

Hard

Assistant Engineer (Electrical), Class 2025

Building Department

A step-down delta-star transformer, with per-phase turns ratio of 5, is fed from a 3-phase, 1100 V, 50 Hz source. The secondary of this transformer through a 3-pulse

A

2 22 A

Correct

B

1 11 A

C

2 11 A

D

1 22 A

Correct Answer: A

Full Detailed Explanation

Concept & Reasoning Because the primary is delta, $V_{1,\text{phase}} = V_{1,\text{line}} = 1100 \text{ V}$. The per-phase turns ratio $N_1/N_2=5$ gives $V_{2,\text{phase}}=220 \text{ V rms}$. A three-pulse midpoint rectifier connected to the star secondary uses the phase-to-neutral secondary voltages, whose peak is $\sqrt{2}V_{2,\text{phase}}$. For a $10 \text{ } \Omega$ resistive load, the maximum instantaneous load current is therefore $\sqrt{2} 22 \text{ A}$. This calculation is a good example of why line/phase voltage must be resolved before applying transformer ratio and rectifier relations. How to Solve It in the Exam Convert line/phase voltage before applying turns ratio. Important Exam Point Always write the delta/star line-to-phase relationships; this avoids 3 errors. Related Revision Path This question sits in the revision path Power Electronics Rectifiers Three-Pulse Rectifier .

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