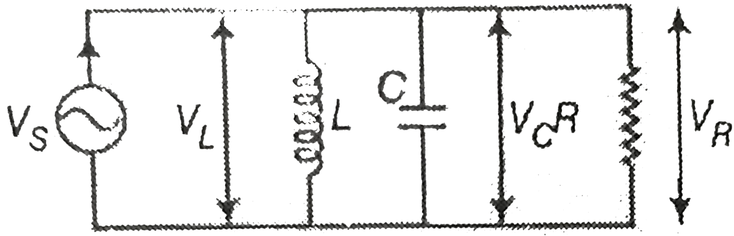
C. decreases

D. decreases at first becomes minimum and then increases

Answer: D

Watch Video Solution

241. An AC source is connected in parallel with an L-C-R circuit as shown.Let l_s, l_L, l_C and l_R denote the currents through and V_s, V_L, V_C and $V_R$the voltage across the corresponding componts.Then,



A. $V_S = V_R + V_L + V_C$

B. $I_S = I_R + I_L + I_C$

C. $(I_R, I_L, I_C) < I_S$

D. I_L, I_C may be $> I_S$

Answer: D

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242. The frequency of A.C. is 50 Hz. How many times the current becomes zero in one second?

A. 50 times

B. 100 times

C. 200 times

D. 25 times

Answer: B

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243. At resonance the peak value of current in a series LCR circuit is

A. $e_0 Z$

B. e_0 / Z

C. e_0

D. e_0 / R

Answer: D

Watch Video Solution

244. In a series LCR circuit, the voltage across the inductance and capacitance are not

A. out of phase with voltage across resistance by 90°

B. equal in magnitude at resonance

C. out of phase with each other by 180°

D. in phase with the source voltage

Answer: D

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245. In an LCR series ac circuit, the current is

A. always in phase with the voltage

B. lags the generator voltage

C. leads the generator voltage

D. none of these

Answer: D

Watch Video Solution

246. In a series LCR circuit, at resonance the

A. total inpedance is $L\omega - (1/C\omega)$

B. toal impedance is R

C. voltage across C and L are in phase

D. the voltage across C lags the source voltage by $\pi / 2$

Answer: B

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247. In an LCR series circuit the capacitance is changed from C to $4C$ For the same resonant fequency the inductance should be changed from L to .

A. 2 L

B. L/2

C. L/4

D. 4L

Answer: C

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248. In an AC circuit $X_C = X_L$. The phase differe3nce between the current and voltage will be

A. 0

B. π

C. $\pi/2$

D. $\pi/4$

Answer: A

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249. A resistor, a capacitor and inductor are connected in series with a source of ac which of the following statement is true? The current in resistor lags behind the

A. current in capacitor

B. current in inductor

C. voltage across capacitor

D. voltage across inductor

Answer: D

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250. In a LCR series circuit, if the phase difference between applied voltage and current is zero then

A. $X_L = X_C$

B. $X_L > X_C$

C. $X_L < X_C$

D. none of these

Answer: A

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251. The series RLC circuit in resonance is called:

A. series resonant

B. parallel resonant

C. reactive circuit

D. none of these

Answer: A

Watch Video Solution

252. In series resonant circuit, at resonance,

A. $Z=\sqrt{R^2+(X_L-X_C)^2}$

B. Z=R

C. $Z=X_L-X_C$

D. $Z=X_C$

Answer: B

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253. In series LCR circuit at resonance,

A. current is maximum and impedance is maximum

B. current is maximum and impedance is minimum

C. current is minimum and impedance is maximum

D. current is minimum and pmpedance is minimum

Answer: B

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254. Power factor in a series R-L-C resonant circuit is

A. equal to 1

B. less than 1

C. greater than 1

D. none of these

Answer: A

Watch Video Solution

255. At resonance series/parallel resonant circuit acts as purely

A. resistive circuit

B. inductive circuit

C. capacitive circuit

D. none of these

Answer: A

Watch Video Solution

256. In resonant circuit, at resonant frequency

A. $X_L = X_C$

B. $Z = R$

C. $X_L > X_C$

D. both 'a' and 'b'

Answer: D

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257. Resonant frequency is given by (for a series L-C-R circuit)

A. $f = \dfrac{1}{2\pi\sqrt{LC}}$

B. $f = \dfrac{1}{\sqrt{LC}}$

C. $f = \dfrac{2\pi}{\sqrt{LC}}$

D. $f = 2\pi\sqrt{LC}$

Answer: A

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258. Resonance curve of a resonant circuit is graphical representation between

A. frequency and current

B. frequency and impedance

C. frequency and reactance

D. none of these

Answer: A

View Text Solution

259. In resonant circuits, at resonance, the phase difference between current and emf is

A. 0

B. π

C. $\pi / 4$

D. $\pi / 2$

Answer: A

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260. In series resonant circuit, at resonance the phase difference between the voltage across inductor and voltage across condenser is

A. $3\pi / 2$

B. $\pi / 2$

C. 0

D. π

Answer: D

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261. Voltage magnification factor of a series resonance circuit is

A. $Q = \omega L / R$

B. $Q = 1 / \omega C R$

C. both a and b

D. neither a nor b

Answer: C

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262. The ratio of voltage across inductor/condenser to the voltage across resistor in a series resonance circuit is

A. voltage magnification factor

B. Q factor

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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263. The voltage across inductor and condenser at resonance is

A. zero

B. of equal magnitude and in phase

C. of equal magnitude and out of phase by π

D. of difference magnitudes and out of phase by π

Answer: C

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264. In an AC circuit resistance, inductance and capacitance are connected in series. The values of potential differences across the three are 70 V, 90 V and 65 V respectively. The value of the potential difference of the AC source is

A. 70 V

B. 225 V

C. 85 V

D. 74.3 V

Answer: D

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265. In LCR series AC circuit, the current

A. is always in phase with voltage

B. always lags behind the generator voltage

C. always leads the generator voltage

D. may be in phase, lag behind or lead by the generator voltage depending on the values of L,C and R

Answer: D

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266. Power delivered by an ac source of angular frequency ω_0 to an LCR series circuit is maximum when .

A. $\omega L = \omega C$

B. $\omega L = \dfrac{1}{\omega C}$

C. $\omega L = R - \dfrac{1}{\omega C}$

D. $\omega C = R - \dfrac{1}{\omega C}$

Answer: B

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267. The phase difference between the current and voltage of LCR circuit in series combination at resonance is

A. zero

B. $\pi/4$

C. $\pi/2$

D. π

Answer: A

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268. A series LCR circuit containing a resistance of 120 ohm has angular resonance frequency $4 \times 10^{3} rads^{-1}$. At resonance, the voltage across resistance and inductance are 60V and 40 V respectively. The values of Land C are respectively

A. 0.2 mH, 32 mμF

B. 0.4 mH,64mμF

C. 0.2 mH,64mμF

D. 0.4 mH, 32mμF

Answer: A

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269. In parallel resonant circuit, at resonance

A. current is maximum and impedance is maximum

B. current is maximum and impedance is minimum

C. current is minimum and impedance is maximum

D. current is minimum and pmpedance is minimum

Answer: C

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270. In parallel resonant circuit, the current through condenser leads the current through inductor by

A. 0°

B. 90°

C. 180°

D. 270°

Answer: C

Watch Video Solution

271. With increase in frequency of ac supply the impedance of the parallel resonant circuit

A. remains constant

B. increases

C. decreases

D. increases at first, becomes maximum and then decreases

Answer: D

View Text Solution

272. In parallel resonant circuit current through condenser leads the source voltage4 by

A. 0°

B. 90°

C. 170°

D. 180°

Answer: B

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273. The series resonant circuit is called as

