CHAPTER 4
133.

$$V_{sec} = I_{line}\left(\frac{0.78 + j0.052}{1{,}000\text{ ft}}\right)(200\text{ ft}) + V_{load} + I_{line}\left(\frac{0.78 + j0.052}{1{,}000\text{ ft}}\right)(200\text{ ft})$$

$$= 240\angle 0° + (2)(30\angle 0°)\left(\frac{1}{5}\right)(0.78 + j0.052)$$

$$= 249.4\angle 0.143°\text{ V}$$

$$|V_{sec}| = 249.4\text{ V}$$

ANSWER (B)

135.
Pload = 8,000 kW
P .F. = 0.80

SZoad= 8,000kW / 0.80 = 10,000kVA
QZoad= $\sqrt{1\ 0{,}000^2 - 8{,}000^2}$ = 6,000 kvar .

Snew= 8,000kW /0.95 = 8421kVA
Qnew= $\sqrt{8{,}421^2 - 8{,}000^2}$ = 2,630 kvar
Qcap= QZoad- Qnew= 6,000 - 2,630 = 3,370kvar
ANSWER (B)

508.
For this unbalanced load, *IA*+ *IB*+ *IN*= 0

$$\text{Also, } V_{\phi N} = V_{\phi\phi}/\sqrt{3} = 13.2 / 1.732 = 7.62 \text{ kV}$$

$$|I_A + I_B| = |-I_N| = \left|\frac{200 + j100}{7.62\angle 0^\circ} + \frac{200 + j100}{7.62\angle 120^\circ}\right| = 29.3 \text{ A}$$

ANSWER (D)

509.
The system is initially ungrounded (the utility neutral is disconnected from ground). Connecting Corner A of the delta to ground will therefore have no effect on the relative phase voltages and *VBG*= *VBA*= 13.2 kV.
ANSWER (C)

510.
Ic = 500 kVA/13.2 kV = 37.9 A
ANSWER (C)

511.
The system is balanced.

$$V_{an} = \frac{12.5}{\sqrt{3}}\angle -30^\circ + \frac{70\angle -20^\circ}{1{,}000}(5 + j10) = 7.48\angle -24.2^\circ$$

$$|V_{ab}| = 7.48\sqrt{3} = 12.95 \text{ kV}$$

ANSWER (C)