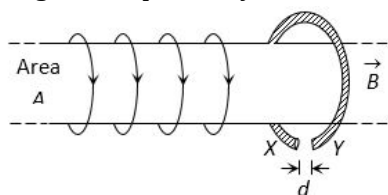
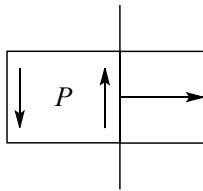


5. A metal conductor of length 1 m rotates vertically about one of its ends at angular velocity 5 rad/s. If the horizontal component of earth's magnetic field is $0.2 \times 10^{-4} \text{T}$, then the emf developed between the ends of the conductor is
- a) $5 \mu\text{V}$ b) 5 mV c) $50 \mu\text{V}$ d) 50 mV
6. If in a coil rate of change of area is $\frac{5 \text{ metre}^2}{\text{milli second}}$, current becomes 1 amp from 2 amp in $2 \times 10^{-3} \text{ sec}$ magnetic field is 1 tesla, then self inductance of the coil is
- a) 2 H b) 5 H c) 20 H d) 10 H
7. The north pole of a long bar magnet was pushed slowly into a short solenoid connected to a galvanometer. The magnet was held stationary for a few seconds with the north pole in the middle of the solenoid and then withdrawn rapidly. The maximum deflection of the galvanometer was observed when the magnet was
- a) Moving towards the solenoid b) Moving into the solenoid
c) At rest inside the solenoid d) Moving out of the solenoid
8. Which of the following is constructed on the principle of electromagnetic induction
- a) Galvanometer b) Electric motor c) Generator d) Voltmeter
9. A highly conducting ring of radius R is perpendicular to and concentric with the axis of a long solenoid as shown in fig. The ring has a narrow gap of width d in its circumference. The solenoid has cross sectional area A and a uniform internal field of magnitude B_0 . Now beginning at $t = 0$, the solenoid current is steadily increased so that the field magnitude at any time t is given by $B(t) = B_0 + at$ where $a > 0$. Assuming that no charge can flow across the gap, the end of ring which has excess of positive charge and the magnitude of induced e.m.f. in the ring are respectively

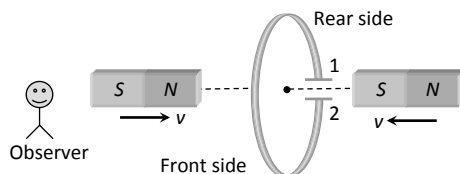


- a) $X, A\alpha$ b) $X, \pi R^2\alpha$ c) $Y, \pi A^2\alpha$ d) $Y, \pi R^2\alpha$
10. A copper disc of radius 0.1 m is rotated about its centre with $20 \text{ rev} - \text{s}^{-1}$ in a uniform magnetic field of 0.1 T with its plane perpendicular to the field. The emf induced across the radius of the disc is
- a) $\frac{\pi}{20} \text{ V}$ b) $\frac{\pi}{10} \text{ V}$ c) $20\pi \text{ mV}$ d) $10\pi \text{ mV}$
11. Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 \gg R_2$, the mutual inductance M between them will be directly proportional to
- a) R_1/R_2 b) R_2/R_1 c) R_1^2/R_2 d) R_2^2/R_1

12. A movable wire is moved to the right crossing an anti-clock-wise induced current, figure. The direction of magnetic induction in the region P points

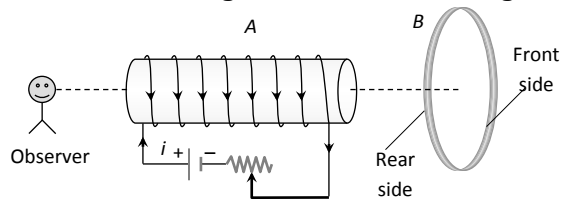


- a) To the right
b) To the left
c) Up the paper
d) Down into the paper
13. The transformation ratio in the step-up transformer is
a) One
b) Greater than one
c) Less than one
d) The ratio greater or less than one depends on the other factors
14. Two coils A and B having turns 300 and 600 respectively are placed near each other, on passing a current of 3.0 ampere in A , the flux linked with A is 1.2×10^{-4} weber and with B it is 9.0×10^{-5} weber. The mutual inductance of the system is
a) 2×10^{-5} henry b) 3×10^{-5} henry c) 4×10^{-5} henry d) 6×10^{-5} henry
15. Faraday's laws are consequence of conservation of
a) Energy
b) Energy and magnetic field
c) Charge
d) Magnetic field
16. The oscillating frequency of a cyclotron is 10 MHz. If the radius of its dees is 0.5 m, the kinetic energy of a proton, which is accelerated by the cyclotron is
a) 10.2 MeV b) 2.55 MeV c) 20.4 MeV d) 5.1 MeV
17. The magnetic flux across a loop of resistance 10Ω is given by $\phi = 5t^2 - 4t + 1$ weber. How much current is induced in the loop after 0.2 sec
a) 0.4 A b) 0.2 A c) 0.04 A d) 0.02 A
18. The resistance and inductance of series circuit are 5Ω and $20H$ respectively. At the instant of closing the switch, the current is increasing at the rate $4A/s$. The supply voltage is
a) 20 V b) 80 V c) 120 V d) 100 V
19. The north and south poles of two identical magnets approach a coil, containing a condenser, with equal speeds from opposite sides. Then



- a) Plate 1 will be negative and plate 2 positive
b) Plate 1 will be positive and plate 2 negative
c) Both the plates will be positive
d) Both the plates will be negative

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



- a) Whether I increases or decreases, B will not experience any force
- b) If I decreases A will attract B
- c) If I increases, A will attract B
- d) If I increases, A will repel B

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