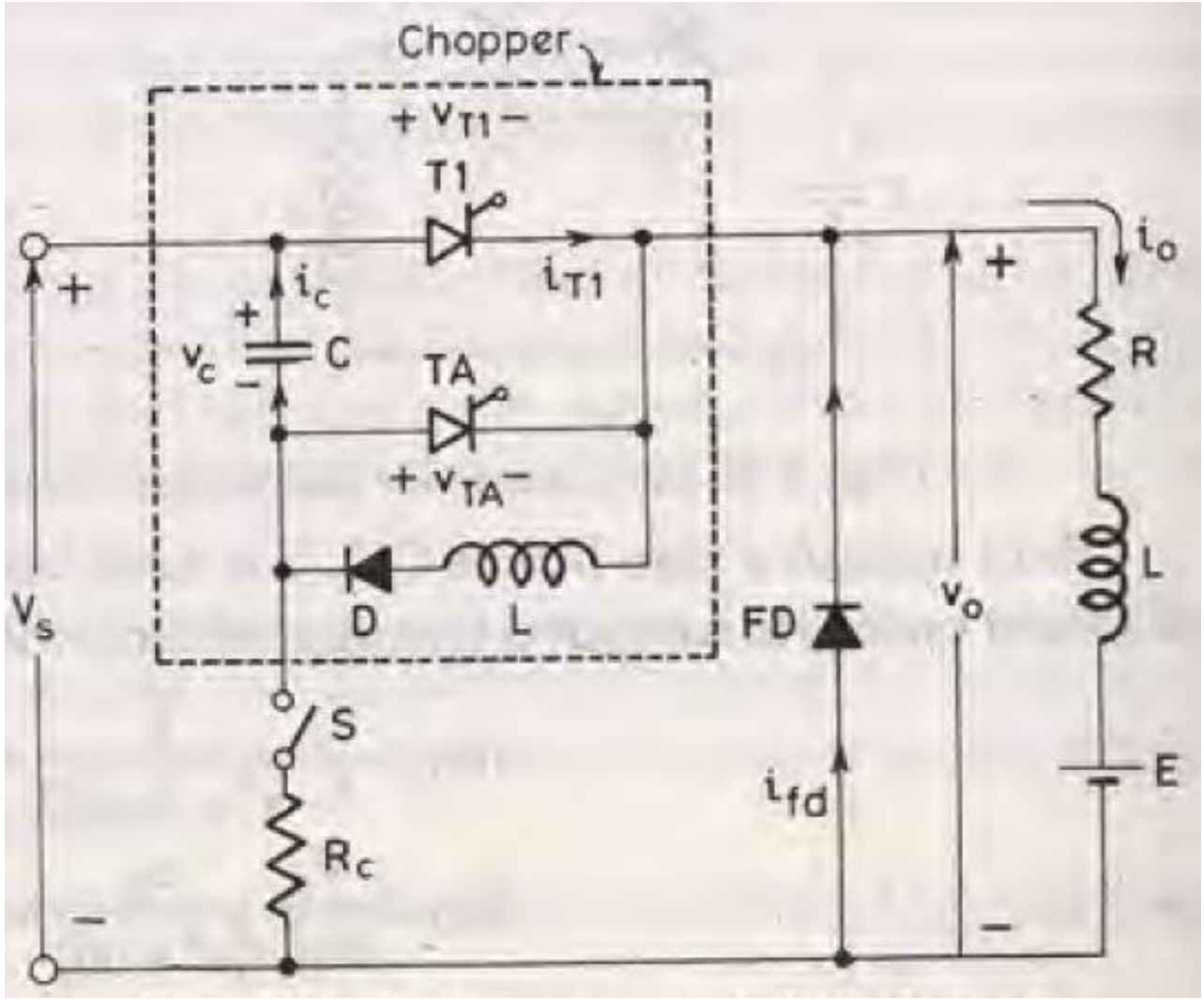
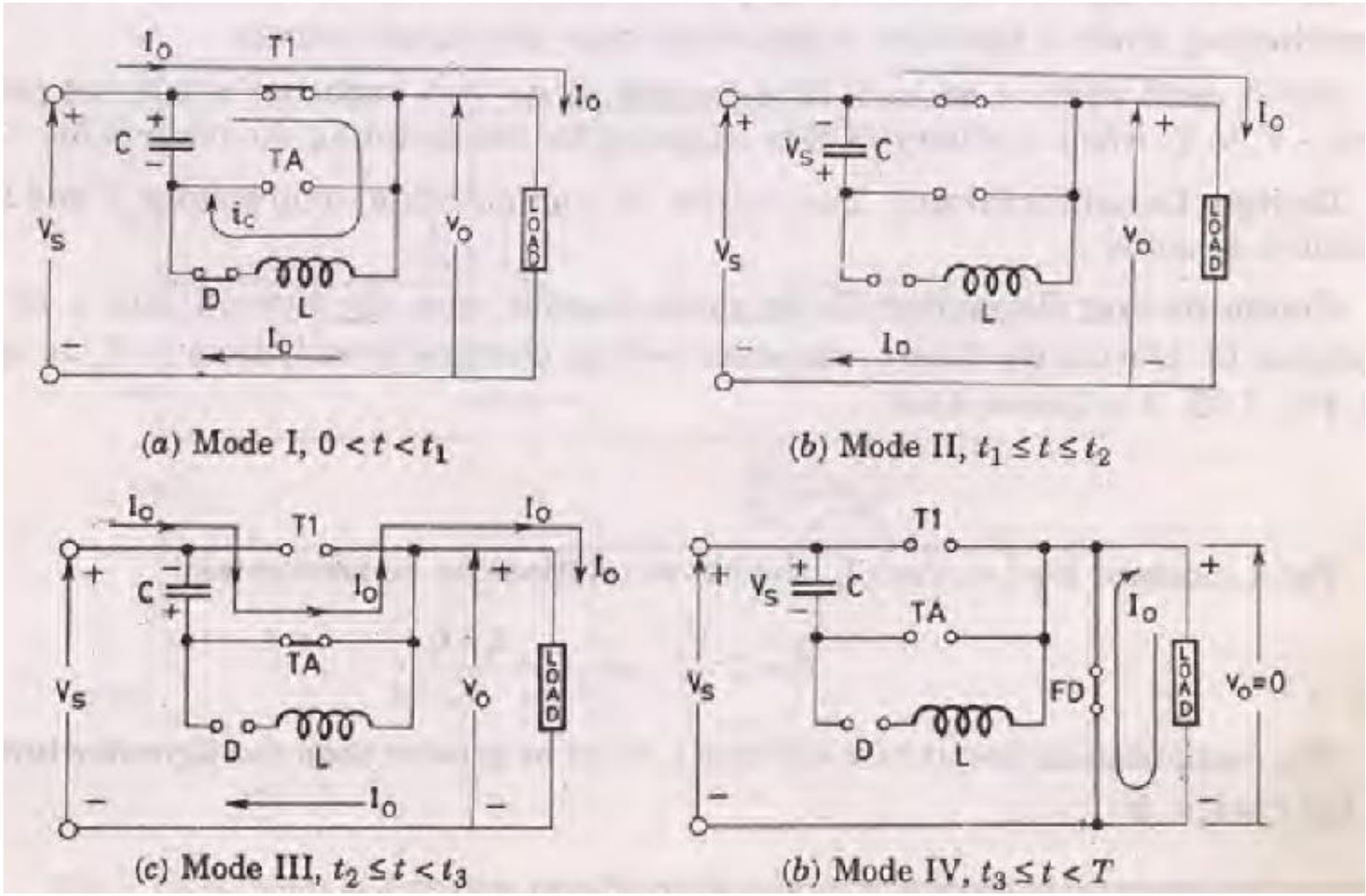
