Moderate | Assistant Engineer (Electrical), Clas | 2025 | Building Department

A synchronous machine has field winding on stator and polyphase armature winding on rotor. At steady state, which of the following is not true for its air gap field?

A. Stationary w.r.t. stator

B. **Rotating at double the speed Ns w.r.t. rotor** — Correct

C. Rotating in direction opposite to rotor

D. Rotating at Ns w.r.t. rotor

Correct Answer: B

Full Detailed Explanation

Concept & ReasoningTake the stator as the stationary reference. The DC field winding on the stator establishes a stationary spatial field. The rotor carrying the polyphase armature rotates mechanically at synchronous speed Ns. Relative to the rotor, a field that is stationary in the stator frame appears to move at Ns in the opposite direction. Therefore 'rotating at double the speed Ns with respect to the rotor' is the statement that is not true. The other statements describe the same relative-motion picture in different frames.How to Solve It in the ExamAlways subtract angular speeds when changing reference frames.Important Exam PointWrite both field and rotor speeds in the same reference frame before judging relative direction.Editorial / Answer-Key NoteThe official GPSC final answer key revised the provisional outcome for this question from D to B.Related Revision PathThis question sits in the revision path Electrical Machines Synchronous Machines Rotating Magnetic Fields .

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