

Medium

Deputy Executive Engineer (Electrician)

2026

Sports Authority of Gujarat / Assistant Engineer (Electrical)

Consider the following statements regarding Maxwell's Equations: 1. Maxwell's equations unify electric and magnetic field theories. 2. Displacement current

A

2 and 3 only

B

1 and 4 only

C

1, 2 and 3 only

Correct

D

All of the above

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1, 2 and 3 only Quick Concept Explanation Maxwell's equations unify electric and magnetic fields. Maxwell added displacement current to Ampere's law, showing that a time-varying electric field acts as a source of magnetic field. Key relation:

$H = J + \frac{dE}{dt}$; $E = \frac{B}{\mu_0}$. Exam focus: Changing E produces H; changing B produces E. Common trap: Maxwell's equations are not limited to static fields. Statement-wise Verification Statement 1 - Correct. Maxwell's equations unify electric and magnetic field theories. Maxwell's equations unify electric and magnetic fields. Statement 2 - Correct. Displacement current term was introduced to modify Ampere's law. Maxwell added displacement current to Ampere's law, showing that a time-varying electric field acts as a source of magnetic field. Statement 3 - Correct. Time-varying electric field produces magnetic field. Maxwell added displacement current to Ampere's law, showing that a time-varying electric field acts as a source of magnetic field. Statement 4 - Incorrect. Maxwell equations apply only to static fields. Maxwell's equations are explicitly valid for time-varying fields and describe electromagnetic waves Core Concept Maxwell's equations unify electric and magnetic fields. Maxwell added displacement current to Ampere's law, showing that a