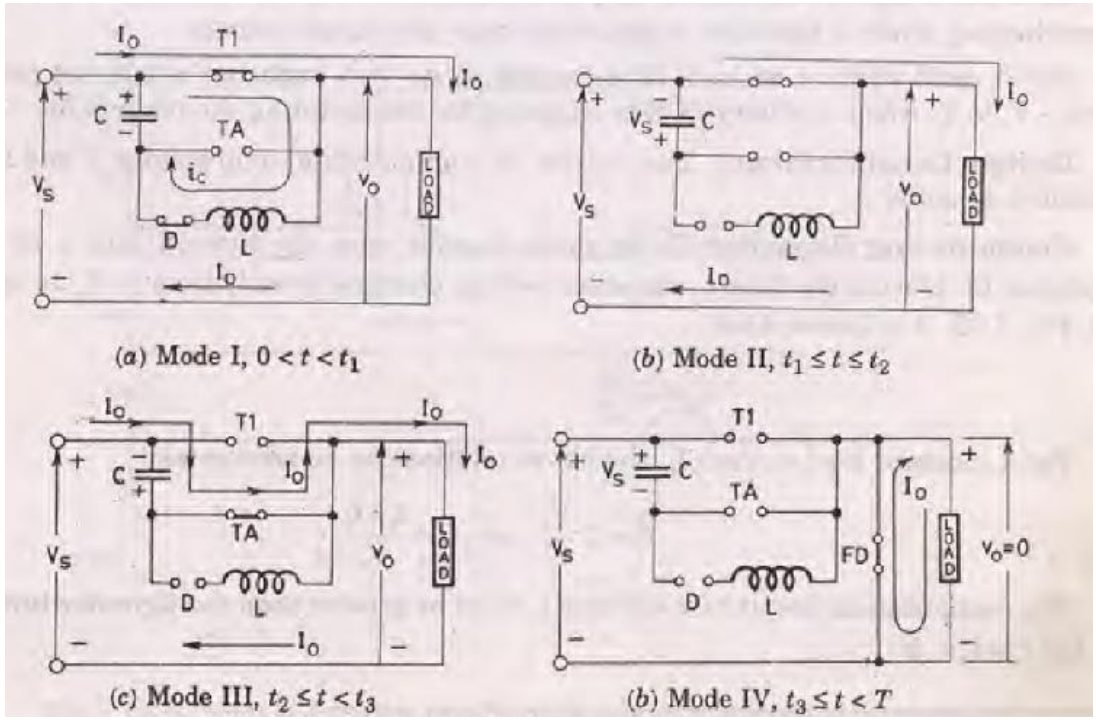
Voltage Commutated Chopper

