



**COLLEGE:** COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

**SCHOOL:** SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

**PROGRAMME:** CERTIFICATE IV IN ELECTRICAL ENGINEERING - STAGE 2

**UNIT CODE:** EEE329

**TITLE:** ELECTRICAL PRINCIPLES (TRADE) 1

## **FINAL EXAMINATION – PENSTER 4, 2013**

**ROOM: AS PER TIMETABLE**

### **INSTRUCTIONS TO STUDENTS**

1. You are allowed 10 minutes extra reading time during which you are NOT to write.
2. Begin each SECTION on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and ATTACH these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of programmable calculator(s) is prohibited.
8. **ANSWER ALL QUESTIONS**
9. Show all working where necessary.
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM.**

**SECTION A**

**(10 Marks)**

1. Draw the following circuit symbols. (1 mark each)
- a) Switch
  - b) Cell
  - c) Battery
  - d) Lamp
  - e) Voltmeter
  - f) Ammeter
  - g) Resistor
  - h) Variable Resistor
  - i) Motor
  - j) Wattmeter

**SECTION B**

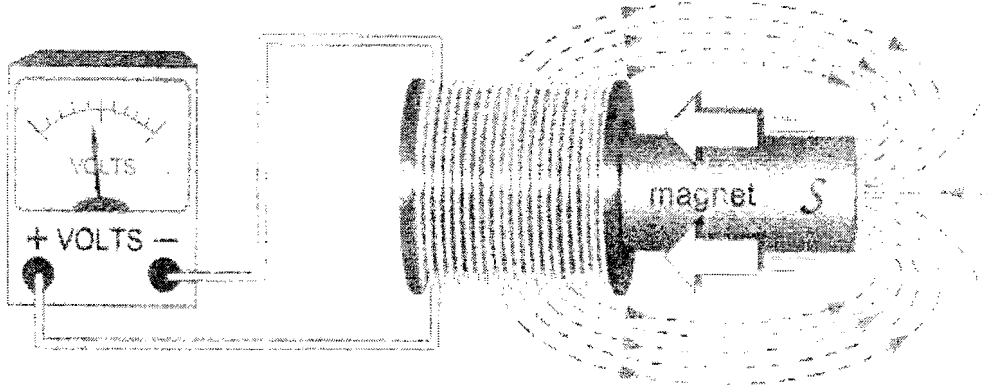
**(25 Marks)**

1. Determine the resistance, tolerance and range of the following 4 band and 5 band resistors.
- a) Brown black black gold (2 marks)
  - b) Blue green black brown red (2 marks)
  - c) Brown red black gold brown (2 marks)
2. Determine the values of the following capacitors
- a) 104K (2 marks)
  - b) 681M (2 marks)
  - c) 5n6K240 (2 marks)
  - d) 223 (2 marks)
3. Name six different types of capacitors (3 marks)
4. Find the resistance of a copper cable 95m in length if it has a diameter of 2mm.  
The resistivity of copper is  $1.72 \times 10^{-8} \Omega\text{m}$ . (3 marks)
5. There are four different types of capacitor symbols. Draw and name each of these symbols. (5 marks)

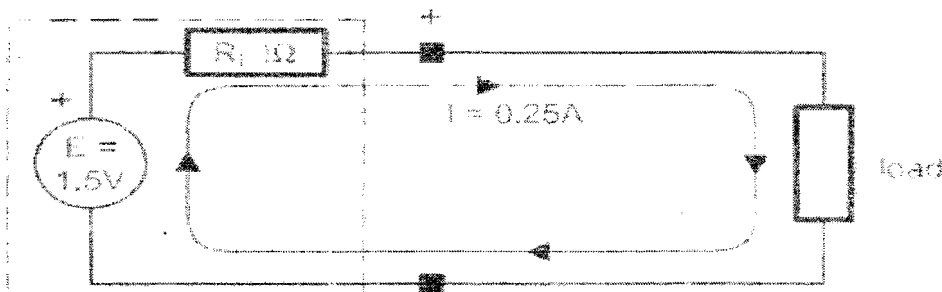
**SECTION C**

**(25 MARKS)**

1. The coil in Figure below has 1000 turns and the flux from the moving magnet is increasing from zero to 0.003 Wb in two seconds. What's the induced EMF? (4marks)



2. A cell has an internal resistance of  $1\Omega$  and an open-circuit terminal voltage of 1.5V. What is its terminal voltage when the load current is 0.25A? (3marks)



