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# JEE MAIN ELECTROMAGNETIC INDUCTION — FARADAY'S LAWS OF INDUCTION — PYQS

**Max. Marks:** 24 **Questions:** 6

## Section A (MCQ) — 5 questions

**Q.1** A square loop of side 2 cm is placed in a time varying magnetic field with magnitude as $B = 0.4\sin(300t)$ Tesla. The normal to the plane of loop makes an angle of 60° with the field. The maximum induced emf produced in the loop is _____ mV.

[JEE Main 2026 (Online) 6th April Evening Shift]

(1) 12 (2) 18 (3) 21 (4) 24

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**Q.2** When a coil is placed in a time dependent magnetic field the power dissipated in it is P. The number of turns, area of the coil and radius of the coil wire are N, A and r respectively. For a second coil number of turns, area of the coil and radius of the coil wire are 2N, 2A and 3r respectively. When the first coil is replaced with second coil the power dissipated in it is $\sqrt{2}\,\alpha P$. The value of α is _____.

[JEE Main 2026 (Online) 2nd April Morning Shift]

(1) 36 (2) $128\sqrt{2}$

(3) 16 (4) 64

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**Q.3** A circular loop of radius 7 cm is placed in uniform magnetic field of 0.2 T directed perpendicular to plane of loop. The loop is converted into a square loop in 0.5 s . The EMF induced in the loop is _____ mV.

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 13.2 (2) 6.6 (3) 1.32 (4) 8.25

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**Q.4** Suppose a long solenoid of 100 cm length, radius 2 cm having 500 turns per unit length, carries a current $I = 10\sin(\omega t)$ A, where ω = 1000 rad/s. A circular conducting loop (B) of radius 1 cm coaxially slid through the solenoid at a speed v = 1 cm/s. The r.m.s. current through the loop when the coil B is inserted 10 cm inside the solenoid is $\frac{\alpha}{\sqrt{2}}\,\mu A$. The value of α is _____.

[Resistance of the loop = 10 Ω]

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 80 (2) 280 (3) 100 (4) 197

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**Q.5** A conducting circular loop of area 1.0 $m^2$ is placed perpendicular to a magnetic field which varies as $B = \sin(100t)$ Tesla. If the resistance of the loop is 100 Ω, then the average thermal energy dissipated in the loop in one period is _____ J.

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $\pi^2$ (2) $\frac{\pi}{2}$ (3) π (4) 2π

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## Section B (Numerical) — 1 question

**Q.6** A circular loop of radius 20 cm and resistance 2 Ω is placed in a time varying magnetic field $\vec{B} = (2t^2 + 2t + 3)$ T. At t = 0, for the plane of the loop being perpendicular to the magnetic field and, the induced current in the loop at t = 3 s is $\frac{\alpha}{50}$ A. The value of α is _____.
(Take π = 22/7)

[JEE Main 2026 (Online) 5th April Evening Shift]

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# ANSWER KEY

## Section A (MCQ) — 5 questions

| Ques. | 1 | 2 | 3 | 4 | 5 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ans.** | **4** | **1** | **3** | **4** | **3** | | | | | | |

## Section B (Numerical) — 1 question

| Ques. | 6 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ans.** | **44** | | | | | | | | | | |