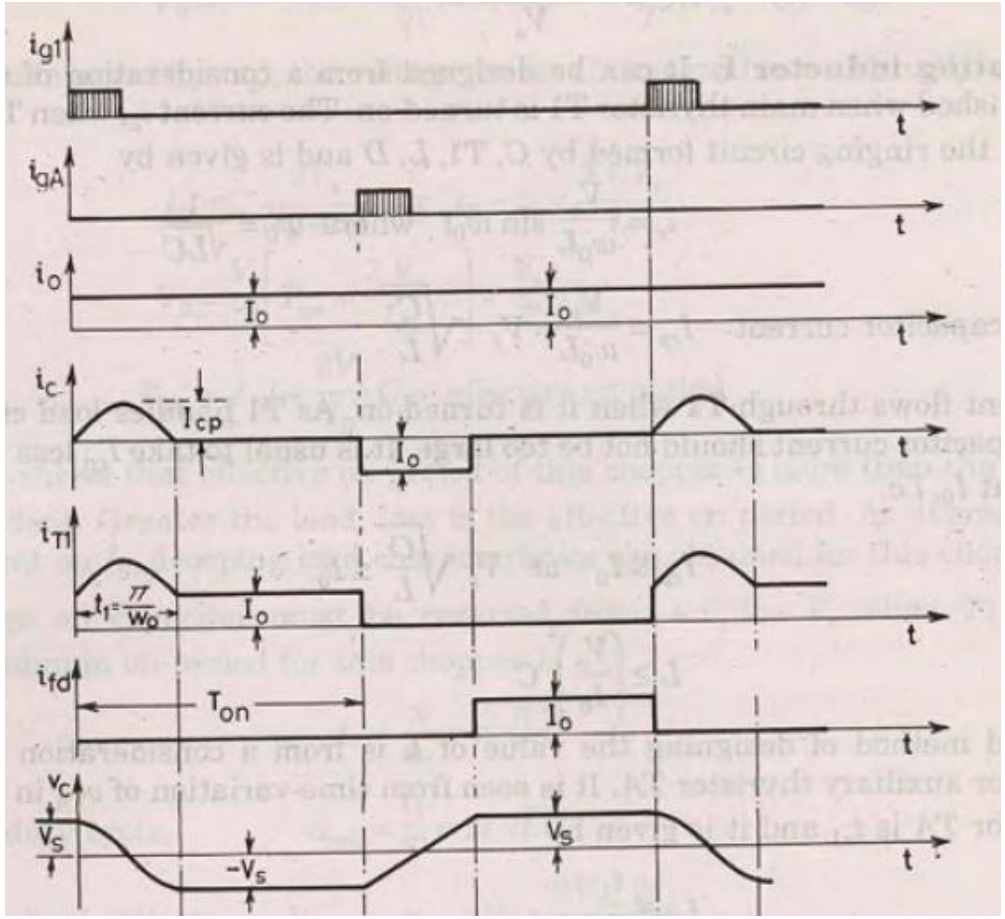


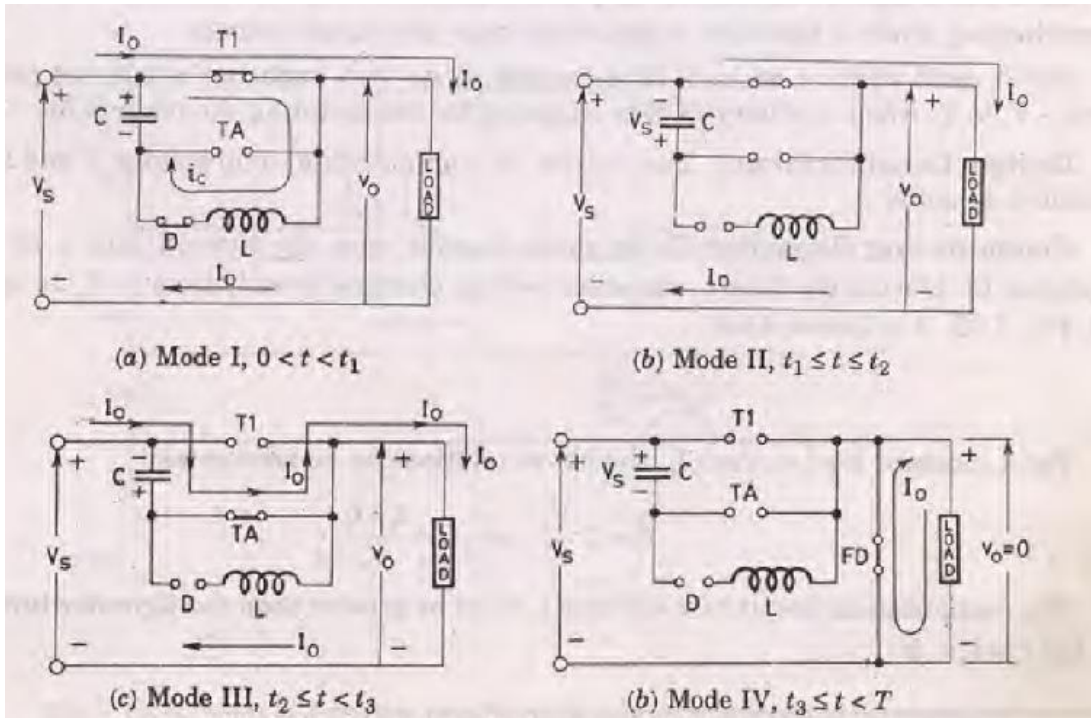
Mode of Operation:

