



COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY
SCHOOL OF ELECTRICAL AND ELECTRONIC ENGINEERING

CERTIFICATE IV in ELECTRICAL ENGINEERING
PROGRAMME

EEE448 ELECTRONICS for ELECTRICIANS II

FINAL EXAMINATION (PENSTER 4, 2017)

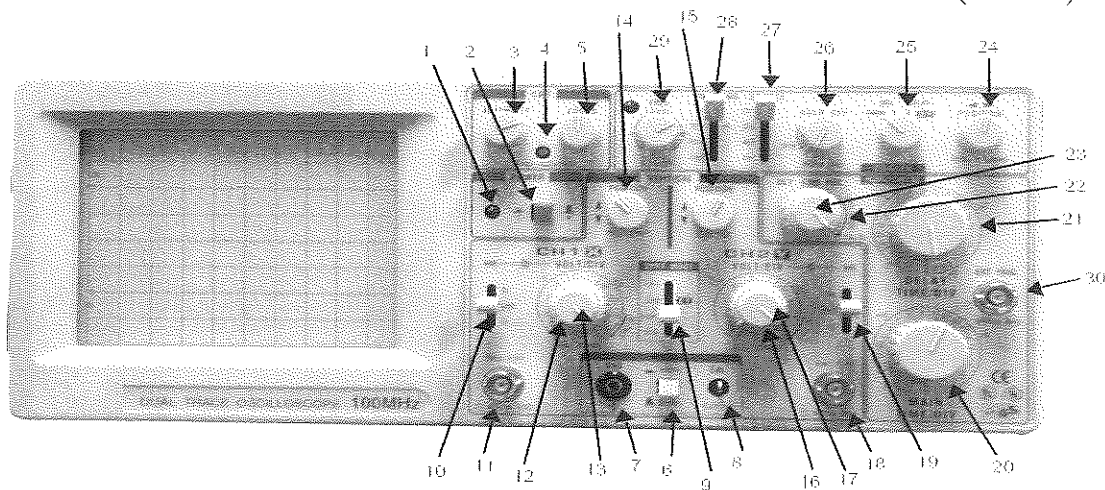
DATE/TIME/ROOM – Refer to Exam Timetable

INSTRUCTIONS TO CANDIDATES

1. You are allowed 10 minutes extra time during which you are not to write.
2. Write all your answers in the allocated Answer Booklet.
3. Begin each answer on a fresh new page and use both sides of the sheets.
4. Write your identification number on the top of each attached sheet.
5. Insert all written foolscaps, graph paper, drawing paper, etc in their correct sequence and secure with string provided.
6. For all sheets of paper in which has been done, cross it through and you must attach to your answer script.
7. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
8. All Sections A, B and C are compulsory however Section D is *optional* and do *one only*.

Section A: (25 marks) *(Instruments and Measurements)*

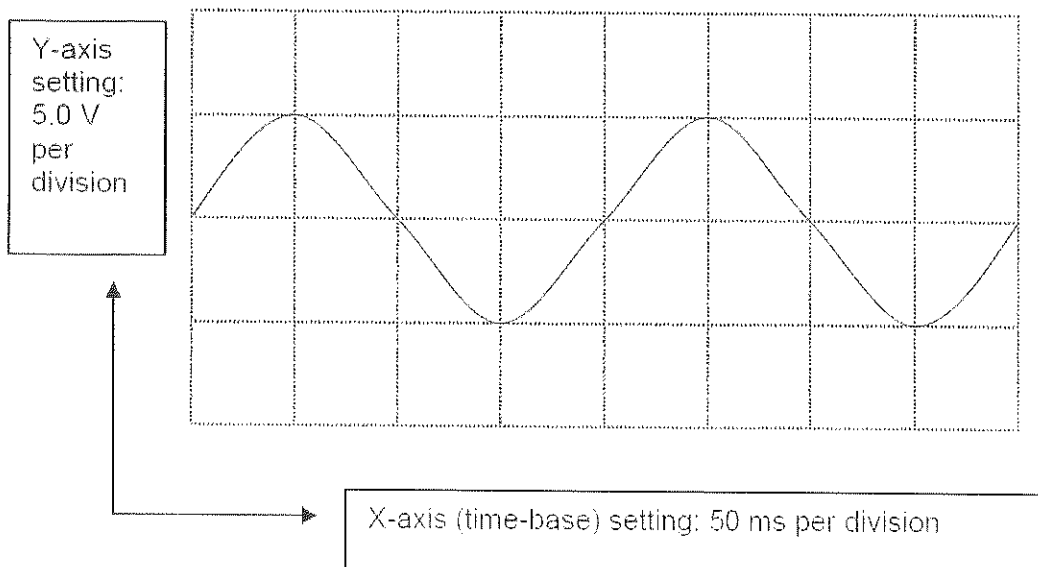
1. Interpret the faceplate controls of the cathode ray oscilloscope and define the purpose of the arrowed alphabet number 2, 3, 5, 14, 20 and 10. (6 marks)



