



PHYSICS

BOOKS - PUNJAB BOARD PREVIOUS YEAR PAPERS

ELECTROMAGNETIC INDUCTION

Exercise

1. A magnetic flux of 5 microweber is linked with a coil when a current of 1 MA flows

through it. What is the self inductance of the coil ?



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2. A magnetic flux of 5 microweber is linked with a coil when a current of 1 MA flows through it. What is the self inductance of the coil ?



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3. The magnetic flux threading a coil changes from to 12×10^{-3} Wb to 6×10^{-3} Wb in 0.015. Calculate the induced e.m.f.



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4. What will be the coefficient of mutual inductance of a pair of coil if a current of 3 ampere in one coil cause the flux in the second coil of 1000 turns to change by 10^{-4} Wb in each turn ?





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5. A wire is cut across a flux of 0.2×10^{-2} weber in 0.12 seconds. What is the e.m.f. induced in the wire ?



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6. A railway track running North South has two parallel rails 1.0m apart. Calculate the value of induced e.m.f. between the rails when a train passes at a speed of 90 kmh^{-1} . Horizontal

component of earth's field at that place is $0.3 \times 10^{-4} \text{ Wbm}^{-2}$ and angle of dip is 60° .



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7. The magnetic flux through a coil perpendicular to its plane and directed into the paper is varying according to the relation, $\phi = (3t^3 + 2t^2 + 4t + 6) \text{ Wb}$. Calculate the e.m.f. induced in the coil at $t = 2\text{s}$.



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8. The magnetic flux through a coil perpendicular to its plane and directed into the paper is varying according to the relation, $\phi = (2t^3 - t^2 - 3t + 5)$ Wb. Calculate the e.m.f. induced in the coil at $t = 2$ s.



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9. The magnetic flux through a coil perpendicular to its plane and directed into the paper is varying according to the equation

$\phi = (2t^3 - 6t^2 - t + 8) \text{Wb}$. Calculate the e.m.f. induced in the coil at $t = 3\text{s}$.



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10. A wire 88cm long bent into a circular loop is placed perpendicular to the magnetic field of density $2.5 \text{ Wb } m^{-2}$. Within 0.5 s the loop is changed into square of each side 22 cm and the density is increased to $3 \text{ Wb } m^{-2}$. Calculate the value of e.m.f. induced.



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11. A rectangular coil having 200 turns and size $0.30 \times 0.05m^2$ is placed perpendicular to a magnetic field. The field changes from $5 \times 10^{-3} \text{ Wbm}^{-2}$ to $2 \times 10^{-3} \text{ Wbm}^{-2}$ in the time interval of 3 millisecond. Calculate the e.m.f. induced in the coil. If the resistance of the coil is 15Ω , find the value of current flowing through it.



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12. Find the e.m.f. induced in a coil of 100 turns and cross-sectional area 0.4m^2 , when a magnetic field perpendicular to a plane of the coil changes from 0.5Wbm^{-2} to 0.1Wbm^{-2} at a uniform rate over a period of 0.04 s. If the resistance of the coil is $3.2\text{k}\Omega$, find the value of current flowing through it.



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13. Current changes from 10A to 0A in 2 seconds in a coil of self inductance 2H. Find the induced emf in the coil.



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14. Current changes from 12A to 7A in 2 seconds in a coil of self inductance 2H. Find the induced emf in the coil.



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15. Current changes from 5A to 0A in 1 second in a coil of self inductance 1H. Find the induced emf in the coil.



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16. Name the physical quantity which is measured in weber *ampere*⁻¹.



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



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18. What factors govern the direction of e.m.f.?
?



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19. Define Weber unit of Magnetic flux.



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20. What is meant by magnetic flux? State its S.I. unit.



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21. What are eddy currents ?



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22. Define the term magnetic flux.



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23. Weber is the unit of which physical quantity ?



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24. State Lenz's law of electromagnetic induction.



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



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26. What is back emf ?



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27. What is meant by magnetic flux? State its S.I. unit.



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28. What is meant by magnetic flux? State its S.I. unit.



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29. State Lenz's law of electromagnetic induction.



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30. Define S.I. unit of self inductance.



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31. What is meant by magnetic flux? State its S.I. unit.



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32. Define pH.



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33. Define S.I. unit of self inductance.



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34. State Lenz's rule to find direction of induced current.



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35. State Lenz's law. Give one example to illustrate it.



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36. What are eddy currents ? Give experiment to explain their origin.



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37. State and explain Faraday's law of electromagnetic induction.



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38. Define co-efficient of self-induction and find an expression for it for a solenoid.



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39. Prove that Lenz's law obeys the law of conservation of energy.



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40. Define coefficient of mutual induction and find an expression for it.



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41. Write the laws of electromagnetic induction.



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42. Derive an expression for induced e.m.f. when a coil rotates in a uniform magnetic field and prove it graphically that the e.m.f. induced is alternating in nature.



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43. What are eddy currents ? How eddy currents can be minimised in transformer?



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44. Is Lenz's law in accordance with the law of conservation of energy?



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45. What are Faraday's laws of electromagnetic Induction ?



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46. What is meant by mutual inductance?



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47. State and explain Faraday's Law of electromagnetic Induction.



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48. Show that energy stored in an inductor L , when a current i is established through it, is $\frac{1}{2}(LI^2)$.



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49. What is electromagnetic induction ? State its laws.



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50. What is meant by mutual inductance?



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51. What are eddy currents ? How are these produced ? How eddy currents can be minimized in a transformer.



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52. State and explain Lenz's law of electromagnetic Induction. Give one example to illustrate the law. How it can be verified experimentally?



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53. State Lenz's rule and show that it is in accordance with the law of conservation of energy.



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54. What is self Inductance of a coil ? Define coefficient of self Induction.



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55. Derive an expression for the coefficient of self-induction of a long solenoid.



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56. An induced current has no direction of its own. Explain, why?



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57. Self-induction is called inertia of electricity. Explain why.



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58. Define mutual inductance. Write its SI unit.

Derive an expression for the mutual inductance of two long co-axial solenoids of same length wound one over the other.



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59. What are eddy currents ? How are these produced ? How eddy currents can be minimized in a transformer.



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60. Explain self induction. Define its unit. Derive relation for self inductance of a long solenoid.



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61. Define S.I. unit of self inductance.



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62. With the help of diagram explain the principle, construction and theory of a moving coil galvanometer. What is the function of iron core in moving coil galvanometer?



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63. Define co-efficient of mutual induction and find an expression for it.



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64. What is electromagnetic induction ? State its laws. Describe the methods for producing induced e.m.f. State the law by which the direction of induced current can be determined.



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65. What is self Inductance of a coil ? Define coefficient of self Induction.



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66. Define co-efficient of mutual induction and find an expression for it.



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