

Benha University		Time : 45 minutes
Faculty of Engineering (Shoubra)		High Voltage Engineering
Electrical Engineering Dept. 30 March, 2013		Third Year (Power) Mid Term Exam.

Question One (10 points)

A. Mention the various methods for electric field computation and discuss the importance of electric field computation. **(3 points)**

B. State and explain Paschen's law. Derive expression for $(pd)_{min}$ and V_{min} . Assume $A = 12$, $B = 365$ and $\gamma = 0.02$ for air. Determine $(pd)_{min}$ and V_{min} . **(7 Points)**

Question Two (10 points)

A. What is the difference between the Townsend criterion for breakdown in uniform and non-uniform field gap. **(4 points)**

B. The following table gives two sets of experimental results for studying Townsend's mechanism. E is kept constant in each set. The minimum current observed is 6×10^{-14} A.

Determine the values of Townsend's first and second ionization coefficients for each set.

Gap distance (mm)	Observed current A	
	I set	II set
0.5	1.5×10^{-13}	6.5×10^{-14}
1.0	5×10^{-13}	2.0×10^{-13}
1.5	8.5×10^{-13}	4×10^{-13}
2.0	1.5×10^{-12}	8×10^{-13}
2.5	5.6×10^{-12}	1.2×10^{-12}
3.0	1.4×10^{-10}	6.5×10^{-12}
3.5	1.4×10^{-10}	6.5×10^{-11}
4.0	1.5×10^{-9}	4.0×10^{-10}
5.0	7.0×10^{-7}	1.2×10^{-8}