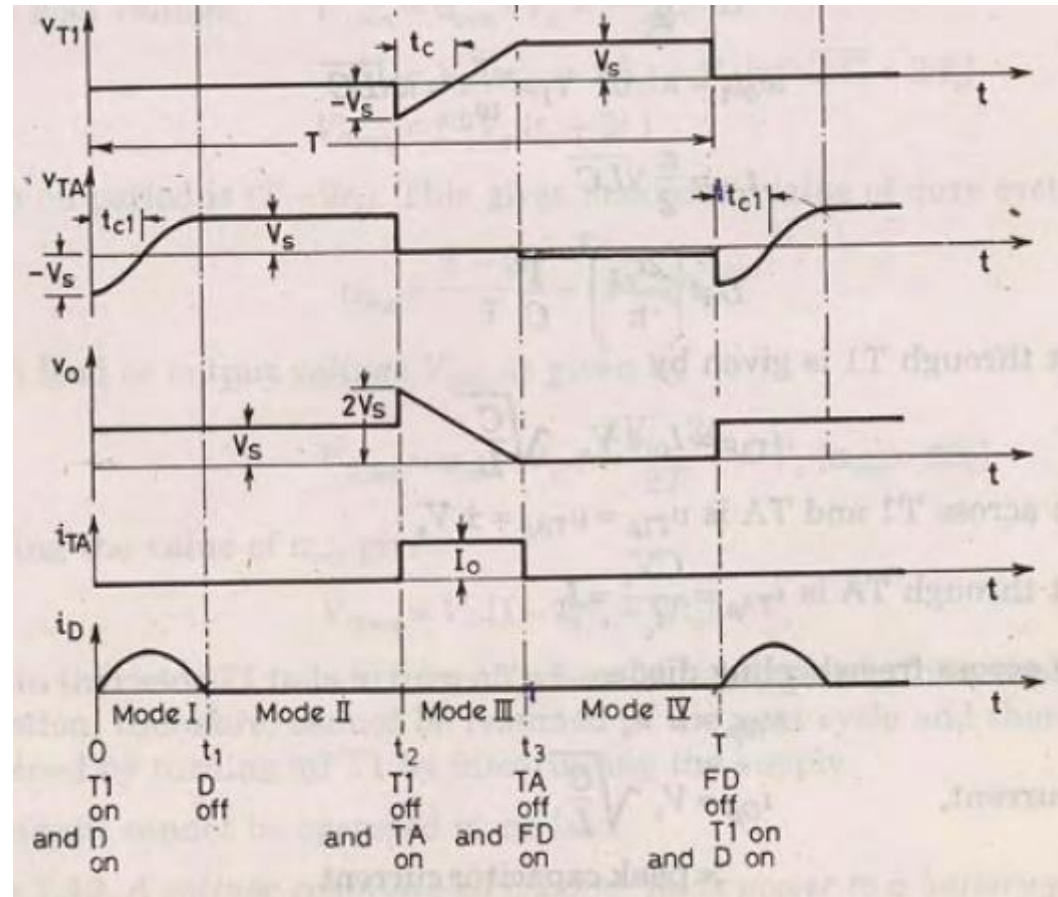


Voltage and Current Waveforms

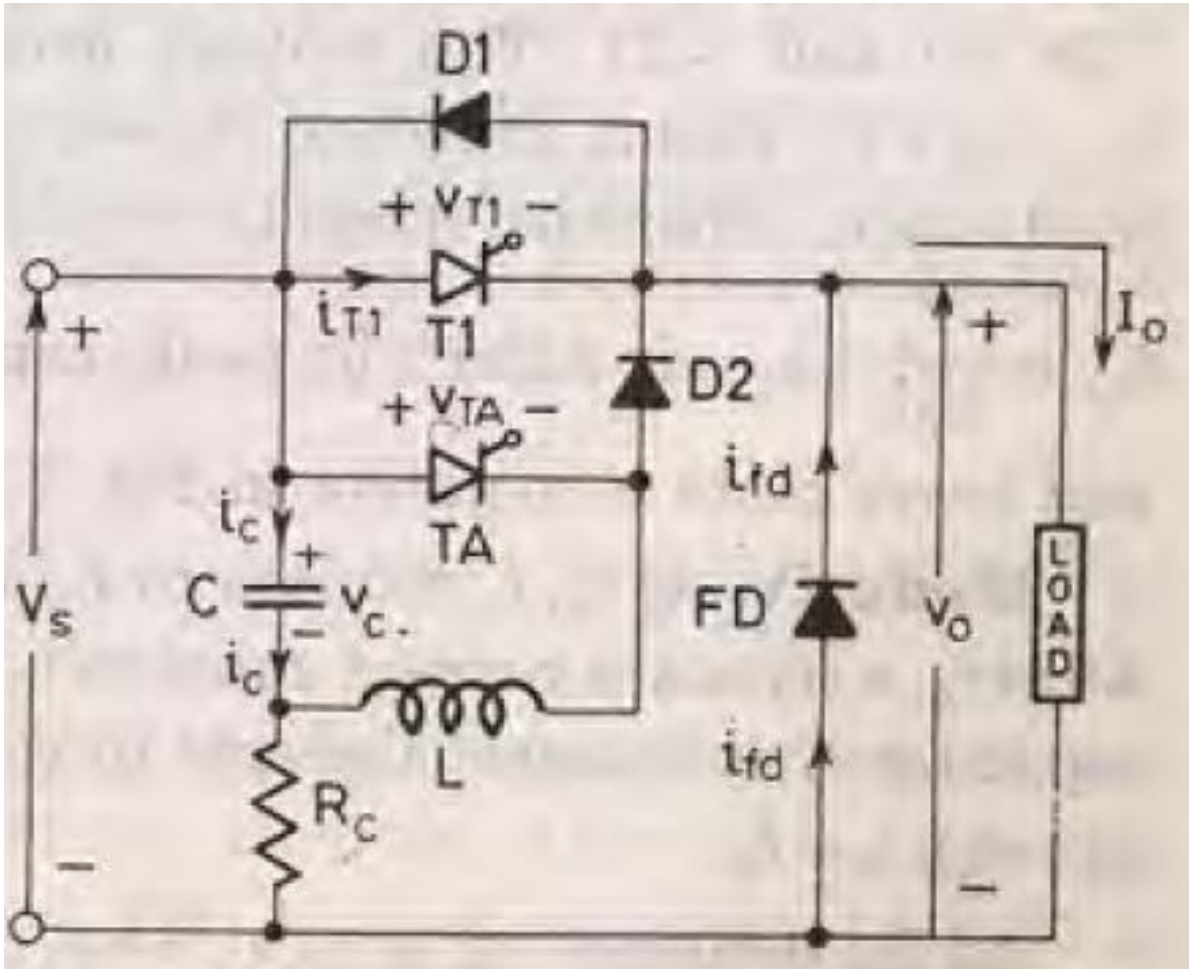




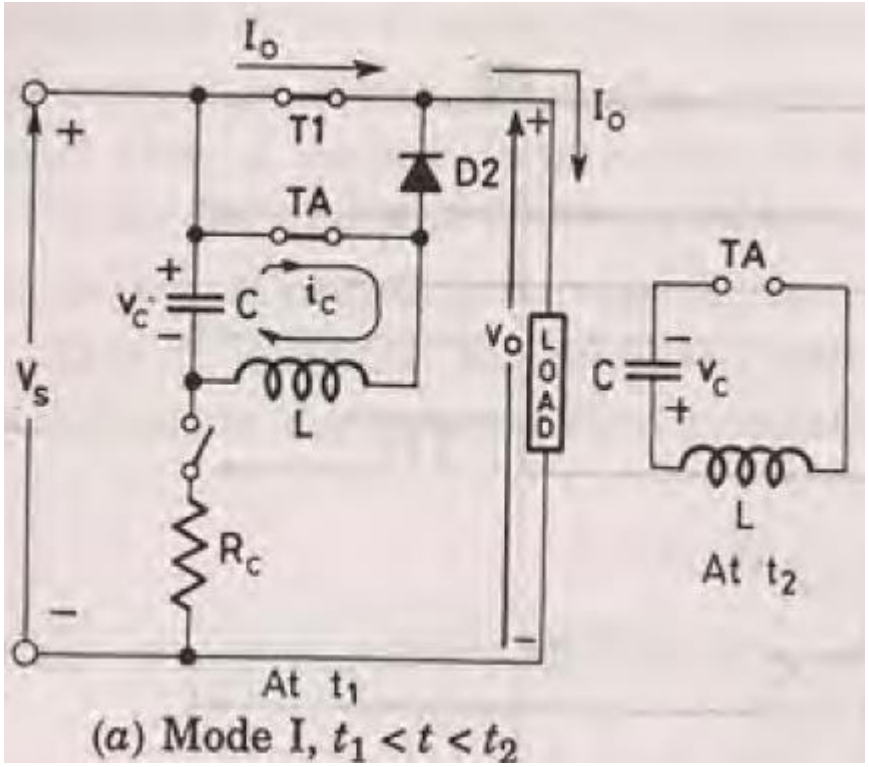

I_o
T1
C
TA
i_c
V_s
v_o
LOAD
D
L
I_o
(a) Mode I, $0 < t < t_1$
(b) Mode II, $t_1 \le t \le t_2$
(c) Mode III, $t_2 \le t < t_3$
(b) Mode IV, $t_3 \le t < T$
FD
$v_o = 0$