A. acceptor circuit

B. rejector circuit

C. rectifier circuit

D. transfer circuit

Answer: A

Watch Video Solution

274. The parallel resonance circuit is called as

A. acceptor circuit

B. rejector circuit

C. rectifier circuit

D. transfer circuit

Answer: B

Watch Video Solution

275. An AC circuit consists of a resistor of 5Ω and inductor of 10 mH connected in series with 50 volt, 50 Hz supply. The capacitance that should be connected in series with the circuit to obtain maximum current is

A. $1014\mu F$

B. $10.14\mu F$

C. $1.014\mu F$

D. $101.4\mu F$

Answer: A

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276. An inductance of 0.5 H, a capacitor of capacitance $10^{-9}F$ and a resistane of 100Ω are connected in series across AC source of emf 10 V. the current through the circuit at resonance is

A. $1A$

B. $10A$

C. 0.1 A

D. 0.01 A

Answer: C

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277. A circuit of negligible resistance has an inductane of 10 mH and a capacitance of 0.1 μF. The resonant frequency of the circuit is nearly

A. 5 kHz

B. 2.5 kHz

C. 31.4 kHz

D. 3.14 kHz

Answer: A

Watch Video Solution

278. The current flowing in two branches of parallel resonant circuit at resonance are

A. in phase

B. out of phase by π

C. differ in phase by $\pi / 2$

D. differ in phase by $\pi / 4$

Answer: B

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279. In parallel resonant circuit, the current and voltage at resonance are

A. both maximum

B. both minimum

C. maximum and minimum respectively

D. minimum and maximum respectively

Answer: D

View Text Solution

280. The sharpness of resonance or Q value of resonant circuit with resonant frequency f_r and half power frequency f_1 and f_2 is

A. $Q = \frac{f}{f_2 - f_1}$

B. $Q = \frac{f_2 - f_1}{f_r}$

C. $Q = \frac{f_r}{f_2 + f_1}$

D. $Q = \frac{1}{f_r(f_2 - f_1)}$

Answer: A

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281. The value of impedance in parallel LC circuit at resonance is (assuming inductor and capacitor to be ideal)

A. minimum

B. maximum current

C. infinite

D. zero

Answer: C

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282. An AC voltage of rms value 2V is applied to a parallel combination of L and C in which L=2mH and C=3.2μF. The current through each branch at resonance is

A. 80 mA, 80 mA

B. 80 mA, 60 mA

C. 60 mA, 80 mA

D. 40 mA, 40 mA

Answer: A

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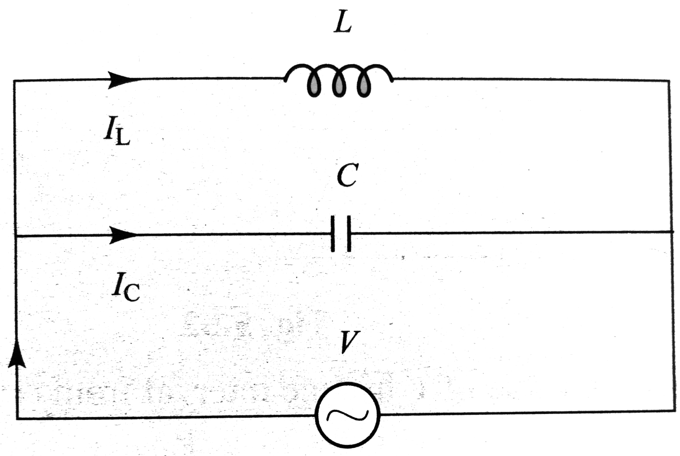
283. For the circuit shown in fig, current in inductance is 0.8A while that in capacitance is 0.6 A. What is the current drawn from the source?



A. 1.4 A

B. 0.2 A

C. 1.0 A

D. 0.1 A

Answer: B

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284. 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. 2

B. 4

C. 6

D. 8

Answer: D

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285. 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. 5×10^{-3}Wb

B. 2.5×10^{-3}Wb

C. 3.5×10^{-3}Wb

D. 4.5×10^{-3} Wb

Answer: A

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286. 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. $25\mu V$

B. $30\mu V$

C. $50\mu V$

D. $60\mu V$

Answer: C

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287. 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. 0.5 V

B. 1 V

C. 1.5 V

D. 2 V

Answer: B

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288. 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. $\frac{2\pi}{3}V$

B. $\frac{4\pi}{3}V$

C. $\frac{5\pi}{3}$

D. $\frac{\pi}{3}V$

Answer: B

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289. 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. 4 L

B. 8 L

C. 16 L

D. 12 L

Answer: C

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290. The inductance of a coil in which a current of 0.1 A yields an energy storage of 0.05 J is

A. 5 H

B. 10 H

C. 12 H

D. 100 H

Answer: B

Watch Video Solution

291. The inductance of a coil which current increases linearly from zero to 0.1 A in 0.2 s producing a voltage of 5 V is

A. 10 H

B. 100 H

C. 1 H

D. 0.1 H

Answer: A

Watch Video Solution

292. The inductance of a coil in which a current of 0.2 A is increasing at the rate of 0.5 A/s represents a power flow of 0.5 W is

A. 10 H

B. 5 H

C. 15 H

D. 50 H

Answer: B

Watch Video Solution

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

A. 25 mH

B. 50 mH

C. 7.5 mH

D. 75 mH

Answer: D

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294. The flux (in weber) in a closed circuit of a resistance 10Ω varies with time t (in seconds) according to equation $\phi = 12t^2 - 5t + 1$. What is the magnitude of induced current at t=0.25 s?

A. $2A$

B. 0.1 A

C. 20 A

D. 0.02 A

Answer: B

Watch Video Solution

295. 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. 2.5 kV

B. 25 kV

C. 250 kV

D. 0.25 kV

Answer: B

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296. A 50 Hz ac current of crest value 2 A flows mutual inductance between the primary and secondary be 0.25 H, the crest voltage induced in the secondary is

A. 15.7 V

B. 1.57 V

C. 17.5 V

D. 157 V

Answer: D

Watch Video Solution

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

A. 6.25 J

B. 62.5 J

C. 65.2 J

D. 26.5 J

Answer: B

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298. A coil is placed in a magnetic field directed downward and increasing from 0 to 18 T in 0.1 s. area of coil is 2 m^2 and resistance 5 Ω. Induced current will be

A. 72 A anticlockwise direction

B. 27 A anticlockwise direction

C. 72 A clockwise direction

D. 27 A clockwise direction

Answer: A

Watch Video Solution

299. A large coil of 10 turns has a resistance 2 Ω. It is kept in a magnetic field of 0.5 T. if the coil is pulled out of the magnetic field uniformly such that its area coming out of the magnetic field is 200 cm^2 / s, the current induced in it is

A. 5 mA

B. 50 mA

C. 2.5 mA

D. 25 mA

Answer: B

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300. 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. 20 mH

B. 50 mH

C. 52 mH

D. 25 mH

Answer: D

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301. The length l of a wire is shaped to form a coil of 1 turn. This coil has self inductance L. if the same length is bend more sharply to form 3 turns, the self inductance will become/remain

A. L

B. 2L

C. 3L

D. 4L

Answer: C

Watch Video Solution

302. Two coils have the mutual inductance of 0.05 H. The current changes in the first coil as $I = I_0 \sin \omega t$, where $I_0 = 1A$ and $\omega = 100\pi \mathrm{rad/s}$. The maximum emf induced in secondary coil is

A. $5\pi V$

B. $7\pi V$

C. $2.5\pi V$

D. πV

Answer: A

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303. A coil of copper having 1000 turns is placed in a magnetic field $B = 4 \times 10^{-3} T$ perpendicular to its plane. The cross-sectional area of the coil is $0.05 m^2$. If it turns through 180° in $0.01 s$, then the e.m.f induced in the coil is

A. 0.2V

B. 0.3V

C. 0.1V

D. 0.4V

Answer: D

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304. A coil of 40Ω resistance has 100 turns and radius $6mm$ us connected to ammeter of resistance of $160ohms$. 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. 0.665 T

B. 0.656 T

C. 0.566 T

D. 5.666 T

Answer: C

Watch Video Solution

305. 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 A/s

B. 2 A/s

C. 0.4 A/s

D. 0.2 A/s

Answer: A

Watch Video Solution

306. In an AC circuit, V and I are given by $V = 100\sin(100t)vo < s, I = 100\sin\left(100t + \frac{\pi}{3}\right)mA$. The power dissipated in circuit is

A. 1.5 W

B. 2.5 W

C. 2 W

D. 3 W

Answer: B

Watch Video Solution

307. A pure resistive circuit element X when connected to an ac supply of peak voltage 400 V gives a peak current of 5 A which is in phase with the voltage. A second circuit element Y, when connected to the same ac supply also gives the same value of peak current but the current lags behind by 90°. If the series combination of X and Y is connected to the same suply, what will be the rms value of current?