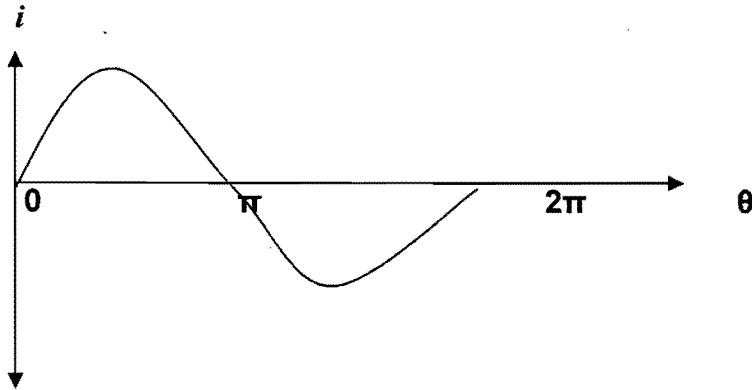
3. What value of current can a 6Ah battery supply for 10 hours, if this rating is for a C/10 discharge current? (3marks)

4. Calculate the amplitude of the household 240V supply. (2marks)

5. List down five safety precautions that need to be taken while working with secondary cells. (5 marks)

6. Why do a D.C, AA & AAA batteries are different in size? (3 marks)

7. Find  $I_m$ ,  $I_{av}$ ,  $I_{rms}$ , form factor and crest factor for the graph of  $i = \sin \theta$ .

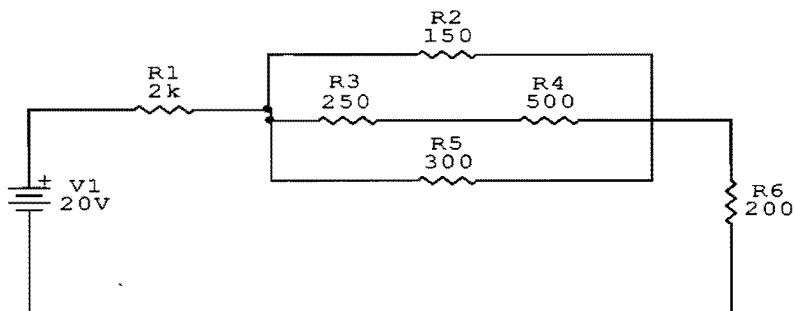


(5marks)

**SECTION D**

(20 Marks)

1. For the circuit shown below calculate:



- b) Total current of the circuit (2 marks)
  - c) Total power consumption by the circuit (2 marks)
  - d) Current through  $R_2$  (2 marks)
  - e) Current through  $R_3$  (2 marks)
  - f) Power dissipated through  $R_2$  (2 marks)
2. List three effects of electricity. (3 marks)

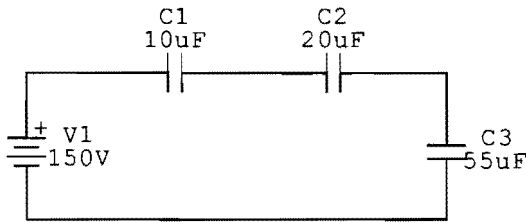
3. Draw graphs of charge and discharge curves of a capacitor clearly indicating the current and voltage and also draw circuits to show charging and discharging period clearly indicating the direction of current.

(5 marks)

**SECTION E**

**(20 Marks)**

1. For the capacitive circuit shown below



Calculate:

- a) Effective capacitance
- b) Voltage across each capacitors

(6 marks)

2. Explain in terms of electron theory the following term:

- a) Conductors
- b) Insulators

(2 marks)

(2 marks)

3.

- a) What is a Thermostat and what is it used for?
- b) What is a Thermistor and what is it used for?
- c) What are Thermocouples and what are they used for?

(2 marks)

(2 marks)

(2 marks)

4. Name the three factors which are required to produce an induced voltage.

(2 marks)

5. List three factors that affect the resistance of a conductor.

(2marks)

.....End of Examination Paper.....

**Resistor color coding chart**

<b>Color</b>	<b>Digit</b>	<b>Multiplier</b>	<b>Tolerance (%)</b>
Black	0	$10^0$ (1)	
Brown	1	$10^1$	1
Red	2	$10^2$	2
Orange	3	$10^3$	
Yellow	4	$10^4$	
Green	5	$10^5$	0.5
Blue	6	$10^6$	0.25
Violet	7	$10^7$	0.1
Grey	8	$10^8$	
White	9	$10^9$	
Gold		$10^{-1}$	5
Silver		$10^{-2}$	10
(none)			20