Problem 5-13

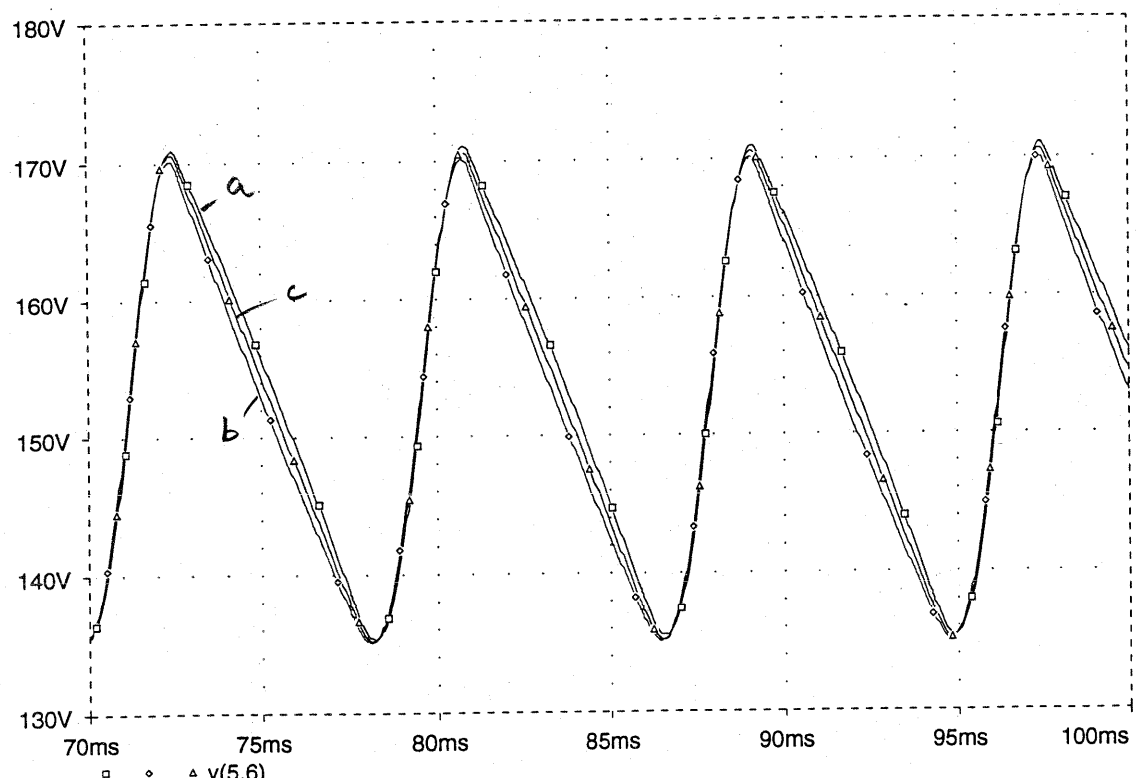
The simulation in part a results in $V_d = 153.04$ V. Therefore, for a power of 1 kW, the following values are calculated:

$$R_{Load} = \frac{V_d^2}{1000\,W} = 23.42\,\Omega \quad \text{in part b}$$

and

$$I_{Load} = \frac{1000\,W}{V_d} = 6.534\,A$$

To compare results form these three parts, all cases are run in the same file, as the listing indicates. The waveforms are very similar.



```
Prob5_13a
* Single-Phase, Diode-Bridge Rectifier
.LIB PWR_ELEC.LIB
.PARAM    FREQ = 60.0Hz
*
LS        1   2   1mH
RS        2   3   0.4
*
rdc       4   5   1u
GDC       5   6   VALUE={1000/V(5,6)}
CD        5   6   1000uF IC=160V
*
XD1       3   4   DIODE_WITH_SNUB
XD3       0   4   DIODE_WITH_SNUB
XD2       6   0   DIODE_WITH_SNUB
XD4       6   3   DIODE_WITH_SNUB
*
VS        1   0   SIN(0 170V {FREQ} 0 0 0)
*
.TRAN     50us    100ms    0s     50us    UIC
.PROBE
.FOUR     60.0  v(1) i(LS)    i(rdc)    v(5,6)
.END
Prob5_13b
* Single-Phase, Diode-Bridge Rectifier
.LIB PWR_ELEC.LIB
.PARAM    FREQ = 60.0Hz
*
LS        1   2   1mH
RS        2   3   0.4
*
rdc       4   5   1u
RLOAD     5   6   23.42
CD        5   6   1000uF IC=160V
*
XD1       3   4   DIODE_WITH_SNUB
XD3       0   4   DIODE_WITH_SNUB
XD2       6   0   DIODE_WITH_SNUB
XD4       6   3   DIODE_WITH_SNUB
*
VS        1   0   SIN(0 170V {FREQ} 0 0 0)
*
.TRAN     50us    100ms    0s     50us    UIC
.PROBE
.FOUR     60.0  v(1) i(LS)    i(rdc)    v(5,6)
.END
Prob5_13c
* Single-Phase, Diode-Bridge Rectifier
.LIB PWR_ELEC.LIB
.PARAM    FREQ = 60.0Hz
*
LS        1   2   1mH
RS        2   3   0.4
*
rdc       4   5   1u
ILOAD     5   6   6.534A
CD        5   6   1000uF IC=160V
*
XD1       3   4   DIODE_WITH_SNUB
XD3       0   4   DIODE_WITH_SNUB
XD2       6   0   DIODE_WITH_SNUB
XD4       6   3   DIODE_WITH_SNUB
*
VS        1   0   SIN(0 170V {FREQ} 0 0 0)
*
.TRAN     50us    100ms    0s     50us    UIC
.PROBE
.FOUR     60.0  v(1) i(LS)    i(rdc)    v(5,6)
.END
```

Note: No blank lines between 3 parts.