A. 2.5A

B. 2A

C. 1A

D. 0A

Answer: A

Watch Video Solution

308. In L-R circit, the A.C. source has voltage $220V$. If potential difference across inductor is $176V$, the potential difference across the resistor (in Volts) is $K \times 33$. Find the value of K

A. 13.2 V

B. 12 V

C. 132 V

D. 1.32 V

Answer: C

Watch Video Solution

309. An AC source is 120 V-60 Hz. The value of voltage after 1/720 s from start will be

A. 8.48 V

B. 6.48 V

C. 84.8 V

D. 88.4 V

Answer: C

Watch Video Solution

310. A coil having an inductance of $1/\pi$ henry is connected in series with a resistance of 300Ω. If 20 volt from a 200 cycle source are impressed across the combination, the value of the phase angle between the voltage and the current is :

A. $\tan^{-1}\left(\frac{4}{3}\right)$

B. $\tan^{-1}\left(\frac{3}{4}\right)$

C. $\tan^{-1}\left(\frac{2}{3}\right)$

D. $\tan^{-1}\left(\frac{3}{2}\right)$

Answer: A

Watch Video Solution

311. A resistor an inductor and a capacitor are connected in series to an ac source An ac voltmeter measures the votage across them as $800V, 30V$ and $90V$ respectively The rms value of the supply voltage is .

A. 10 V

B. 1 V

C. 100 V

D. 90 V

Answer: C

Watch Video Solution

312. An inductive circuit a resistance of $10 ohm$ and an inductance of 2.0 henry. If an AC voltage of 120 volt and frequency of $60 Hz$ is applied to this circuit, the current in the circuit would be nearly

A. 1.6 A

B. 0.16 A

C. 2.6 A

D. 6.2 A

Answer: B

Watch Video Solution

313. When $100V$ DC is applied across a solenoid, a current of $1.0A$ flows in it. When $100V$ AC is applied across the same coil. The current drops to $0.5A$. If the frequency of the ac source is $50Hz$, the impedance and inductance of the solenoid are

A. $100\Omega, 5.05\Omega$

B. $210\Omega, 5.50H$

C. $200\Omega, 5.55H$

D. $200\Omega, 0.55H$

Answer: D

Watch Video Solution

314. In an LCR series circuit the capacitance is changed from C to $4C$ For the same resonant fequency the inductance should be changed from L to .

A. L/4

B. L/2

C. L

D. 2L

Answer: A

Watch Video Solution

315. The reactance of an inductor at 50 Hz is 100Ω. If the frequency is increased to 60 Hz, the reactance of the same inductor becomes

A. 12Ω

B. 21Ω

C. 1.2Ω

D. 120Ω

Answer: D

Watch Video Solution

316. An e.m.f. $E = 4\cos(1000t)$volt is applied to an LR circuit of inductance $3mH$ and resistance $4ohm$. The amplitude of current in the circuit is

A. $8A$

B. $4A$

C. $0.8A$

D. 0.4 A

Answer: C

Watch Video Solution

317. The magnetic flux associated with a coil changes from zero to $5 \times 10^{-5} Wb$ in 25s. The emf induced in the coil is

A. $2 \mu V$

B. $1.5 \mu V$

C. $2.5 \mu V$

D. $0.5 \mu V$

Answer: A

Watch Video Solution

318. A coil having 50 turns and an area of $800cm^2$ is held with its plane perpendicular to uniform magnetic field of induction $5 \times 10^{-5} Wb / m^2$. If it is pulled out of the field in 2 second, then the emf induced in the coil will be

A. $10^{-4} V$

B. $10^{-5} V$

C. $10^{-6} V$

D. $10^{-8}V$

Answer: A

Watch Video Solution

319. The horizontal telegraph wire 100 m long, oriented along magnetic east west falls freely under gravity to the ground with a speed of 20 cm/s. the horizontal component of earth's magnetic field is 4.0×10^{-5} tesla. The emf induced in the wire at the instant, the wire strikes the gound is

A. 0.4 mV

B. 0.2 mV

C. 0.8 mV

D. 0.6 mV

Answer: C

Watch Video Solution

320. A coil of effective area $4m^2$ is placed with its plane perpendicular to magnetic induction of 0.04 Wb/m^2. The induced emf in the coil if magnetic induction reduces to $(1/4)^{th}$ of its original value in 0.5 s will be

A. 0.5 V

B. 0.75 V

C. 0.4 V

D. 0.24 V

Answer: D

Watch Video Solution

321. A coil having an area of 0.4 m^2 and 100 turns is kept perpendicular to a uniform magnetic field of induction of 0.5 Wb/m^2. The coil is rotated about one of is diameter so as to cut the lines of induction of the magnetic field. The average value of emf induced in the coil if it is rotated through 60° in 2 seconds will be

A. 5 V

B. 2.5 V

C. 1.5 V

D. 5.5 V

Answer: A

Watch Video Solution

322. A square wire loop with sides 0.5 m is placed with its plane perpendicular to the magnetic field. The resistance of the loop is 5Ω. The rate at which the magnetic induction should be changed so that a current of 0.1 A is induced in the loop is

A. 4 T/s

B. 3 T/s

C. 2 T/s

D. 1 T/s

Answer: C

Watch Video Solution

323. A meter gauge train runs northwards with a constant speed of 22 m/s on a horizontal track. If the vertical component of the earth's magnetic field at that place is $3 \times 10^{-4} T$. The emf induced in its axle is

A. 6.6 mV

B. 5.5 mV

C. 4.5 mV

D. 4.4 mV

Answer: A

Watch Video Solution

324. The axle of a railway engine is of length 150 cm. the engine oves with a speed of 60 km/hr in horizontal direction the angle of dip is 46° and horizontal component of earth's magnetic induction is $3.6 \times 10^{-5} Wb/m^2$. The emf that will exist between the ends of the axle is

A. 1.0 mV

B. 0.39 mV

C. 0.93 mV

D. 0.5 mV

Answer: C

Watch Video Solution

325. A vertical metal rod of length 1.5 m is at rest in the earth's magnetic field of $B_H = 4 \times 10^{-5} T$. If it starts moving at right angle to the magnetic meridian with a uniform acceleration of $5m/s^2$, then the instantaneous emf induced in it at the end of 2 s will be

A. 0.6 mV

B. 0.3 mV

C. 0.5 mV

D. 0.4 mV

Answer: A

Watch Video Solution

326. A vertical metal rod 1 m long performs linear SHM at right angles to B_H of $4 \times 10^{-5} Wb/m^2$ with an amplitude of 5 cm and a period of πs. The values of maximum and minimum emfs induced in it are

A. $0 \mu V, 4V$

B. $4\mu V, 0V$

C. $0\mu V, 0V$

D. $4\mu V, 4V$

Answer: B

Watch Video Solution

327. A vertical metal rod of length 1 m moves at right angles to its length with a speed of 45 km/h in a direction making an angle of 60° with B_H. The emf induced in it is. $(B_H = 3.6 \times 10^{-5} T)$

