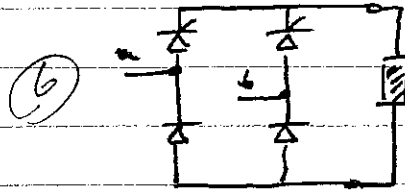
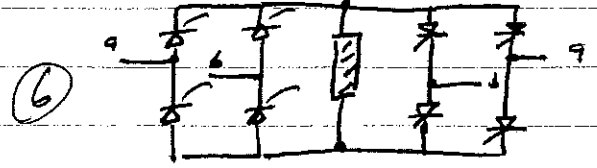


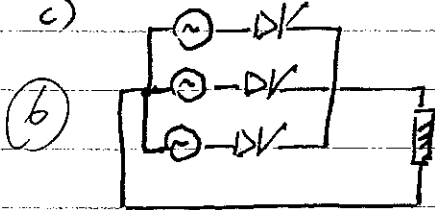
Q.7 a)



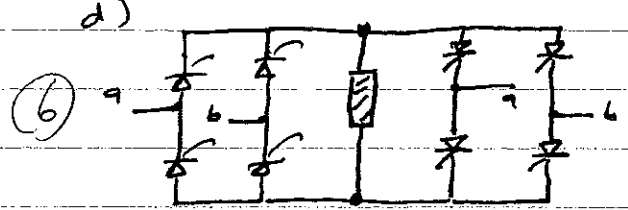
b)



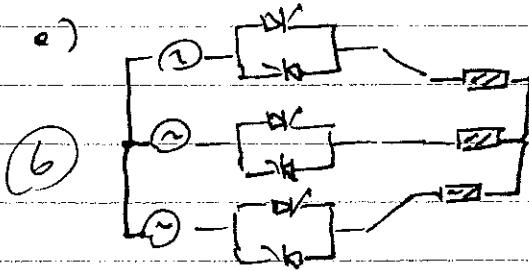
c)



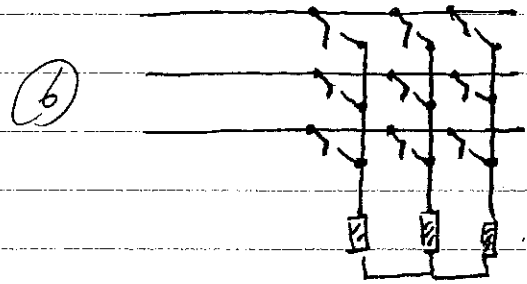
d)



e)



f)



$$Q_2] a) V_{DC} = \frac{3\sqrt{3} V_m}{2\pi} (1 + \cos \alpha) = \frac{1}{2} \left( \frac{3\sqrt{2} V_m}{\pi} \right) \quad (10)$$

$$1 + \cos \alpha = 1 \Rightarrow \alpha = 90^\circ$$

$$c) V_{RMS} = \left[ \frac{3}{2\pi} \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} (\sqrt{3} V_m \sin(\omega t))^2 d(\omega t) \right]^{\frac{1}{2}}$$

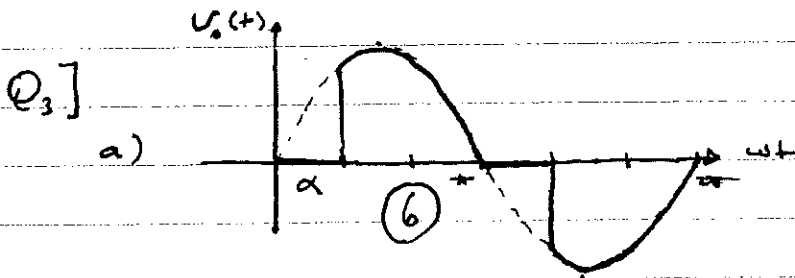
$$V_{RMS} = \sqrt{3} V_m \left[ \frac{3}{4\pi} \left( \pi - \alpha + \frac{\sin 2\alpha}{2} \right) \right]^{\frac{1}{2}} = 180.13 \text{ V} \quad (6)$$

$$I_{RMS} = \frac{V_{RMS}}{R} = 18.013 \text{ A}$$

$$V_{DC} = \frac{3\sqrt{3} V_m}{2\pi} = \frac{3\sqrt{2} (208)}{2\pi} = 140.45 \text{ V}$$

$$I_{DC} = \frac{V_{DC}}{R} = 14.045 \text{ A} \quad (6)$$

$$d) PF = \frac{V_{RMS} I_{RMS}}{\sqrt{3} V_s I_s} = \frac{(18.013)^2 (10)}{\sqrt{3} (208) (\sqrt{2/3}) (18.013)} = 0.612 \text{ lagging} \quad (6)$$



$$b) V_{RMS} = \left[ \frac{2}{2\pi} \int_{\alpha}^{\pi} V_m^2 \sin^2(\omega t) d(\omega t) \right]^{\frac{1}{2}} = V_s \left[ \frac{1}{\pi} \left( \pi - \alpha + \frac{\sin 2\alpha}{2} \right) \right]^{\frac{1}{2}} \quad (6)$$

$$V_{RMS} = 134.54 \text{ V}$$

$$c) PF = \frac{V_{RMS} I_{RMS}}{V_s I_s} = \frac{134.54}{150} = 0.8969 \text{ lagging} \quad (6)$$

$$d) I_{DC,T} = \frac{1}{2\pi} \int_{\alpha}^{\pi} \frac{V_m}{R} \sin(\omega t) d(\omega t) = \frac{\sqrt{2} V_s}{2\pi R} (1 + \cos \alpha) = 10.13 \text{ A} \quad (6)$$

$$I_{RMS,T} = \frac{I_{RMS}}{\sqrt{2}} = \frac{(134.54/5)}{\sqrt{2}} = 19.03 \text{ A} \quad (6)$$