

Easy

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Consider the following statements regarding Poynting Vector: 1. Poynting vector represents power flow per unit area in electromagnetic field. 2. It is given by

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 The Poynting vector gives electromagnetic power-flow density and points in the direction of energy transport for a propagating wave. It is the cross product of electric and magnetic fields. Key relation: $S = E \times H$ [W/m²]. Exam focus: Cross E with H to get energy-flow direction. Common trap: V/m is electric-field unit, not Poynting-vector unit.

Statement-wise Verification

Statement 1 - Correct. Poynting vector represents power flow per unit area in electromagnetic field. The Poynting vector gives electromagnetic power-flow density and points in the direction of energy transport for a propagating wave.

Statement 2 - Correct. It is given by the cross product of electric and magnetic field vectors. It is the cross product of electric and magnetic fields.

Statement 3 - Correct. Direction of Poynting vector indicates direction of energy propagation. The Poynting vector gives electromagnetic power-flow density and points in the direction of energy transport for a propagating wave.

Statement 4 - Incorrect. It has units of volts per meter. The correct principle is: $S = E \times H$ [W/m²].

Core Concept The Poynting vector gives electromagnetic power-flow density and points in the direction of energy transport for a propagating wave. It is the cross product of electric and magnetic fields. Its SI unit is watt per square metre, not