A. 0.93 mV

B. 0.74 mV

C. 0.50 mV

D. 0.39 mV

Answer: D

Watch Video Solution

328. A metal rod of length 0.5 m rotates at a uniform angular speed about one of its ends in a plane at right angle to a uniform magnetic field of induction $10^{-5}T$. If it turns through an angle of

60° ini 0.1 s. then the emf induced between its ends will be

A. 13 μV

B. 31 μV

C. 15 μV

D. 20 μV

Answer: A

Watch Video Solution

329. A coil of 500 turns and mean radius 10 cm makes 3000 rotations per minute about one of its diameter in a uniform magnetic field of induction $4 \times 10^{-2} Wb/m^2$ perpendicular to its axis of rotation. The rms current through the coil if its resistance is 100 Ω, is

A. 4.1A

B. 1.4A

C. 4.4A

D. 1.1A

Answer: B

Watch Video Solution

330. A coil of 1000 turns each of area $1.2m^2$ is rotating about an axis in its plane and perpendicular to uniform magnetic field of induction $2 \times 10^{-3}T$. If it performs 300 rpm. The peak value of induced emf is

A. 65.4 V

B. 25.4 V

C. 70.4 V

D. 75.4 V

Answer: D

Watch Video Solution

331. An alternating emf, e=200 sin ωt is applied to a lamp, whose filament has a resistance of 1000Ω. The rms valve of current is

A. 0.5A

B. 1.4A

C. 0.14A

D. 0.04A

Answer: C

Watch Video Solution

332. When an alternating emf, e=300 sin $100\pi t$ volt is applied across a bulb, the peak value of current is found to be 2 A. the average power is

A. 100 W

B. 200 W

C. 300 W

D. 400 W

Answer: C

Watch Video Solution

333. An alternating emf of peak value 350 V is applied across an a.c. ammeter of resistance 100Ω. What is the reading of the ammeter?

A. 2.5A

B. 1.5A

C. 5.2A

D. 2.2A

Answer: A

Watch Video Solution

334. A circular coil of 50 turns an diameter 24 cm is rotated continuously in a uniform magnetic field of induction 3.6×10^{-4}T so as to cut the lines of induction of the field. If the speed of rotation is 5π rad/s. the instantaneous induced emf when the plane of the coil is inclined at 30° to the direction of the field is nearly

A. 15mV

B. 14mV

C. 10mV

D. 11mV

Answer: D

Watch Video Solution

335. The self inductance of a circuit ini which an emf of 10 V is induced when the current in the circuit changes uniformly from 1 A to 0.5 A in 0.2 s is

A. 4 H

B. 2 H

C. 6 H

D. 8 H

Answer: A

Watch Video Solution

336. The mutual inductance of a pair of a coil is 0.75 H. if the current in primary coil changes from 0.5 A to 0A in 0.01 s. the average induced emf in secondary coil is

A. 73.5 V

B. 3.75 V

C. 37.5 V

D. 3.5 V

Answer: C

Watch Video Solution

337. The reactance of 2 H inductance in an ac circuit of frequency 50 Hz is

A. 628Ω

B. 826Ω

C. 286Ω

D. 862Ω

Answer: A

Watch Video Solution

338. The reactance of $1\mu F$ condenser in an ac circuit of frequency 50 Hz is nearly

A. $2.3k\Omega$

B. $3.2k\Omega$

C. $3.5k\Omega$

D. $5.3k\Omega$

Answer: B

Watch Video Solution

339. A coil has an inductance of 0.5 H is connected in series with a resistance of 50 Ω to 240 V, 50 Hz AC. The maximum current in the circuit is

A. 2.5 A

B. 14.5A

C. 1.50A

D. 1.45A

Answer: D

Watch Video Solution

340. A capacitor of capacitance $20\mu F$ is connected in series with 25Ω resistance to 240 V, 50 Hz AC. The maximum current in the circuit is

A. 14.9 A

B. 1.49 A

C. 2.49 A

D. 2.89 A

Answer: B

Watch Video Solution

341. The frequency of voltage source used in ac circuit is 5 kHz. The circuit contains a coil of inductance of 0.5 mH, a capacitor of capacitance of $10\mu F$ and resistor of resistance 8 Ω are connected in series with source. The impedance of circuit is

A. 14.9Ω

B. 1.49Ω

C. 1.49Ω

D. 18.9Ω

Answer: A

Watch Video Solution

342. The power factor of a circuit containing a lamp of resistance 100 Ω, a choke coil of inductance 0.2 H and a condenser of capacitance 1 mH connected in series with an alternating emf of frequency 50 Hz is

A. 1.86

B. 86.6

C. 8.66

D. 0.86

Answer: D

View Text Solution

343. A capacitor of capacitance 2 μF and resistance of 100 Ω are connected in series and an alternating emf of frequency 1 kHz is applied across the combination. The phase difference between applied emf and current is nearly

A. 84°

B. 48°

C. 38°

D. 83°

Answer: C

Watch Video Solution

344. An alternating emf of 200 V, 50 Hz is applied a circuit containing a resistance of 100 Ω and inductance of 0.1 H in series. The powerr dissipated in the circuit is

A. 463 W

B. 364 W

C. 634 W

D. 346 W

Answer: B

Watch Video Solution

345. An AC circuit consists of a resistor of 5Ω and inductor of 10 mH connected in series with 50 volt, 50 Hz supply. The capacitance that should be connected in series with the circuit to obtain maximum current is

A. 1 mF

B. 1.5 mf

C. 2.5 mF

D. 2 mF

Answer: A

Watch Video Solution

346. A 50Ω resistor is connected in series with an inductance of 450 mH and capacitance 9 μF. The resonant frequency is nearly

A. 79 Hz

B. 97 Hz

C. 85 Hz

D. 65 Hz

Answer: A

Watch Video Solution

347. In inductance of $(4/\pi)$ H and the resistor R, are connected in series and an alternating emf of frequency 50 Hz is applied across combination. If phase difference between applied emf and current is 45° then the value of R is

A. 200Ω

B. 400Ω

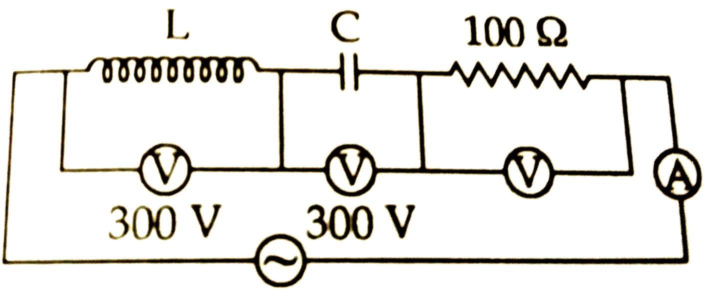
C. 600Ω

D. 800Ω

Answer: B

Watch Video Solution

348. In a circuit shown in figure. What will be the readings of a voltmeter and ammeter, if AC source of 220 V and 100 Hz is connected ?