2. ***Cathode Ray Oscilloscope Display:***

- a) Determine the waveform parameters that was displayed on the cathode ray oscilloscope given below:

- i. Amplitude (2 marks)
- ii. rms value (2 marks)
- iii. peak-to-peak value (2 marks)
- iv. frequency (4 marks)



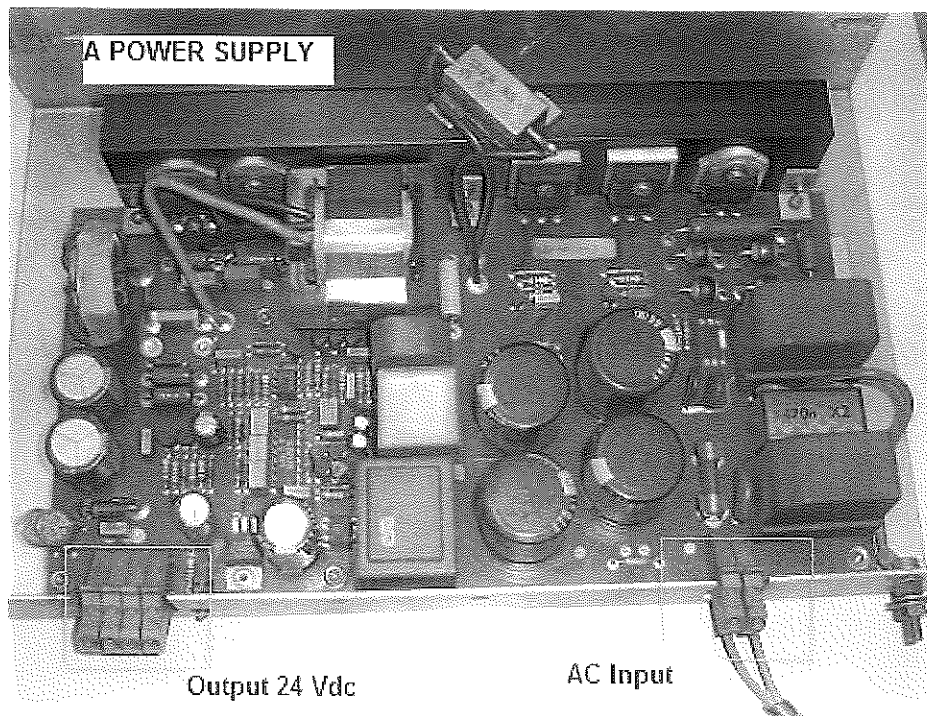
- b) Specify the importance and an example of an rms value. (1 mark)

- c) Specify the test instrument used to detect open circuit and short circuit faults and determine in your own words how you will accomplish this. (3 marks)
- d) Relate to a circuit by sketch the circuit diagram where you can apply a logic probe to detect a logic one or logic zero. (5 marks)

Section B: (25 marks) (Troubleshooting)

Case Study

The diagram below shows the DC power supply that gives an output voltage of 24V_{DC} which is commonly used in most systems. As it happens, no 24V_{DC} was measured as the DC power supply was reported as faulty. You as an electrician having done the unit in Electronics for Electricians II were instructed by your supervisor to immediately diagnose the problem, specify the likely causes by answering the following questions.



