Easy | Deputy Executive Engineer (Electric | 2026 | orts Authority of Gujarat / Assistant Engineer (El

Consider the following statements regarding AC Machine Windings: 1. Distributed windings are used in AC machines to reduce harmonic content and produce

A. 2 and 3 only

B. 1 and 3 only

C. **1, 2 and 4 only** — Correct

D. All of the above

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1, 2 and 4 only Quick Concept Explanation Distributed and short-pitched AC windings are deliberate design choices that improve waveform quality and suppress selected harmonics. Short pitching reduces the fundamental induced EMF slightly through pitch factor kp; distribution across slots introduces distribution factor kd. Key relation: k_w=k_p k_d; k_p=cos(/2) for chording angle .Exam focus: Winding factor is normally less than 1. Common trap: A concentrated winding does not inherently guarantee a sinusoidal EMF. Statement-wise Verification Statement 1 - Correct.Distributed windings are used in AC machines to reduce harmonic content and produce a nearly sinusoidal EMF waveform.Distributed and short-pitched AC windings are deliberate design choices that improve waveform quality and suppress selected harmonics. Statement 2 - Correct.The pitch factor accounts for the effect of short-pitching of coils and usually reduces the magnitude of induced EMF.Short pitching reduces the fundamental induced EMF slightly through pitch factor kp Statement 3 - Incorrect.Concentrated windings inherently produce a perfectly sinusoidal induced EMF waveform.Concentrated windings tend to contain more spatial harmonics; distributed windings are used to improve the waveform Statement 4 - Correct The winding factor is defined as the product of pitch factor and distribution factor