A. 800 V, 2A

B. 300 V,2A

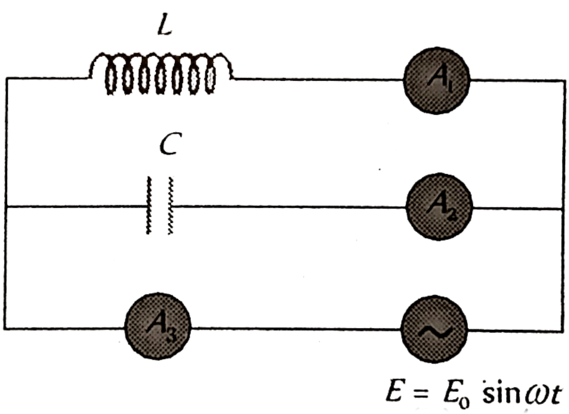
C. 220 V,2.2 A

D. 100 V,2 A

Answer: C

Watch Video Solution

349. An inductor L and a capacitor C are connected in the circuit as shown in the figure. The frequency of the power supply is equal to the resonant frequency of the circuit. Which ammeter will read zero ampere



A. A_1

B. A_2

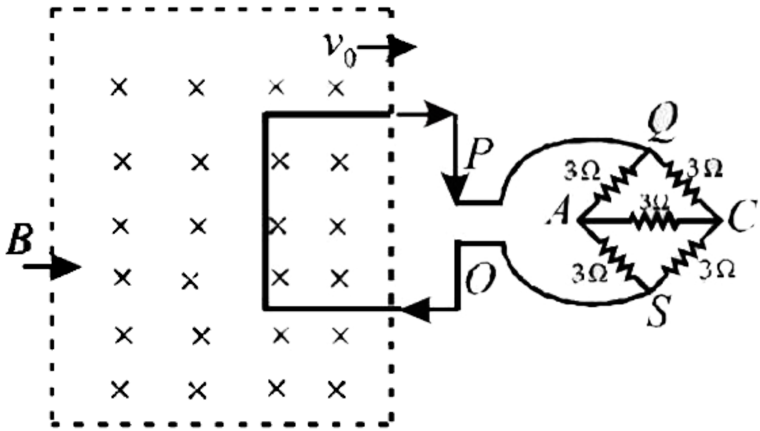
C. A_3

D. none of these

Answer: C

Watch Video Solution

350. A square metal wire loop of side 10 cm and resistance 1 ohm is moved with a constant velocity (v_0) in a uniform magnetic field of induction $B = 2weber/m^2$ as shown in the figure. The magnetic field lines are perpendicular to the plane to the loop (directed into the paper). The loop is connected to a network of resistors each of value 3 ohms. The resistances of hte lead wire OS and PQ are negligible. What should be the speed of the loop so as to have a steady current of 1 milliampere in the loop? Given the direction of current in the loop.



A. 0.04 m/s

B. 0.4 m/s

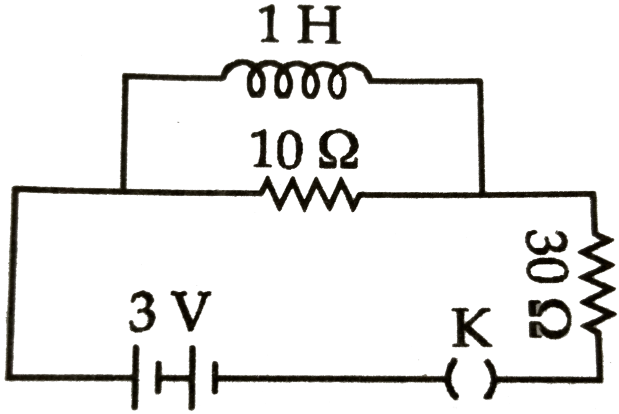
C. 0.2 m/s

D. 0.02 m/s

Answer: D

Watch Video Solution

351. The value of current in 10 Ω resistor, when plug of key K is inserted in the adjoining figure is



A. 0.5 A

B. 0

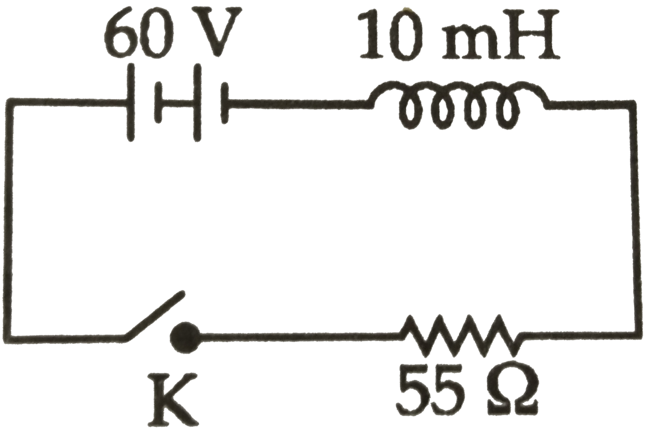
C. 0.3 A

D. 0.2 A/s

Answer: B

View Text Solution

352. The rate of charge of current is 500 A/s at the instant key is pressed in the circuit shown in the figure. The current through the circuit is



A. 0.5 A

B. 2 A

C. 1A

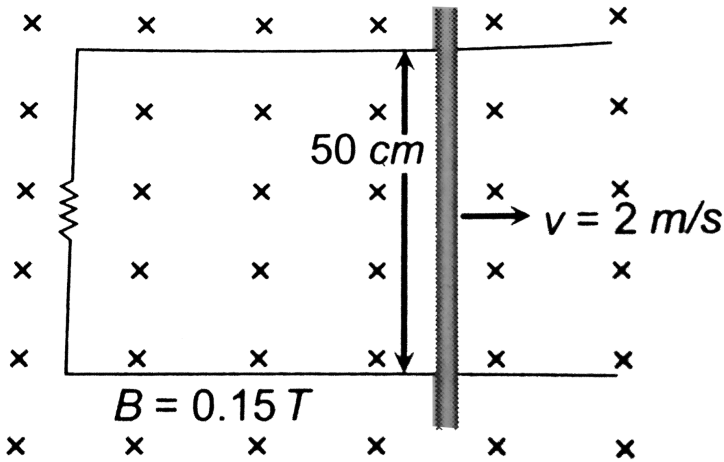
D. 3.5 A

Answer: C

Watch Video Solution

353. 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. $2.75 \times 10^{-3} N$

B. $1.75 \times 10^{-3} N$

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

D. $4.75 \times 10^{-3} N$

Answer: C

Watch Video Solution

354. A capacitor, a 15Ω resistor and 101.5 mH inductor are placed in series with 50 Hz. AC source. Calculate the capacitance of the capacitor, if the current is observed in phase with the voltage.

A. $25\mu F$

B. $50\mu F$

C. $75\mu F$

D. $100\mu F$

Answer: D

Watch Video Solution

355. Obtain the resonant frequency and Q factor of a series LCR circuit with L = 3.0 H, $C = 27\mu F$ and R = 7.4 ohm.

A. 111.1 rad $s^{-1}, 45.05$

B. 121.1 rad s^{-1}, 55.05

C. 131.1 rad s^{-1}, 65.05

D. 141.1 rad s^{-1}, 75.05

Answer: A

Watch Video Solution

356. A flat coil of radius 0.7 cm has 100 loops. It is placed in a magnetic field of induction 0.3 T so that no flux passes through it. Then it is rotated such that maximum flux passes through it in 0.02 s. the induced emf in the coil is

A. 0.15 V

B. 0.73 V

C. 0.23 V

D. 4.14 V

Answer: C

Watch Video Solution

357. A certain current flows in the primary of an induction coil of mutual inductance 5 H. when the break occurs, an emf of 30,000 V is induced in the secondary. If the current in the primary falls uniformly to zero in 10^{-4}s, find the current in the primary just before the break?

A. 0.6 A

B. 0.3 A

C. 0.2 A

D. 0.1 A

Answer: A

Watch Video Solution

358. In a series RC circuit with an AC source, $R = 300\Omega, C = 25\mu F, \varepsilon_0 = 50V$ and $v = \frac{50}{\pi}Hz$. Find the peak current and the average power dissipated in the circuit.

A. 0.1 A

B. 2 A/s

C. 0.02 A

D. 1A

Answer: A

Watch Video Solution

359. What is the resistance to be connected in series with a condenser of a capacity $5 \mu F$ so that the phase difference between the current and the applied voltage is 45° when the angular frequency of applied voltage is 400 rad/s ?

A. 250Ω

B. 400Ω

C. 500Ω

D. 600Ω

Answer: C

Watch Video Solution

360. Two coils A and B are connected in series across a $240V$, 50Hz supply The resistance of A is 5Ω and the inductance of B is 0.02 H The power factor is 0.75 The impedance of the circuit is (if power consumed is 3kW) .