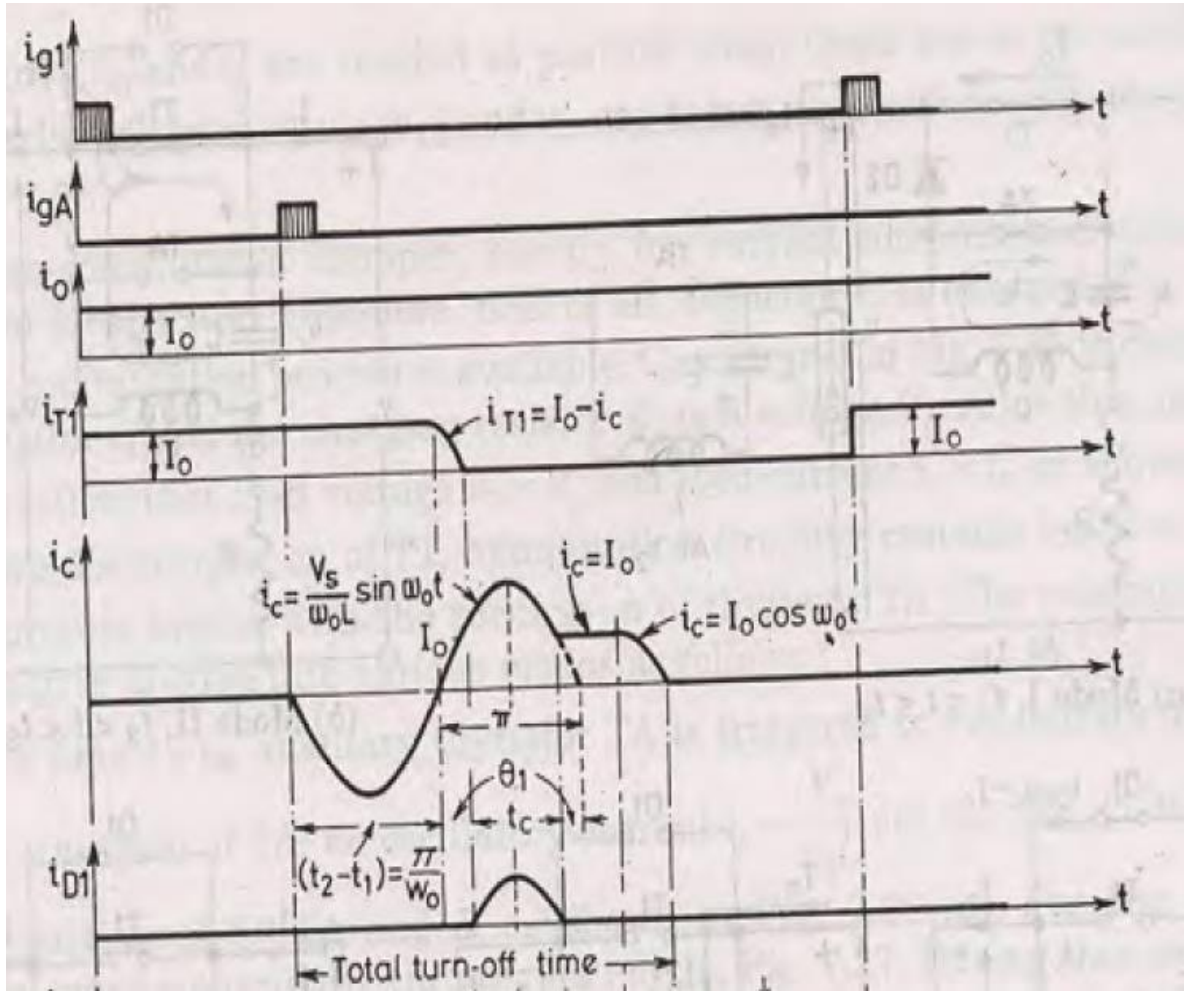

v_{T1}
t_c
V_s
$-V_s$
T
t
v_{TA}
t_{c1}
$2V_s$
v_o
i_{TA}
I_o
i_D
Mode I
Mode II
Mode III
Mode IV
0
T1 on and D on
t_1
D off
t_2
T1 off and TA on
t_3
TA off and FD on
T
FD off and T1 on and D on

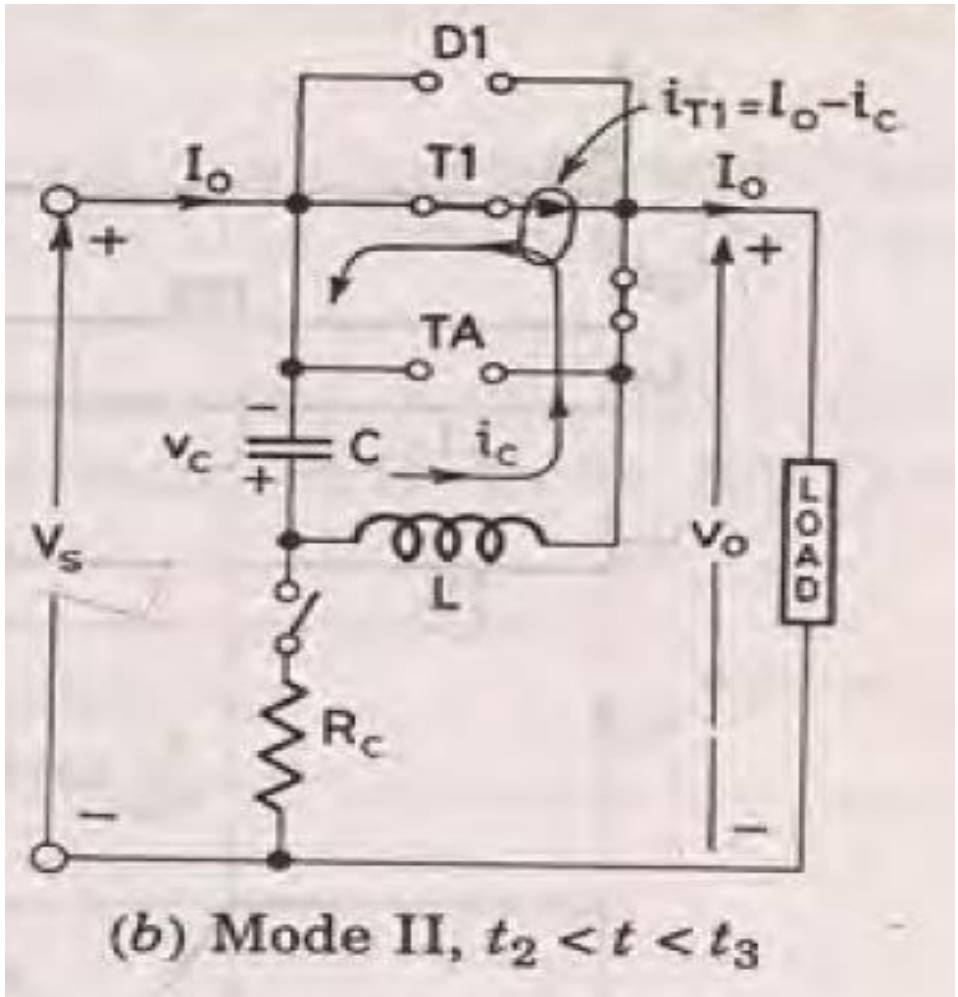
Current Commutated Chopper:



