

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF ELECTRICAL ENGINEERING

EE460-01 POWER ELECTRONICS

EXAM : I
DATE : November 7, 2007
PLACE : BLDG. 59-1010
TIME : 5:30-7:00 PM

Student Name: _____

Student ID : _____

Instructors : Dr. Mahmoud Kassas

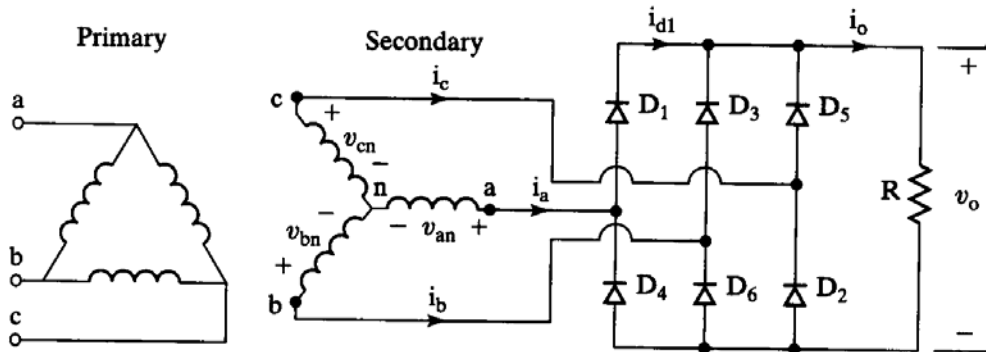
Problem 1	
Problem 2	
Problem 3	
Total	

Problem 1 (10 points)

Three-phase bridge rectifier has a purely resistive load. Determine:

- (a) The efficiency, η . (1 point)
- (b) The form factor, FF. (1 point)
- (c) The ripple factor, RF. (1 point)
- (d) The Transformer Utilization Factor, TUF. (1 point)
- (e) The PIV. (1 point)
- (f) The peak current and the rms current through the diode. (2 points)
- (g) Draw the current in phase C (1.5 points)
- (h) Draw the voltage across D6. (1.5 points)

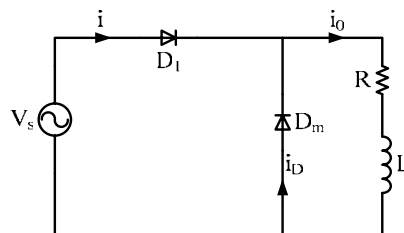
The rectifier delivers $I_{dc} = 60A$ at $V_{dc} = 280.2V$ & the source frequency is 60Hz.



Problem 2: (6 Points)

In the circuit shown below, the source voltage $v = 170 \sin 120\pi t$ V, $R = 5\Omega$, & $L = 30$ mH. Calculate the following:

- (a) The average value of the load current i_o . (2 points)
- (b) The steady-state value $I'_{0\pi}$ & $I'_{02\pi}$. (2 points)
- (c) Draw the current i & i_D . (2 points)



Problem 3: (9 points)

A single phase full converter in Fig. 1 is supplied from 120-V (rms) 60-Hz supply and the load resistance is $R=10\Omega$. If the average output voltage is 25% of the maximum possible average output voltage, calculate:

- (a) The delay angle α . (2 points)
- (b) The average and rms thyristor currents. (2 points)
- (c) The average and rms output currents. (2 points)
- (d) The input power factor, PF. (1 point)
- (e) Draw the voltage across the Th3. (2 points)