A. 0.144Ω

B. 1.44Ω

C. 14.4Ω

D. 144Ω

Answer: C

Watch Video Solution

361. In L-C-R series circuit, $R = 23\Omega, C = 480 \times 10^{-9}F$ and $L = 0.12H$ connected to a 230 V alternating current source. The Q factor of circuit is

A. 21.7

B. 42.5

C. 67.8

D. 12.5

Answer: A

Watch Video Solution

362. 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. 10 J

B. 20 J

C. 30 J

D. 40 J

Answer: A

Watch Video Solution

363. A wire 40 cm long bent into a rectangular loop $15cm \times 5cm$ is placed perpendicular to the magnetic field whose flux density is $0.8Wbm^{-2}$. Within 1.0 second, the loop is changed into a 10 cm square and flux density increases to 1.4 Wbm^{-2}. Calculate the value of induced emf.

A. 16 mV

B. 10 mV

C. 8 mV

D. 4 mV

Answer: A

Watch Video Solution

364. A horizontal telephone wire 10^3 m long is lying along east west in earth's magnetic field. It falls freely to the ground from a height of 10m. The emf induced in the wire when the wire strikes emf induced in the wire when the wire strikes the ground will be $\left(B_H = 0.32 \times 10^{-4} T, g = 9.8 m/s^2\right)$

A. 0.248 V

B. 0.448 V

C. 0.348 V

D. 0.684 V

Answer: B

Watch Video Solution

365. 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. 0V

B. 2V

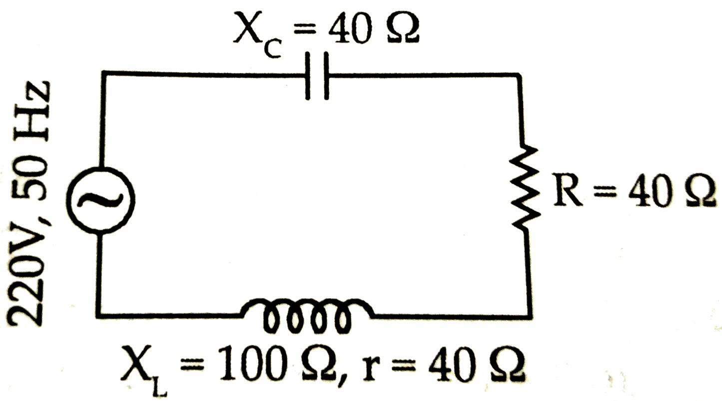
C. 1V

D. 5V

Answer: A

Watch Video Solution

366.



The power factor of the circuit shown in figure is

A. 0.4

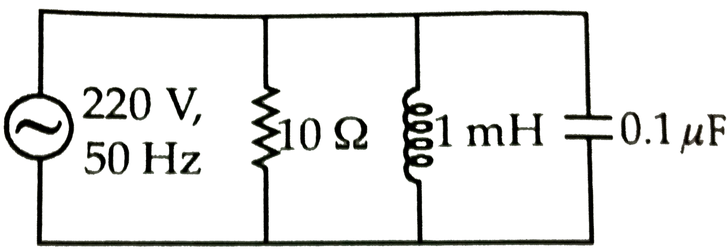
B. 0.8

C. 0.9

D. 0.7

Answer: B

Watch Video Solution

367. 

The value of conductance in the adjoining circuit is

A. 0.1 mho

B. 0.2 mho

C. 0.3 mho

D. 0.4 mho

Answer: A

Watch Video Solution

368. The magnetic field in a certain region is given by $B = \left(4.0\vec{i} - 1.8\vec{k}\right) \times 10^{-3}T$. How much flu passes through a $5.0cm^2$ area loop in this region if the loop lies flat on the xy-plane?

A. -800 nWb

B. -600 nWb

C. -900 nWb

D. -450 nWb

Answer: C

Watch Video Solution

369. A transmitter transmits at a wavelength of $300m$. A condenser of capacitance $2.4\mu F$ is being used. The value of the inductance for the resonant circuit is approximately

A. $10^{-8}H$

B. $10^{-6}H$

C. $10^{-9}H$

D. $10^{-7}H$

Answer: A

Watch Video Solution

370. The LCR series circuit is connected to an external emf $e = 200 \sin 100\pi t$. The values of the capacitance and resistance in the circuit are $1\mu F$ and 100Ω respectively. The amplitude of the current in the circuit will be maximum when the inductance is

A. $\dfrac{100}{\pi}H$

B. $\dfrac{100}{\pi^2}H$

C. $\dfrac{200}{\pi}H$

D. $\dfrac{200}{\pi^2}H$

Answer: B

Watch Video Solution

371. A current is made up of two components 3 A dc component and ac component given by $I = 4\sin(\omega)tA$. The effective value of current is

A. $I = (3 + 5\sin\omega t)A \text{ and } I_{rms} = \sqrt{17A})$

B. $I = (3 + 4\sin\omega t)A \text{ and } I_{rms} = \sqrt{15A})$

C. $I = (4 + 4\sin\omega t)A \text{ and } I_{rms} = \sqrt{17A})$

D. $I = (3 + 4\sin\omega t)A \text{ and } I_{rms} = \sqrt{17A})$

Answer: D

Watch Video Solution

372. An AC is given by the equation $i = i_1 \cos \omega t + i_2 \sin \omega t$. The r.m.s. current is given by

A. $\frac{1}{\sqrt{2}}\left(I_1^2 + I_2^2\right)^{1/2}$

B. $\frac{1}{\sqrt{3}}\left(I_1^2 + I_2^2\right)^{1/2}$

C. $\frac{1}{\sqrt{3}}\left(I_1^2 + I_2^2\right)^{3/2}$

D. $\frac{1}{\sqrt{3}}\left(I_1^2 + I_2^2\right)^{3/2}$

Answer: A

Watch Video Solution

373. An ideal choke takes a current of 8A when connectd to an AC source of 100V and 50 Hz. A pure resistor under the same condition strikes a current of 10A. If two are connected in series to an AC supply of 100V and 40Hz, then the current in the series combination of above resistor and inductor $\sqrt{10x}$A. Find value of x

A. $3\sqrt{2}A$

B. $\sqrt{2}A$

C. $5\sqrt{2}A$

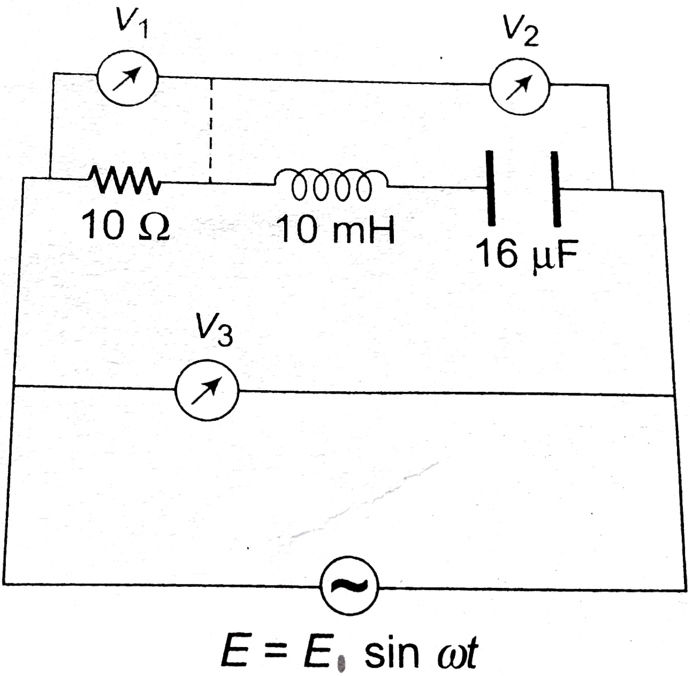
D. $2\sqrt{2}A$

Answer: C

Watch Video Solution

374. In figure which voltmeter reads zero when ω is equal to the resonant frequency of series LCR

circuit



A. V_3

B. V_2

C. V_1

D. none of these

Answer: B

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

A. 5 H

B. 10 H

C. 11 H

D. 22 H

Answer: C

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376. In an AC circuit, the current is given by $i = 5\sin\left(100t - \frac{\pi}{2}\right)$ and the AC potential is $V = 200\sin(100t)$volt. Then the power consumption is

