

Fakulti: FAKULTI KEJURUTERAAN ELEKTRIK	
Nama Matapelajaran: Makmal Tahun 4	Semakan : 1
Kod Matapelajaran : SEE 4722	Tarikh Keluaran : 2007
	Pindaan Terakhir : 2007
	No. Prosedur : PK-UTM-FKE-(0)-10



SEE 4722

**FAKULTI KEJURUTERAAN ELEKTRIK
UNIVERSITI TEKNOLOGI MALAYSIA
KAMPUS SKUDAI
JOHOR**

**INSTITUT VOLTAN DAN ARUS TINGGI (IVAT)
STUDENT PACK (Experiment 09)**

**Development of a Portable High Voltage Power Supply using
Ignition Coil**

Disediakan oleh : Dr. Zolkafle Buntat	Disahkan oleh : Ketua Jabatan
Nama :	Nama :
Tandatangan :	Tandatangan :
Cop :	Cop :
Tarikh : Jun 2007	Tarikh :

1. LIST OF COMPONENTS AVAILABLE

a) High Voltage Measuring units

 Oscilloscope

 H.V Probe

b) Car Ignition Coil

c) Components for driver circuit/pulse generator

Component	Description	Quantity
LM 555	Timer	1
7812	+12V Voltage Regulator	1
IRFZ44N	Advanced power MOSFET	1
	Car ignition coil	1
25K Ohm Potentiometer	Linear Potentiometer	1
Red LED	Light Emitting Diode	1
Green LED	Light Emitting Diode	1
1N4007	Diode	2
330 Ohm, 1/2 Watt	Resistor	1
560 Ohm, 1/2 Watt	Resistor	1
180 Ohm, 1/2 Watt	Resistor	1
1kOhm, 1/2 Watt	Resistor	1
10nF, 63 Watt	Electrolytic capacitor	2
Manual switch on/off	Single circuit switch	2
Fuse 1A	Fuse 1A and socket	1
Transformer	230V/2x24V at least 2A	2

2. PRELIMINARY WORK RELATED TO THE LABORATORY WORK

You will be better equipped to solve the laboratory problem if you equip yourself with the understanding of the following items:

- i. Car ignition coil and its operation
- ii. Suitable driver circuit to drive the car ignition coil to generate high voltage output.
- iii. Circuit analysis and simulation study using Pspice.
- iv. How to develop and test high voltage power supply
- v. What are the safety requirement when dealing with high voltage system.
- vi. Design and fabrication of PCB using Protel DXP

3. PROBLEM-SOLVING TIME-LINE

Activities	Week 1	Week 2	Week 3	Week 4
1) Understanding/Identify/Brainstorming				
2) Design/Simulation /Experiments				
3) Hardware Development/Testing				
4) Measurements/Data Analysis				
5) Presentation/Report Writing				

4. REPORT WRITING

- d) Other than the general guide specified by the Laboratory Coordinator, your report for this laboratory must also include;
- Results of all the tests.
 - Photographs of the system set-up.
 - Photographs of your group members during hands-on session.
 - The group shall submit a write-up on the topic of *Method and Technique to develop a simple portable high voltage power supply* (4 pages) to the facilitator on the **second week** of the laboratory.

- In the report, you have to consider the several type of transformer (i.e flyback, car ignition coil and etc) that can be used to generate high voltage power supply.

5. REFERENCES

- i) *Internet Sources* (www.jinlabs.org, www.orcad.com, www.kronjaeger.com, www.electronics-lab.com)
- ii) M.S. Naidu and V. Kamaraju (2004). *High Voltage Engineering*. Mc. Graw Hill.
- iii) E. Kuffel and W.S. Zaengl. *High Voltage Engineering, Fundamentals*. Pergamon Press.
- iv) Useful information related to high voltage engineering is available at <http://www.nikhef.nl/~enrichn/highvolt/notes.html>
- v) More information on High voltage power supply.