



PHYSICS

BOOKS - MBD -HARYANA BOARD

E.M.I. and A.C.

Example

1. What is the basic cause of induced e.m.f. ?



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2. Lenz's law



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3. State Lenz's law of electromagnetic induction.



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4. State Lenz's law of electromagnetic induction.



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5. State and explain Fleming's right hand rule.



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6. Electromagnetic induction



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7. Unit of self inductance is



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8. What is one henry ?



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9. Explain why resistance coils are usually double wound.



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10. Why cannot a transformer be used to step up d.c. voltage ?



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11. We can measure d.c. by an ordinary ammeter, but not a.c. Why ?



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12. Define resonant frequency of LCR series circuit.



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13. Why is the core of a transformer laminated?



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14. In an a.c. circuit, there is no power consumption in an ideal inductor. Explain.



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15. 220 volt a.c. is more dangerous than 220 volt d.c why?



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16. Why a spark is produced in a switch sometimes when it is switched off?



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17. The frequency of direct current (d.c.) is :



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18. Why are oscillations of a copper sheet in a magnetic field highly damped ?



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19. Primary of a transformer is connected to 1.5 V dry cell. What will be the output voltage?



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20. The instantaneous emf an a.c. source is given by $\varepsilon = 300 \sin 314t$. What is the rms value of the emf?



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21. Assertion: Acceleration of a magnet falling through a long solenoid decreases.

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



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22. The power factor of LCR circuit at resonance is-



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23. What is the direction of induced current when main current in an inductive circuit is switched on.



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24. What is the direction of induced current when main current in an inductive circuit is switched off.



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



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26. Assertion : L/R and CR both have same dimensions

Reason L/R and CR both have dimensions of time



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27. Why does an LC circuit produce oscillations?



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28. What is generator.



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29. Introduction to Alternating Current |

Average and RMS value of AC



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30. What is expression for magnetic energy stored in an inductor. Compare it with the electrostatic energy stored in a capacitor.



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31. What is sharpness of resonance?



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32. Which is more dangerous, a.c. or d.c.?



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33. Can a transformer be used to alter DC voltage?



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34. How does capacitor behave to d.c.?



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35. What value of a.c. is given by an a.c. ammeter?



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36. frequency of a.c. source is doubled. How do R , X_L and X_C get affected?



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37. A lamp is connected in series with a capacitor. What will happen if d.c. or a.c. is connected to current?



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38. A resistance of 6 ohm is connected in series with inductor and capacitor having reactances 36 and 44 ohm respectively. What is the combined impedance?



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39. The number of magnetic lines crossing a surface normally is called magnetic flux linked with the surface. (True/False)



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40. SI unit of magnetic flux is weber.

(True/False)



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41. Lenz's law cannot be used to find the direction of induced current. (True/False)



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42. The mutual inductance between the two coils is maximum, when one coil is wound over the other. (True/False)



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43. The current whose magnitude changes with time and direction reverses periodically is called direct current. (True/False)



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44. When a.c. flows through a resistor, the e.m.f. is inwith the current.



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45. When a.c. flows through a capacitor, the peak value of current in the circuit is.....



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46. At resonance, in a parallel circuit=

$$\frac{1}{\omega C}$$



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47.is a device to obtain high p.d. from low d.c. potential difference.



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48. The eddy currents have both desirable and undesirable effects.



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49. The self inductance of a straight conductor is zero.



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50. Tick the correct option .Energy stored in an inductor reside in it is in the form of

- A. electric field
- B. magnetic field
- C.
- D.

Answer:



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51. Tick the correct option. In SI, the unit of self inductance is

A. henry

B. ampere

C.

D.

Answer:



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52.law for magnetism establishes that monopoles do not exist.



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53. State Faraday's laws of electromagnetic induction.



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54. Write the laws of electromagnetic induction.



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55. State Faraday's laws of electromagnetic induction and explain three methods for producing induced e.m.f.



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56. What is electromagnetic induction? State its Faraday's laws and describe two methods for producing induced emf.



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57. How eddy currents are produced? give two applications of eddy currents.



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58. A capacitor of $100\mu F$, a resistor of 20Ω and an inductor of inductance L are connected in series with an a.c. source of frequency 50 Hz . Calculate the value of inductance L of the inductor, if phase angle between current and voltage is zero.



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59. An ideal inductor consumes no power in an a.c. circuit. Why?





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60. An electric device which runs at 80 volt d.c. and consumes 10 A is connected to 100 V, 50 Hz a.c. supply through a choke. Calculate the inductance of the choke for safe working of the device.



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61. Derive the relation for mean or average value of alternating current.



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62. State the rms value of an alternating current? Write the relation between the rms value and peak value of an alternating current that varies with time



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63. Describe the principle, construction and working of an AC generator.





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64. Draw a labelled diagram of an a.c. generator. State its principle and explain its working.



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65. a) State the principle of ac generator.

b) Explain with the help of a well labelled diagram, its working and obtain the expression for the emf generated in the coil.

c) Is it possible to generate emf without rotating the coil? Explain



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66. With the help of a phasor diagram find an expression for impedance (Z) in a series L-C-R circuit.



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67. Derive an expression for impedance of an a.c. circuit with an inductor L , capacitor C and a resistor R in series. What is condition of resonance?



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68. Explain principle and theory of transformer with the help of diagram.



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69. With the help of labelled diagram, describe the principle, construction and working of a transformer.



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70. Derive an expression for the average power of an AC(alternating current) circuit.



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71. What is self induction? Define coefficient of self induction. Also define its S.I.



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72. What is mutual induction? Find the coefficient of mutual induction and also define S.I. unit of mutual induction.



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73. Write an expression for mutual inductance of two co-axial solenoids.



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74. Discuss the phase relationship between current and emf in an circuit containing a capacitance only.



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75. An alternating e.m.f. is applied to purely capacitive circuit. The phase relation between e.m.f. and current flowing in the circuit is or in a circuit containing capacitance only



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76. State and Explain Faraday's laws of electromagnetic induction.



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Exercise

1. SI unit of magnetic flux is

A. gauss

B. weber

C. oersted

D. tesla

Answer:



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2. In electromagnetic induction, the induced emf in a coil is independent of:

A. change of flux

B. time

C. number of turns of coil

D. resistance of the coil

Answer:



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

A. charge

B. momentum

C. energy

D. mass

Answer:



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

A. 0.5 V

B. 0.1 V

C. 1 V

D. 2 V

Answer:



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5. A solenoid has 2,000 turns wound over a length of 0.3 m. The area of its cross-section is $2 \times 10^{-3} \text{ m}^2$. Around its central part, a coil of 300 turns is wound. If an initial current of 2 A is reversed in 0.25 s, the induced e.m.f. produced in the coil is:

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

B. 4.8×10^{-2}

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

D. 48 V

Answer:



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

A. 500 s

B. 35 s

C. 20 s

D. 1 s

Answer:



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7. An inductance of 2 H and resistance of 10Ω are connected to a battery of 5 V. the time constant of the circuits is:

A. 20 s

B. 0.2 s

C. 5 s

D. 100 s

Answer:



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8. The minimum and maximum values of power factor in an A.C. circuit are respectively:

A. 0 and 1

B. 0.1 and 1

C. 1 and 2

D. 1 and 1.5

Answer:



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9. Average power of an a.c. circuit is:

A. $E_v I_v \sin \phi$

B. $E_v I_v \cos \phi$

C. $E_v I_v$

D. None of these

Answer:



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10. In an AC circuit the maximum value of voltage is 423 volt, Its effective voltage is :-

A. 323 V

B. 340 V

C. 400 V

D. 300 V

Answer:



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