A. 100 W

B. 40 W

C. 20 W

D. 0 W

Answer: D

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377. 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. 1.26 V

B. 2.52 V

C. 5.04 V

D. 7.2 V

Answer: B

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378. If a rate of change of current of 4 As^{-1} induces an emf of 20 mV in a solenoid, the self inductance of the solenoid is

A. 3 mH

B. 4 mH

C. 5 mH

D. 6 mH

Answer: C

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

A. half

B. zero

C. two times

D. four times

Answer: C

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380. A coil having effective area A, is held with its plane normal to a magnetic field of induction B. The magnetic induction is quickly reduced to 25% of its initial value in $2s$. Then e.m.f. induced across the coil will be

A. $\frac{3AB}{8}$

B. $\frac{3AB}{4}$

C. $\frac{AB}{4}$

D. $\frac{AB}{2}$

Answer: A

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381. The dimensions of magnetic flux are

A. $[M^1L^2T^{-2}A^1]$

B. $[M^1L^1T^{-2}A^{-1}]$

C. $[M^1L^1T^{-2}A^1]$

D. $[M^1L^2T^{-2}A^{-1}]$

Answer: D

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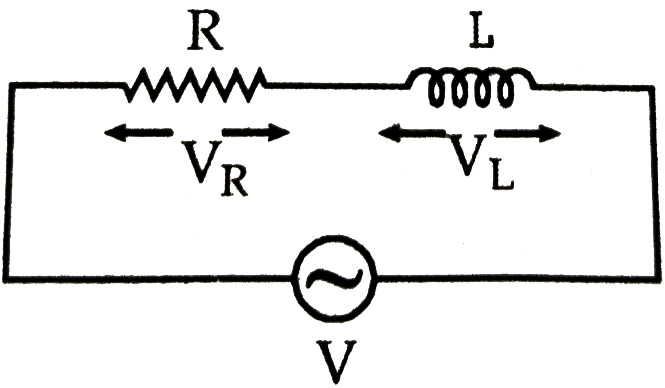
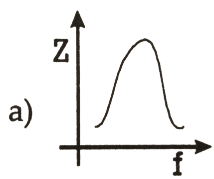
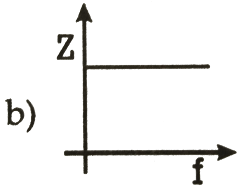
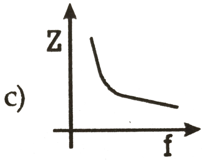
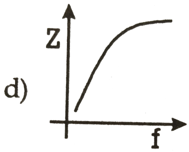
382. Which graph gives the correct relation between Z and f for the given R-C circuit?



A. 

B. 

C. 

D. 

Answer: C

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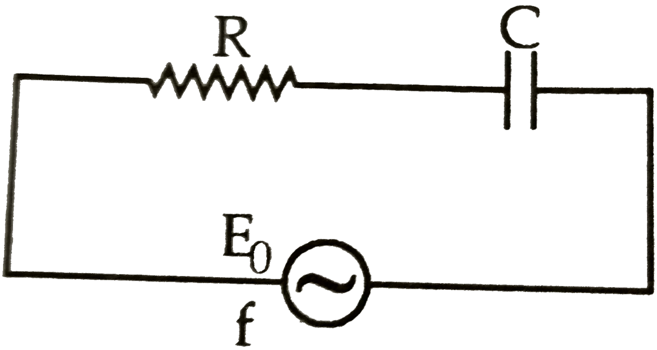
383. In the given L-R circuit, which of the following gives correct relation between V,V_R and V?



A. $V < V_R + V_L$

B. $V > V_R + V_L$`

C. $V = V_R + V_L$

D. none of these

Answer: A

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384. Reactance of a capacitor of capacitance $C \mu F$ for ac frequency $\frac{400}{\pi} Hz$ is 25Ω. The value C is

A. $50 \mu F$

B. $25 \mu F$

C. $100 \mu F$

D. $75 \mu F$

Answer: A

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385. In a coil, $L = 5H$, current changes at the rate of 2 ampere per second. The induced emf

A. $-10V$

B. 10 V

C. 5 V

D. $-5V$

Answer: A

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386. An alternating e.m.f. given by e=200 sin 50 t is applied to a circuit containing only a resistance of 50Ω. What is the value of r.m.s. current in the circuit?

A. 0.02828 A

B. 0.2828 A

C. 2.828 A

D. 28.28 A

Answer: C

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387. Flux passes through coil changes from $2 \times 10^{-3} Wb$ to 3×10^{-3} Wb during 25s. The induced emf is

A. 0.02 mV

B. 0.03 mV

C. 0.05 mV

D. 0.04 mV

Answer: D

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388. A conductor of length 10 cm is moved parallel to itself with a speed of $10m/s$, at right to a magentic induction of $10^{-4}Wb/m^2$. The e.m.f. Induced in the conductor is

A. $10^{-4}V$

B. $10^{-2}V$

C. $0V$

D. $10^{-6}V$

Answer: A

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389. In an AC circuit containing only capacitance the current

A. current leads voltage by π

B. current is in phase with voltage

C. current leads voltage by $\pi / 2$

D. current lags voltage by $\pi / 2$

Answer: C

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390. Wattless current is obtained

A. when resistance is zero

B. when current in minimum

C. when inductance is zero

D. when current is alternating current

Answer: A

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391. For a coil of unit area, induction B is doubled in $0.2s$. Then, the induced e.m.f. is

A. 5B

B. 10B

C. 8 B

D. 4B

Answer: A

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392. Deal beat galvanometer works on the principle of

A. eddy current

B. self induction

C. mutual induction

D. magnetic effect of electric current

Answer: A

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393. The capacitive reactance is 20Ω, when the frequency is 100 Hz. Find the reactance, when frequency is 150 Hz.

A. 13Ω

B. 12.5Ω

C. 12.3Ω

D. 13.3Ω

Answer: D

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394. In a series resonant L-C-R circuit, the power factor is

A. 0

B. 1

C. 0.3

D. 1.5

Answer: B

Watch Video Solution

395. A half metre rod is rotating abou tone fixed end perpendicular to uniform magnetic field $4 \times 10^{-5} T$ with angular velocity 720 rpm. The emf induced across its ends is

A. 0.24 V

B. 0.36 V

C. 0.12 V

D. 0.36 mV

Answer: D

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396. In an RLC circuit, capacitance is changed from C to 2C. For the resonant frequency to remain unchanged, the inductance should be changed from L to :

A. 4L

B. L/4

C. L/2

D. 2L

Answer: C

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397. When a rod of length l is rotated with angular velocity of ω in a perpendicular field of induction B , about one end , the emf across its ends is

A. $B\omega l^2$

B. $2B\omega l^2$

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

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

Answer: C

Watch Video Solution

398. Resistance of earth coil is 7Ω. If flux associated with coil changes from 1.35 Wb to 0.79 Wb within 0.1s, the charge produced by the earth coil is

A. 0.08 C

B. 0.008 C

C. 0.8 C

D. 0.04 C

Answer: A

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399. In the induction coil, across secondary coil the output voltage is practically

A. unidirectional, high, intermittent

B. directional, low, intermittent

C. unidirectional, high, constant

D. unidirectional, low, constant

Answer: A

Watch Video Solution

400. A wire of length 2.5 km and resistance 35Ω has fallen from a height of 10m in earth's horizontal field of $2 \times 10^{-5}T$. The current through the wire is

