**中山大学**

**电路与电子学实验课程实验报告**



实验主题\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

实验时间\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

姓名 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

学院 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

实验日期 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **实验目的**  1.实践日光灯线路的接线。  2.测量日光灯的功率因数。  3.实践改进功率因数的方法。 |
| **实验原理**   1. 日光灯通过启辉器短路而让镇流器产生一个瞬时极大电压击穿灯管内的汞蒸气使其导电，从而激发壁上的荧光粉发光。 2. 功率因数pf=cosφ=（其中φ为相位角,P为有功功率，S为视在功率） 3. 功率因数可通过并联电容增加，但若并联的电容过大，功率因数反而降低。原因是电容容值过大会导致电路从感性电路变为容性电路。所以并联的电容有一个合适的最大值。 |
| **注意事项**   1. 此次实验使用的是380V工业用电，要防止触电。先接好线路再通电。 2. 断开电路时使用test键 3. 灯管有时可能会接触不良，需要手动扭动灯管使其发光。 4. 功率表的绿线一定要接到N端（地线端） |
| **实验仪器、设备**  强电实验箱x1，功率表x1，380V工业强电，导线若干。 |
| **实验步骤**   1. 按仿真图纸所示接好电路，检查好线路后将空气开关拨至连接状态。 2. 观察表上的总电压、总电流、有功功率和功率因数。 3. 利用实验箱上的交流电表测出镇流器和灯管的电压，算出视在功率。 4. 套用公式：pf=cosφ=，得出实验pf值 5. 与功率表上显示的pf相比较，讨论误差原因。 6. 改变日光灯并联电容的大小，观察功率表上功率因数pf随电容阻值变化的关系。 7. 断开开关，收好导线，整理实验现场。 |
| **仿真图纸** |
| **仿真数据表格（230V/50Hz市电）**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 总电流（mA） | 总电压（V） | 视在功率（V·A） | 有功功率（W） | 功率因数pf | | 186 | 230 | 42.78 | 27.40 | 0.64 | |

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| **实验数据表格**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | 总电流（mA） | 总电压（V） | 视在功率（V·A） | | 有功功率（W） | 功率因数pf | |  |  |  | |  |  | | 等效并联电容（μF) | | | 改进后功率因数（pf） | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |  | | |  | | | | |
| **实验结论** |
| **实验数据误差分析** |
| **实验总结和反思** |