1. Express in your words the definition of the term “troubleshooting”. (2 marks)
2. Specify whether this power supply is a regulated DC power supply or an unregulated DC power supply. Give a reason to support your answer. (4 marks)
3. Illustrate and label the block diagram of the DC power supply you had specified above. (5 marks)

4. Sketch the probable circuit diagram of the DC power supply you had determined and label the reference designators. (Assume the description of the circuit if necessary by writing a paragraph) (5 marks)
5. Relate and sketch the possible troubleshooting flow chart that will direct you to diagnose the possible faults. Specify the techniques involved procedurally. (9 marks)

Section C: (25 marks) (*Electronic Workshop Practice Skills and components*)

1. Soldering and Desoldering:
 - a) Interpret the terms “soldering” and “desoldering” in your own words when applied to extract or insert the components onto the printed circuit board. (4 marks)
 - b) Specify the tools applied in soldering and desoldering of components from the printed circuit board. (3 marks)
 - c) Determine the soldering procedure for a good solder joint on the printed circuit board. (3 marks)
2. Discrete Components
 - a) Determine the component use as a light sensor and can be applied to a circuit to switch the light or a motor in the event when the light to the sensor is blocked. (1 mark)
 - b) Sketch and label the graph showing the component’s performance. Determine the operation of the graph referenced to the Light Dependent Resistor (4 marks)
 - c) Demonstrate the operation by writing in your own words how the circuit works by illustrating a circuit diagram. (4 marks)
3. Digital Circuits
Sketch the AND, OR, NAND, NOR and NOT gates and relate this to its operation by specifying its truth table. (6 marks)

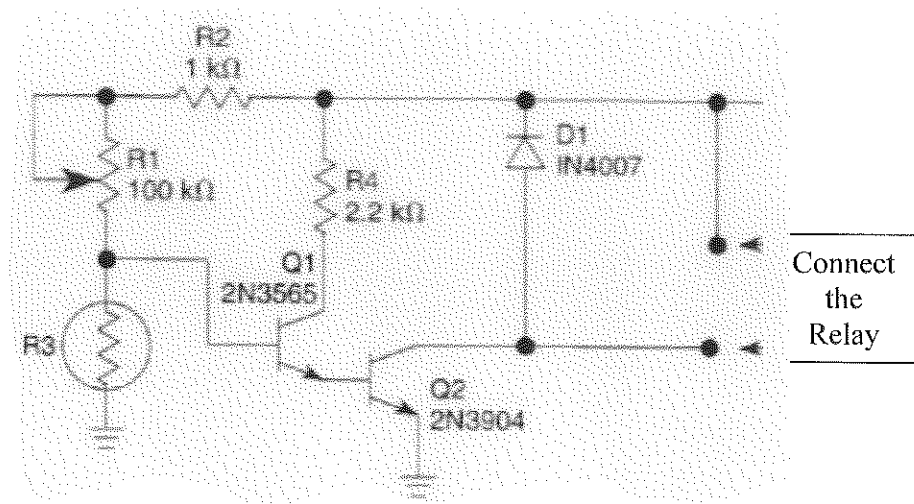
Section D: (25 marks) (*Optional*) (*Project circuit-based question*)

Choose ONE circuit only by writing the circuit number in your answer sheet. Answer the following circuits:

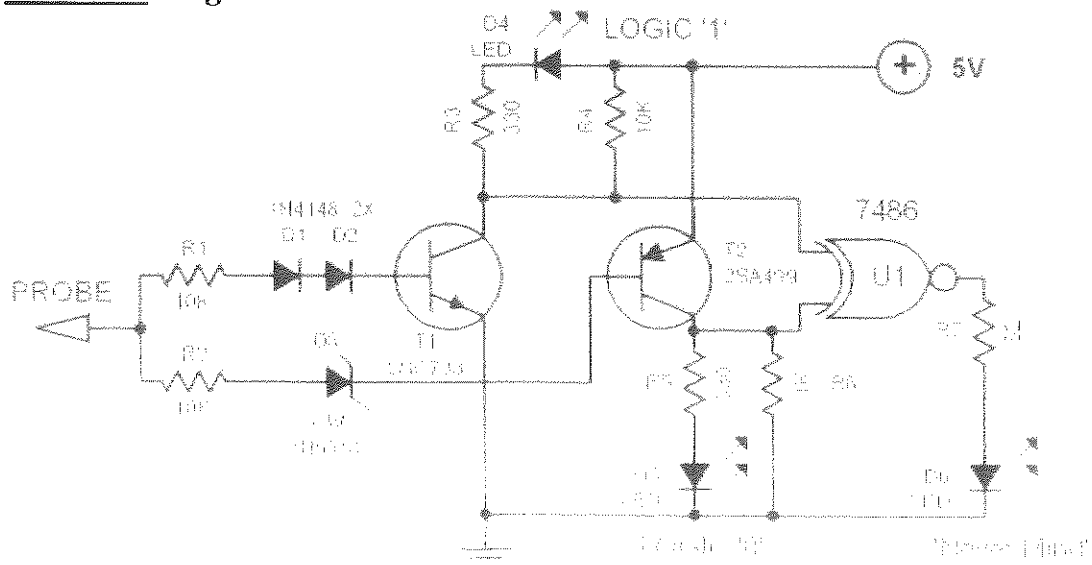
1. Sketch the Gantt chart and specify the likely project timeline that you had chosen for your circuit, for duration of six weeks. (4 marks)
2. Illustrate and specify the stages of the block diagram for the circuit you chose. Determine the operation of the circuit in your own words. (6 marks)

3. Determine in your own words how you will simulate the circuit on the breadboard. (6 marks)
4. Relate in your own words how you made the printed circuit board. (4 marks)
5. Apply the techniques in testing of your project circuit by writing in your own words the procedures involved to accomplish the project circuit. (5 marks)

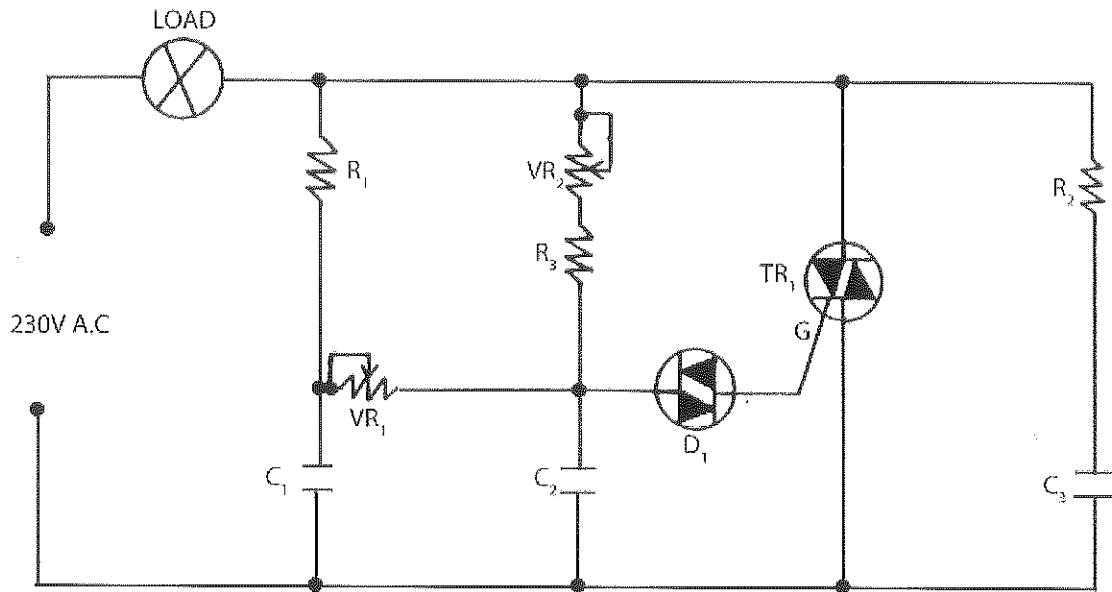
Circuit 1: Light Activated Switch



Circuit 2: Logic Probe



Circuit 3: Light Dimmer



Circuit 4: Motor Control Circuit