A. 0.02 A

B. 0.002 A

C. 0.2 A

D. 2A

Answer: A

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401. The average value dissipated by resistance is ($I_0 =$ peak value of current)

A. $\frac{1}{2}I_0^2 R$

B. $I_2^2 R$

C. $\frac{1}{2}I_0^2 R\cos\phi$

D. $I_0^2 R \cos \phi$

Answer: A

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402. If a rate of change of current of 4 As^{-1} induces an emf of 20 mV in a solenoid, the self inductance of the solenoid is

A. 3 mH

B. 4 mH

C. 5 mH

D. 6 mH

Answer: C

Watch Video Solution

403. If the P.D. across the inductor $(3mH)$ is the same as that across the condenser $(30\mu F)$ in a series R-L-C circuit, then the frequency of the applied e.m.f. is

A. 180 Hz

B. 500 Hz

C. 890 Hz

D. 5 kHz

Answer: B

Watch Video Solution

404. When a rod of length l is rotated with angular velocity of ω in a perpendicular field of induction B , about one end , the emf across its ends is

A. $Bl^2\omega$

B. $0.5Bl^2\omega$

C. $Bl\omega$

D. $0.5Bl\omega$

Answer: B

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405. A coil of self inductance 20 mH, having 50 turns, carries a current of 300 mA. If the area of the coil is $2cm^2$, the magnetic induction at the centre of the coil is

A. $7.5 \times 10^{-3}T$

B. $7.5 \times 10^{-2} T$

C. $6 \times 10^{-1} T$

D. $0.5T$

Answer: C

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406. A.C. voltmeter is connected to a source of $e_0 = 141.4$ volt, then it will read

A. 50 V

B. 150 V

C. 100 V

D. 141.4 V

Answer: C

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407. Inductance of a coil is 5 mH is connected to AC source of 220 V, 50 Hz. The ratio of AC to DC resistance of the coil is

A. 5Ω

B. 0Ω

C. infinity

D. data is incomplete

Answer: C

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408. A rectangular coil of 25 turns, area of $25cm^2$ and resistance of $4ohm / turn$ is placed perpendicular to a varying magnetic field, which changes at the rate of $500T / s$. The induced current in the coil is

A. 0.3125 A

B. 31.25 A

C. 4.25 A

D. 9.8 A

Answer: A

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409. Henry is equivalent to

A. ampere/second

B. ampere second

C. Ohm/second

D. Ohm second

Answer: D

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410. In a purely resistive AS circuit,

A. current leads emf by a phase angle of π radians

B. current leads emf by a phase angle of $\pi/2$ radians

C. current and emf are in phase

D. current lags behind emf by a phase angle of $\pi/2$ radians

Answer: C

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411. In a series LCR circuit, at resonance, power factor is ....

A. zero

B. 0.5

C. 1

D. ∞

Answer: C

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412. An alternating voltage $E = 200\sqrt{2}\sin(100t)$ is connected to a 1 microfarad capacitor through an AC ammeter. The reading of the ammeter shall be

A. 10 mA

B. 20 mA

C. 40 mA

D. 80 mA

Answer: A

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413. Same current is flowing in two alternating circuits. The first circuit contains only inductances and the other contains only a capacitor, if the frequency of the e.m.f of AC is increased, the effect on the value of the current will be

A. increases in the first and decrease in the other

B. increase in both the circuits

C. decreases in both the circuits

D. decreases in the first and increase in the order

Answer: D

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414. In a circuit, the current lags behind the voltage by a phase difference of $\frac{\pi}{2}$, the circuit will contain which of the following ?

A. only R

B. only C

C. only L

D. R and C

Answer: C

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415. Average power in the L-C-R circuit depends upon

A. current

B. phase different only

C. emf

D. current, emf and phase difference

Answer: D

Watch Video Solution

416. A transformer is having 2100 turns in primary and 4200 turns is secondary. An ac source of 120 V, 10 A is connected to its primary. The secondary voltage and current are

A. 240 V, 5A

B. 120 V, 10 A

C. 240 V, 10 A

D. 120 V, 20 A

Answer: A

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

A. half

B. zero

C. two times

D. four times

Answer: C

Watch Video Solution

418. When the current changes from $+2A$ to $-2A$ in $0.05s$, and emf of $8B$ is induced in a coil. The coefficient of self-induction of the coil is

A. 0.05 H

B. 0.1 H

C. 0.2 H

D. 0.4 H

Answer: B

Watch Video Solution

419. An alternating voltage $E = 200\sqrt{2}\sin(100t)V$ is applied to a $2\mu F$ capacitor through an A.C. ammeter. The reading of the ammeter is

A. 4 mA

B. 40 mA

C. 2 mA

D. 3 mA

Answer: B

Watch Video Solution

420. In a series LCR circuit, at resonance, power factor is ....

A. less than one

B. greater than one

C. unity/one

D. can not be predicted

Answer: C

Watch Video Solution

421. In series LCR circuit at resonance,

A. current is maximum and voltage is minimum

B. current is maximum and voltage is maximum

C. current is minimum and voltage is maximum

D. current is minimum and voltage is minimum

Answer: A

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422. The self inductane of coil of 400 turns is 8 mH. If current of 5 mA flows in it, then flux associated with the coil is

A. $(\mu_0 / 4\pi)$

B. μ_0

C. $\frac{100\mu_0}{\pi}$

D. $(4\pi / \mu_0)$

Answer: C

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423. In LCR series circuit an ac emf of 2 volt and frequency 50 Hz is applied across the combination. If resistance is 4Ω, capacitance is $8\mu F$ and inductance is $10^{-2}H$ then the voltage across inductor will be

A. (3/5 V)

B. (5/3 V)

C. (2/3 V)

D. (0.0159 V)

Answer: D

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424. A coil of self-inductance L is connected in series with a bulb B and an AC source. Brightness of the bulb decreases when

A. number of turns in the coil is reduced

B. a capacitance of reactance $X_C = X_L$ is included in the same circuit

C. an iron rod is inserted in the coil

D. frequency of the AC source is decreased

Answer: D

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425. A wire loop is rotated in magneitc field. The frequency of change of direction of the induced e.m.f. is.

A. twice per revolution

B. four times per revolution

C. six times per revolution

D. once per revolution

Answer: D

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426. If $'N'$ is the number of turns in a coil, the value of self inductance varies as

A. N^0

B. N

C. N^2

D. N^{-2}

Answer: C

Watch Video Solution

427. In LCR series circuit , an alternating emf e and current i are given by the equations

$e = 100\sin(100t)$ volt .

$i = 100\sin\left(100t + \frac{\pi}{3}\right)$ mA

The average power dissipated in the circuit will be

A. 100 W

B. 10 W

C. 5 W

D. 2.5 W

Answer: D

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428. In electromagnetic wave , according to Maxwell , changing electric field gives

A. stationary magnetic field

B. conduction current

C. eddy current

D. displacement current

Answer: D

Watch Video Solution

429. Same current is flowing in two alternating circuits. The first circuit contains only inductances and the other contains only a capacitor, if the frequency of the e.m.f of AC is increased, the effect on the value of the current will be

A. increase in first circuit and decrease in second

B. increase in both circuits

C. decrease in both circuits

D. decrease in first circuit and increase in second

Answer: D

Watch Video Solution

430. Two coils A and B have mutual inductance 2×10^{-2} Henry if the current in he primary coil is i=5 sin $(10\pi t)$ then the maximum value of emf induced in coil B is

A. π volt

B. $\pi / 2$ volt

C. $\pi / 3$ volt

D. $\pi / 4$ volt

Answer: A

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431. The capacity of a parallel plate air capacitor is $2\mu F$ and voltage beteen the plates is changing at the rate of 3 v/s the displacement current in the capacitor is

A. $2\mu A$

B. $3\mu A$

C. $5\mu A$

D. $6\mu A$

Answer: D

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