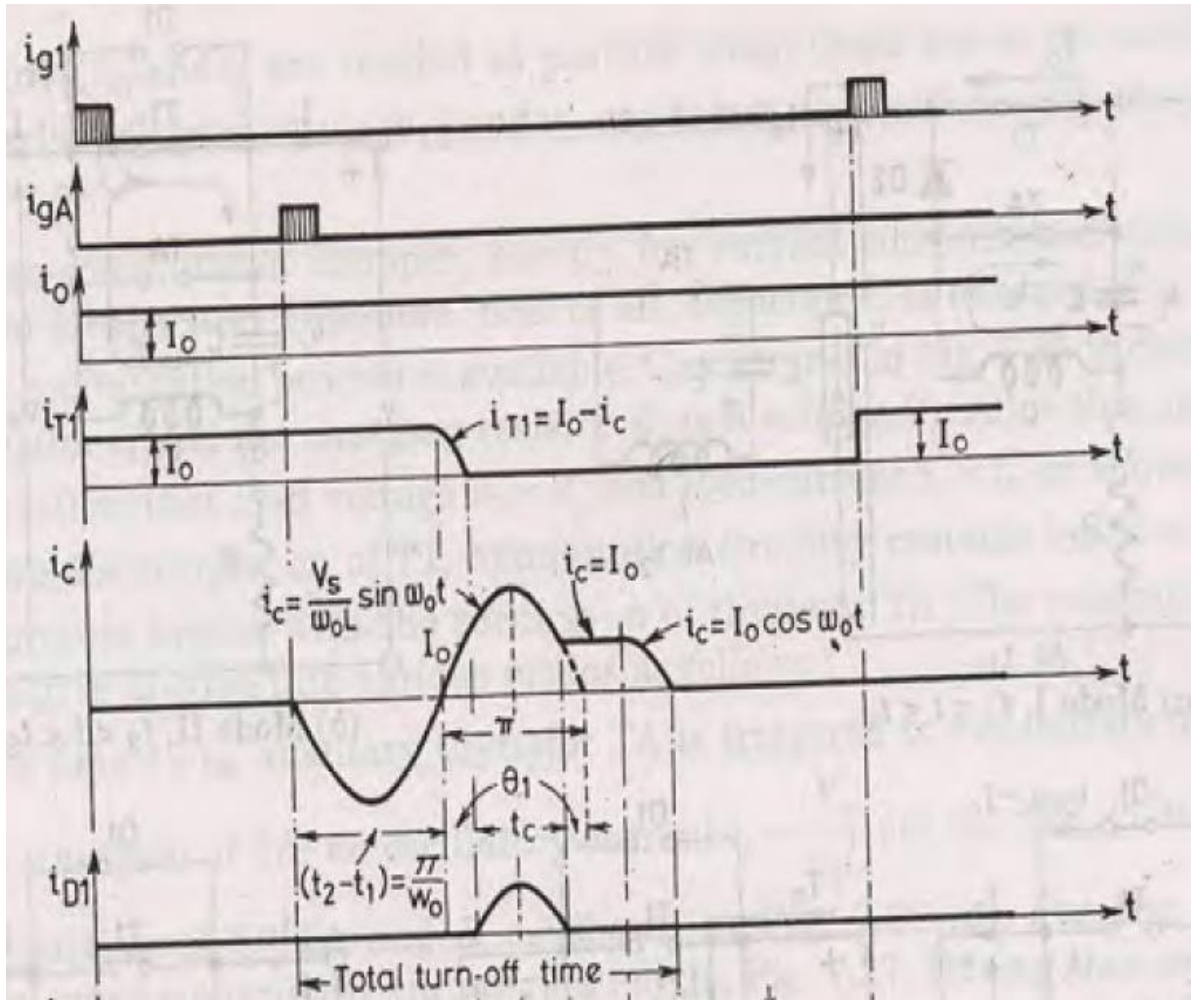
Mode of Operation:

