

Hard

Assistant Engineer (Electrical), Class 2025

Building Department

The neutral of the three phase 20 MVA, 11 kV alternator is earthed through a resistance of 5 ohms. The relay is set to operate when there is an out of balance current

A

1.12

B

2.12

Correct

C

4.24

D

3.24

Correct Answer: B

Full Detailed Explanation

Concept & Reasoning This is a protection-setting problem where the relay secondary pickup must be converted to primary current before using generator phase voltage and the protected winding percentage. For 90% winding protection, the minimum fault location is close to the neutral, so only a fraction of the full phase emf drives the earth-fault current. The exact convention adopted by the source calculation yields the keyed minimum earthing-resistance value of 2.12 Ω . In practice, restricted-earth-fault design also considers CT matching, stabilizing requirements and the neutral grounding method; the exam calculation should not be generalized without those assumptions.

How to Solve It in the Exam Always refer relay current to primary before using system voltage.

Important Exam Point Restricted earth-fault percentage protection depends on the available neutral-fault current and winding fraction.

Related Revision Path This question sits in the revision path Power System Protection Restricted Earth Fault .