



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

ELECTRICAL SERVICEMAN'S COURSE-STAGE 1

EEE211 APPLIED ELECTRICITY I

FINAL EXAMINATION PENSTER 2, 2016

Day/Date: As per timetable Time: As per timetable Room: As per timetable

DURATION: 2HRS, 10MINS

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

MULTIPLE CHOICE

(10 MARKS)

In each question there is only one right answer. Write the identifying letter of the correct answer in your answer booklet.

1. If one 3 ohm ,1 ohm and one 6 ohm resistors are connected in series, the total resistance will equal to:

- a) 10 ohms
- b) 2 ohms
- c) 3 ohms
- d) 4 ohms

2. Which band in a four band resistor do you find the tolerance band?

- a) 1st
- b) 2nd
- c) 3rd
- d) 4th

3. One of the factors that reduce or destroy the magnetic powers of a magnet is:

- e) Age
- f) Make
- g) Color
- h) Size

4. The capacitor whose dielectric consists of one or more layers of paper like the cigarette paper:

- a) Mica capacitors
- b) Air insulated and vacuum capacitors
- c) Plastic film capacitors
- d) Paper-insulated capacitors

5. The two types of secondary cells are:

- a. Lead acid and car battery
- b. Carbon zinc and mercury cell
- c. Lead acid and Alkaline cell
- d. Lithium cell and silver oxide cell

6. If the resistance of a material increases with an increase in temperature the Material is said to have:
- a) Temperature coefficient
 - b) Negative temperature coefficient of resistance
 - c) Positive temperature coefficient of resistance
 - d) Neutral temperature coefficient of resistance
7. If an electric current passes through a coil of (insulated) wire, it will be found that this coil shows all the characteristics if a :
- a) Solenoid
 - b) Motor
 - c) Magnet
 - d) Specific heat capacity
8. One of the three types of thermostats is the:
- a) Temperature controlled type
 - b) Positive temperature coefficient
 - c) Bimetallic strip type
 - d) Negative temperature coefficient
9. The property of a solenoid to oppose changes in current is called:
- a) Solenoid
 - b) Capacitance
 - c) Inductance
 - d) Reactance.
10. It has been found that the emf of a thermocouple increases in a linear fashion with:
- a) Increase of heat
 - b) Decrease of heat
 - c) Increase of temperature.
 - d) Decrease of temperature

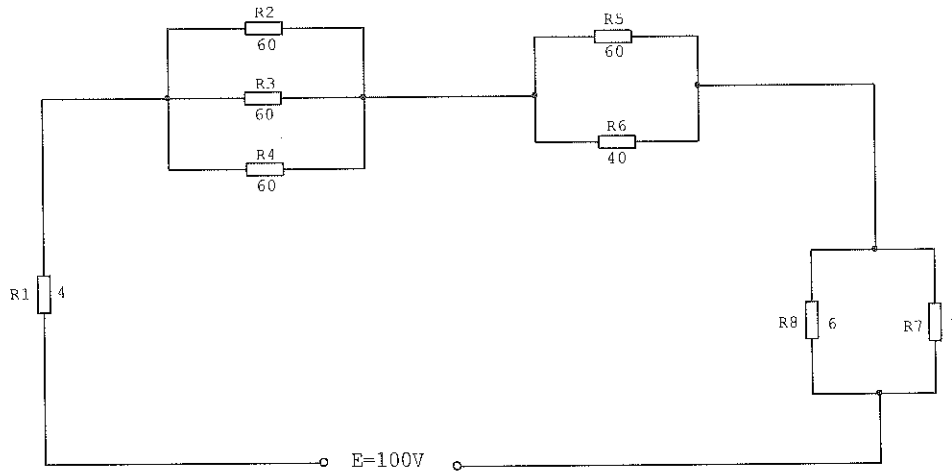
1. A is the capacitance of the capacitor which stores a charge of one coulomb at a potential difference of one volt.
2. In resistor colour coding the first band indicates the first significant figure, the second band the second significant figure, the third band the multiplier and the fourth band the
3. A cell is a device in which chemical energy is converted to electrical energy. This process is called action.
4. The two main means of evaluating the performance of a thermostat are sensitivity and
5. can be generated by passing conductors through a magnetic field by a method called induction.
6. is that property of a material which opposes the flow of electrons.
7. is the property of a circuit that enables an e.m.f. to be induced in it.
8. lines of force existing outside the desired magnetic path are called the leakage flux.
9. The of a magnetic material indicates the ease with which magnetic induction can occur in a material.
10. In a connected circuit there is more than one path for the current to flow between the higher and lower potential terminals.

SECTION C

CALCULATIONS

(40 Marks)

1. For the circuit shown below calculate:



- a) Total resistance of the circuit (2 marks)
- b) Total current of the circuit (2 marks)
- c) Total power consumption by the circuit (2 marks)
- d) Current through R₄ (2 marks)
- e) Current through R₅ (2 marks)
- f) Power dissipated through R₃ (2 marks)

2. List the indicated values and tolerance for the following resistors:

- a) brown, yellow, orange, gold (2 marks)
- b) brown, violet, yellow, silver (2 marks)
- c) blue, black, yellow (2 marks)

3. Find the resistance of a copper cable 85m in length if it has a diameter of 4mm.
The resistivity of copper is $1.72 \times 10^{-8} \Omega\text{m}$.

(5 marks)

4. When the maximum value of an alternating current is 22A, determine:

- a) R.M.S. value? (2 marks)
- b) Average value? (2 marks)
- c) Peak – to – peak value? (2 marks)
- d) Peak value? (2 marks)

5. a) Determine the p.d. across a $4 \mu\text{F}$ capacitor when charged with 5mC (3 marks)
 b) Find the charge on a 50 pF capacitor when the voltage applied to it is 2 kV . (3 marks)
6. Find the total voltage if four batteries are connected in Parallel, each having 9Volts (3 marks)

SECTION D

SHORT ANSWERS

(40 Marks)

1. List the two main groups of base unit system? (2 marks)
2. Define the following terms and give examples of each:
 a) Molecules (1.5marks)
 b) Matter (1.5marks)
3. State how many atoms are contained in each of the following molecule?
 a) H_2O (1mark)
 b) H_2SO_4 (1marks)
4. Draw the principle parts of an atom? (3marks)
5. State Ohm's Law? (3 marks)
6. Determine four factors that affect the resistance of any conductor and explain the relationship of each with respect to resistance. (8 marks)
7. Produce an a.c waveform showing the RMS, Average and Peak values. (8 marks)
8. Sketch the pattern of the magnetic field associated with a bar magnet. Mark the direction of the field. (5 marks)
9. To measure the following quantities: [Voltage, Resistance and Current] draw the circuit diagram. (6 marks)

THE END

Color	1st Band	2nd Band	3rd Band	Decimal Multiplier	Tolerance
Black	0	0	0	1	1
Brown	1	1	1	10	10
Red	2	2	2	100	100
Orange	3	3	3	1K	1,000
Yellow	4	4	4	10K	10,000
Green	5	5	5	100K	100,000
Blue	6	6	6	1M	1,000,000
Violet	7	7	7	10M	10,000,000
Gray	8	8	8		100,000,000
White	9	9	9		1,000,000,000
Gold					0.1
Silver					0.01
None					