

JEE MAIN ELECTROMAGNETIC WAVES — DISPLACEMENT CURRENT AND MAXWELL'S EQUATIONS (QUALITATIVE) — PYQS

Max. Marks: 20

Questions: 5

Section A (MCQ) — 4 questions

- Q.1** A displacement current of 4.0 A can be set up in the space between two parallel plates of 6 μF capacitor. The rate of change of potential difference across the plates of the capacitor is nearly $\alpha \times 10^6$ V/s. The value of α is _____.

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

- (1) 0.58 (2) 0.67 (3) 0.82 (4) 0.75

Scan or tap for the full solution



- Q.2** Match List-I with List-II.

List-I Relation		List-II Law	
A.	$\oint \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int \vec{B} \cdot d\vec{a}$	I.	Ampere's circuital law
B.	$\oint \vec{B} \cdot d\vec{l} = \mu_0 \left(I + \epsilon_0 \frac{d\phi_E}{dt} \right)$	II.	Faraday's laws of electromagnetic induction
C.	$\oint \vec{E} \cdot d\vec{a} = \frac{1}{\epsilon_0} \int \rho \, dv$	III.	Ampere-Maxwell law
D.	$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$	IV.	Gauss's law of electrostatics

Choose the correct answer from the options given below :

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

- (1) A-I, B-IV, C-III, D-II (2) A-II, B-III, C-IV, D-I
(3) A-IV, B-I, C-II, D-III (4) A-II, B-III, C-I, D-IV

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- Q.3** If ϵ , E and t represent the free space permittivity, electric field and time respectively, then the unit of $\frac{\epsilon E}{t}$ will be :

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) Am (2) A/m (3) A/m² (4) Am²

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- Q.4** If ϵ_0 denotes the permittivity of free space and Φ_E is the flux of the electric field through the area bounded by the closed surface, then dimensions of $\left(\epsilon_0 \frac{d\Phi_E}{dt} \right)$ are that of :

[JEE Main 2025 (Online) 7th April Morning Shift]

- (1) electric charge (2) electric field
(3) electric current (4) electric potential

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Section B (Numerical) — 1 question

- Q.5** An electromagnetic wave of frequency 100 MHz propagates through a medium of conductivity, $\sigma = 10$ mho/m. The ratio of maximum conduction current density to maximum displacement current density is _____.

[Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ N m}^2/\text{C}^2$]

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

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ANSWER KEY

Section A (MCQ) — 4 questions

Ques.	1	2	3	4							
Ans.	2	2	3	3							

Section B (Numerical) — 1 question

Ques.	5						
Ans.	1800						