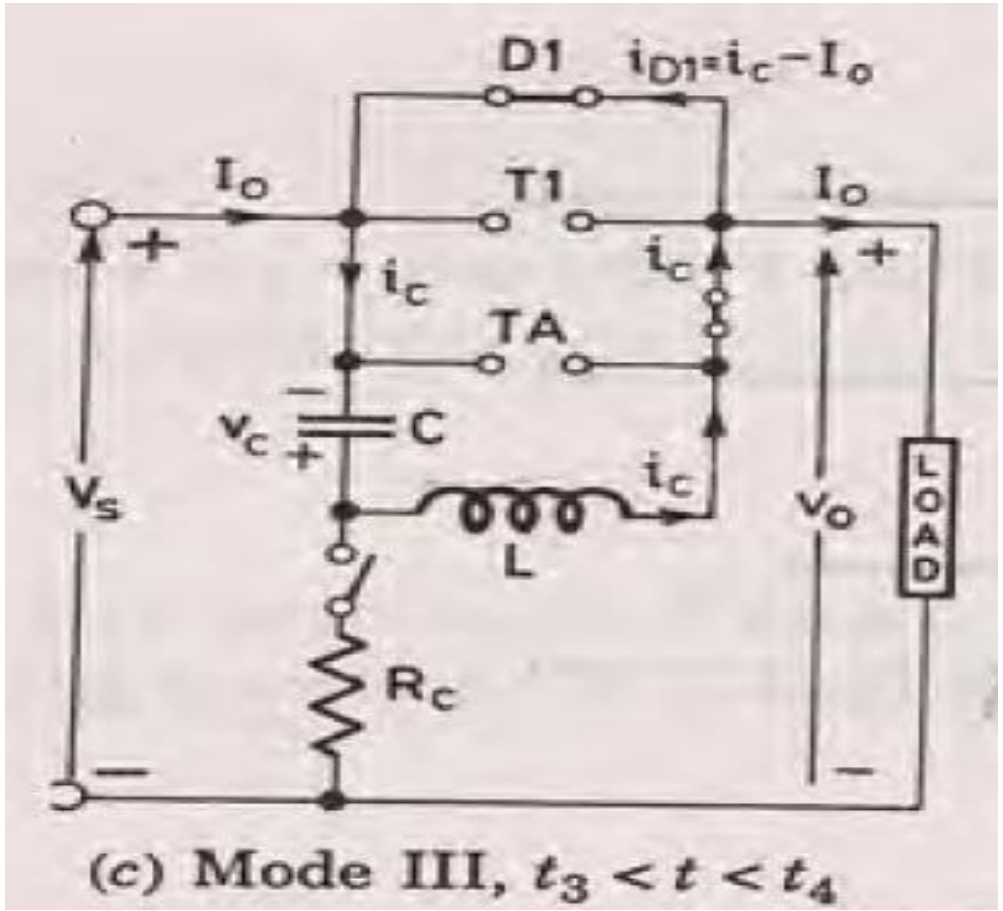




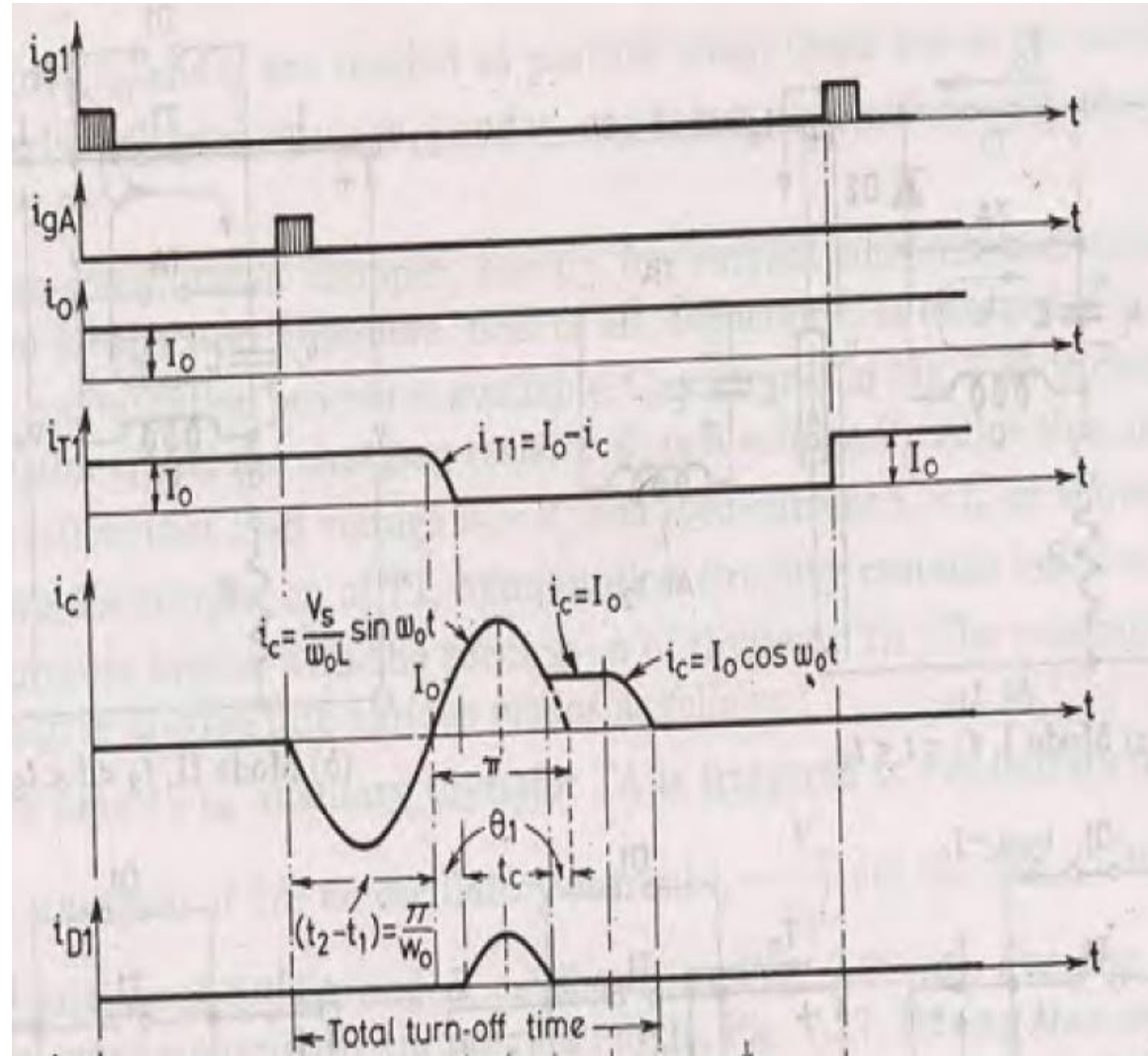


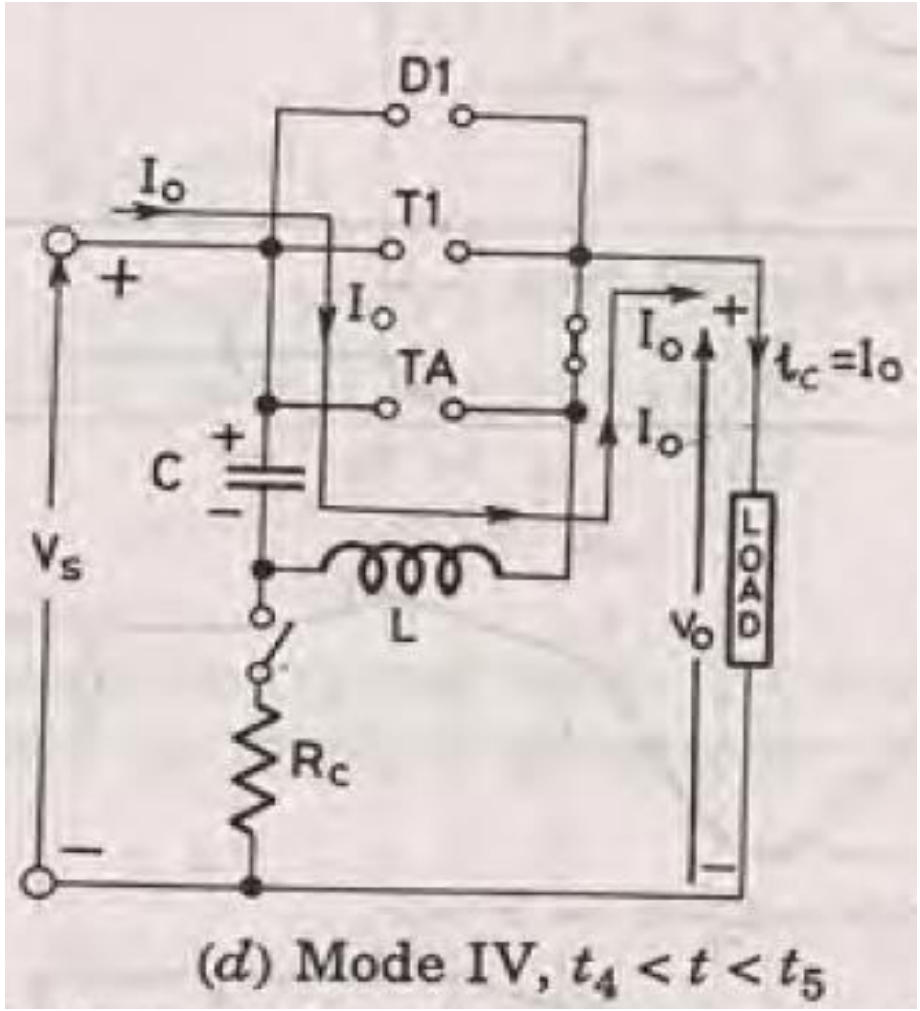
(b) Mode II, $t_2 < t < t_3$



