

Hard

Deputy Executive Engineer (Electrician) 2026

Gujarat Public Service Commission / Assistant Engineer (Electrical)

A fault occurring at the terminals of an unloaded synchronous generator operating at its rated voltage has resulted in the following values of currents and voltages:

I_{a0}

A

L - L fault

B

L - L - G fault

Correct

C

L - G fault

D

L - L - L fault

Correct Answer: B

Full Detailed Explanation

Correct Answer: B - L - L - G fault Quick Concept Explanation For a double-line-to-ground fault on phases b and c, the unfaulted phase current I_a is zero and the fault-point sequence voltages satisfy the appropriate equal-voltage relation. Three independent signatures agree: zero sequence present ground fault; I_{a0} phase a healthy; negative sequence present unbalanced two-phase involvement. Exam focus: Fault ID shortcut: zero-sequence present means the ground path participates. Common trap: Selecting a 3-phase fault despite nonzero I_0 and I_2 . Technical Verification Given $V_0=V_1=V_2=0.237$ p.u. This equality is compatible with the boundary condition for a double-line-to-ground fault on the other two phases. $I_a = I_0+I_1+I_2 = j(2.37 - 3.05+0.68)=0$, so phase a carries no current and is the healthy phase. Nonzero zero-sequence current proves that ground is involved; therefore a pure L-L fault is excluded. Nonzero negative- and zero-sequence components exclude a balanced three-phase fault. Core Concept Symmetrical components turn an unbalanced fault into coupled positive-, negative- and zero-sequence networks. Ground involvement is recognized by zero-sequence current. For a double-line-to-ground fault on phases b and c, the unfaulted phase current I_a is zero and the fault-point sequence voltages satisfy the appropriate equal-voltage relation. Formula / Key