

Electromagnetic Induction

NEET previous year questions · Physics

4 questions from the official papers: NEET 2026 (1), Re-NEET 2026 (3). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q30

A rectangular wire loop of sides 8 cm and 3 cm with a small cut, is moving out of a region of uniform magnetic field of magnitude 0.3 T directed normal to the plane of the loop. The emf developed across the cut, if the velocity of the loop is 2 cm s^{-1} , in a direction normal to the shorter side of the loop, will be:

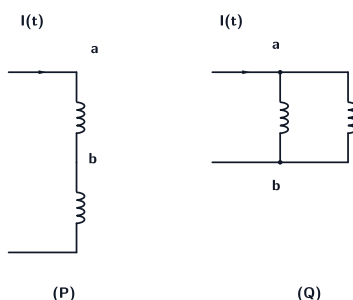
- (1) $4.8 \times 10^{-4} \text{ volt}$ (2) $1.2 \times 10^{-4} \text{ volt}$
(3) $1.3 \times 10^{-4} \text{ volt}$ (4) $1.8 \times 10^{-4} \text{ volt}$

Answer (4)

Sol. The motional electromotive force (emf) is $E = Bvl$, where l is the side perpendicular to the velocity. Since the loop moves normal to the shorter side, the effective length is the shorter side (3 cm): $E = 0.3 \times (2 \times 10^{-2}) \times (3 \times 10^{-2}) = 1.8 \times 10^{-4} \text{ V}$. Option (1) wrongly uses the 8 cm side.

2. Re-NEET 2026 · Q3

Two identical inductors are connected in two different configurations P and Q , where a time varying current $I(t)$ is flowing, as shown in the figure. The induced emf between points a and b for configuration P is E_P and that for configuration Q is E_Q . The ratio E_P/E_Q is: [Neglect the effect of mutual inductance.]



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

Answer (4)

Sol. In configuration P the two inductors are in series and the segment between a and b spans just ONE of them,

carrying the full current, so $E_P = L \frac{dI}{dt}$. In configuration Q the points a and b straddle the parallel pair, whose equivalent inductance is $\frac{L}{2}$, so $E_Q = \frac{L}{2} \frac{dI}{dt}$. The ratio is therefore 2. NCERT Class 12, Electromagnetic Induction (self-inductance).

Why the other options are wrong:

- (1) takes E_P across the series pair as $2L$ and inverts the ratio
- (2) inverts the correct answer by swapping which configuration sits in the numerator
- (3) assumes identical inductors must produce identical electromotive forces (emfs) regardless of how a and b are placed

3. Re-NEET 2026 · Q5

Consider a long solenoid of length l and radius r . If n is the number of turns per unit length and μ_0 is the permeability of free space, the inductance of the solenoid is :

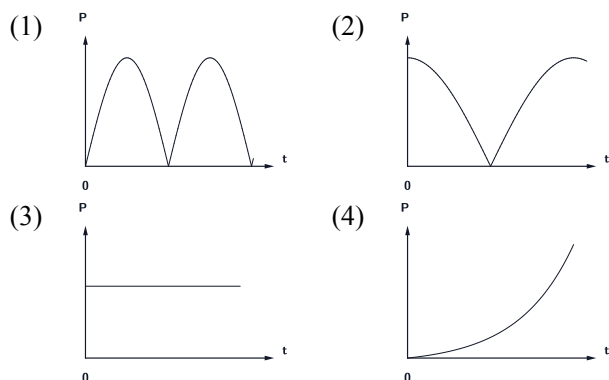
- (1) $\mu_0 \pi n^2 r^2 l$ (2) $\mu_0 n^2 r^2 l$
(3) $(\mu_0/2\pi) n^2 r^2 l$ (4) $2\mu_0 \pi n^2 r^2 l$

Answer (1)

Sol. For a long solenoid $L = \mu_0 n^2 A l$, where n is turns per unit length and A the cross-sectional area. Substituting $A = \pi r^2$ gives $L = \mu_0 \pi n^2 r^2 l$. NCERT Class 12, Electromagnetic Induction (self-inductance).

4. Re-NEET 2026 · Q32

A conducting loop of finite resistance lies on the $x - y$ plane. There is a constant magnetic field in the z direction. The area of the loop varies with time t , as $A = A_0(1 + \sin t)$ in appropriate units. The figure that correctly indicates the qualitative behaviour of the power P dissipated in the loop as a function of time is:

**Answer (2)**

Sol. Faraday's law gives $\varepsilon = -\frac{d\Phi}{dt} = -BA_0 \cos t$, so the dissipated power is $P = \frac{\varepsilon^2}{R} = \frac{B^2 A_0^2}{R} \cos^2 t$. Because $\cos^2 t$ is MAXIMUM at $t = 0$ and touches zero at $t = \pi/2$, the correct graph starts at a peak and dips to zero, unlike a $\sin^2 t$ curve which would start at zero. P is never negative because the electromotive force (emf) is squared. NCERT Class 12, Electromagnetic Induction (Faraday's law).

Why the other options are wrong:

- (1) differentiates $\sin t$ to $\cos t$ rather than $\sin t$, producing a $\sin^2 t$ curve that starts at zero
- (3) assumes the constant field means a constant emf, forgetting that it is the CHANGING area that drives induction
- (4) confuses the growing area with growing power, ignoring that the flux change is periodic and bounded

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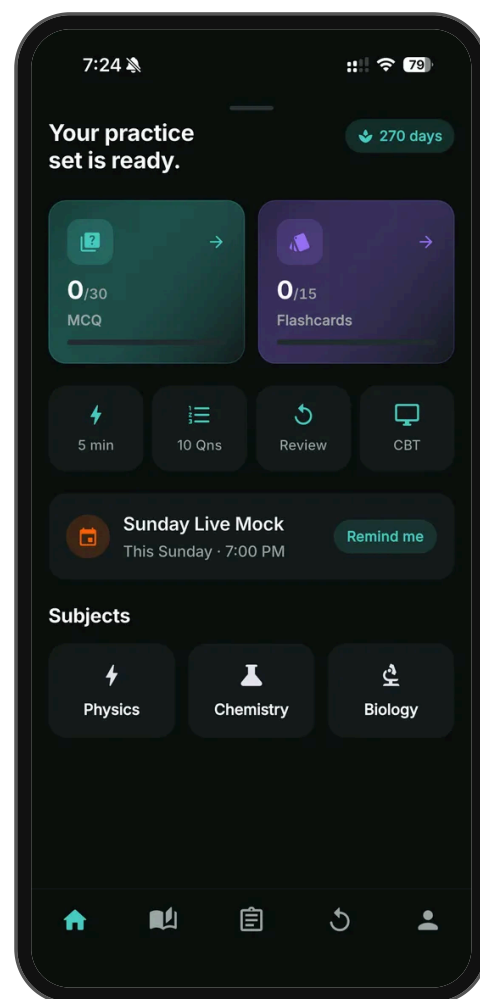
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