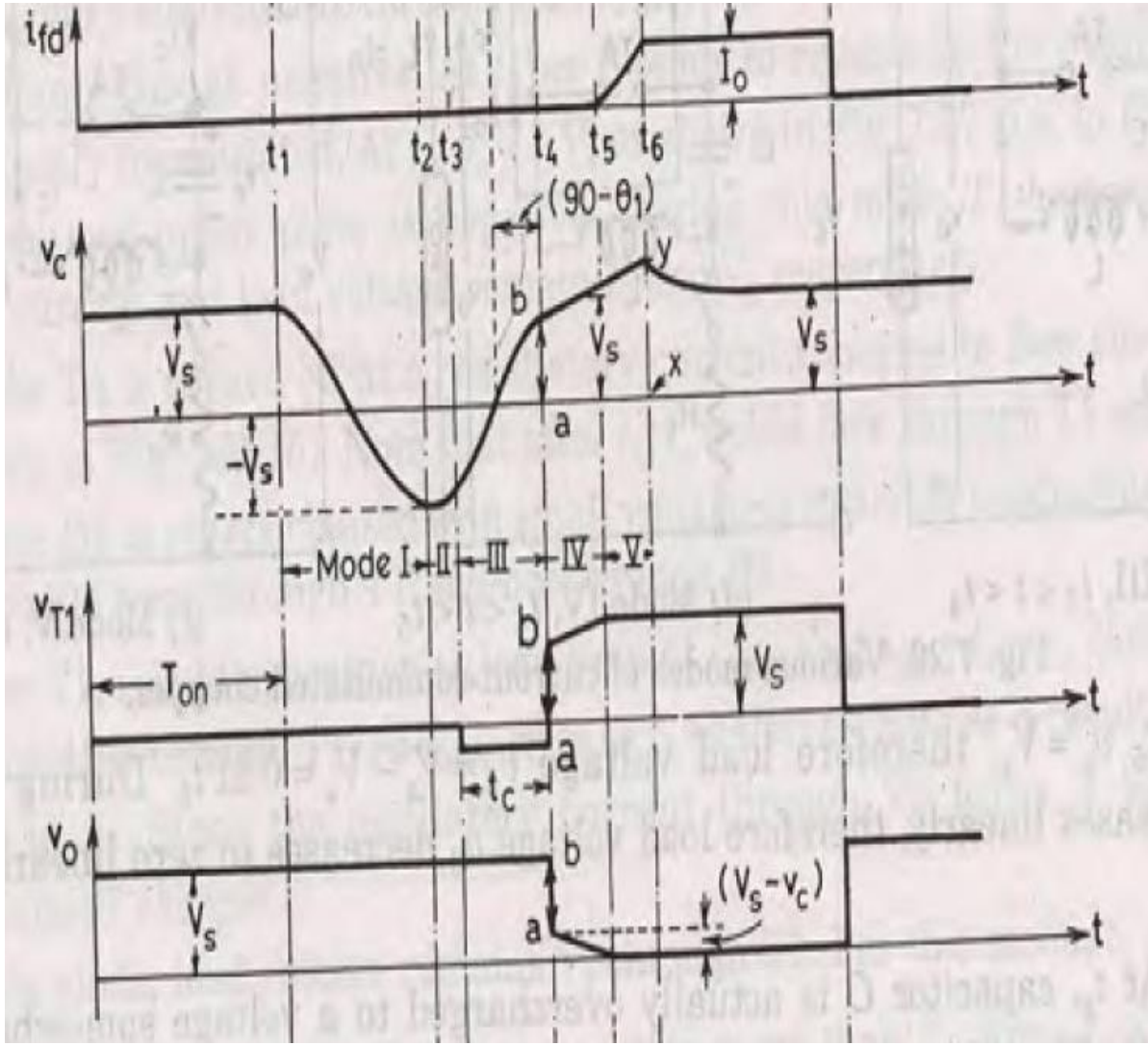


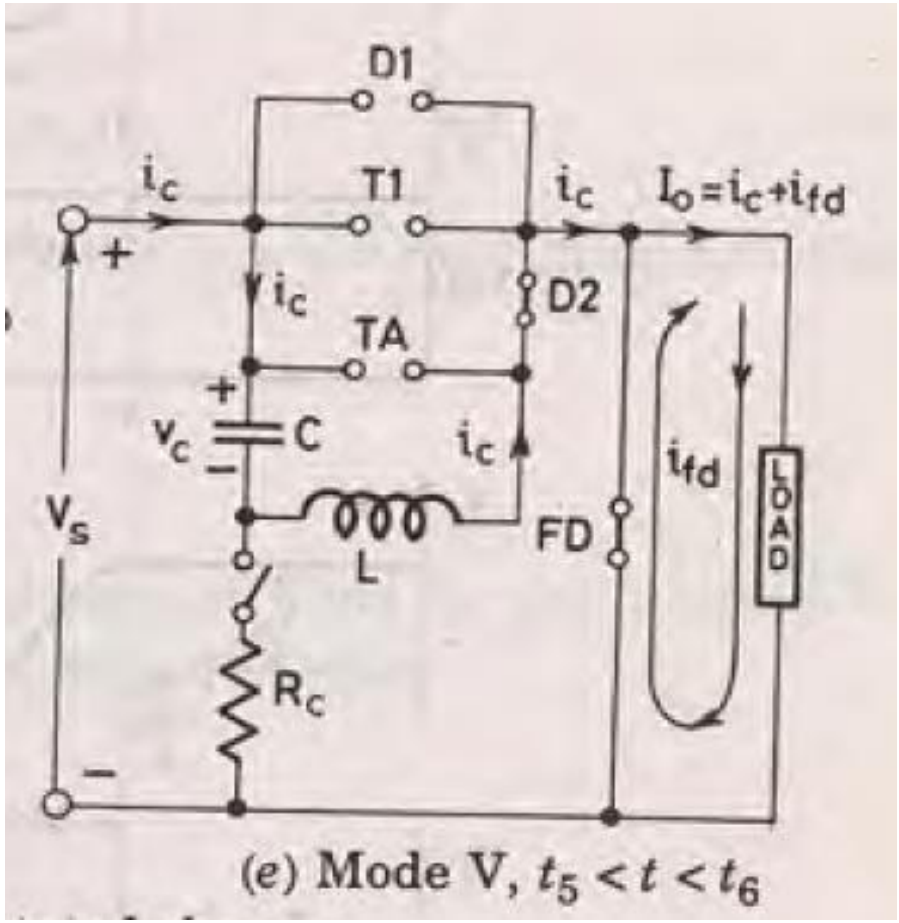
(c) Mode III, $t_3 < t < t_4$





(d) Mode IV, $t_4 < t < t_5$





(e) Mode V, $t_5 < t < t_6$

