



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

TRADE DIPLOMA IN ELECTRICAL & ELECTRONIC ENGINEERING - Stage 1

EEE402- ELECTRICAL PRINCIPLES 2A

FINAL EXAMINATION – SEMESTER-1, 2016

Total Marks---100

Day/Date: As per timetable Time: As per timetable(3Hrs) 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 answer 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 string*
5. *For all sheets of paper on which rough/draft work has been done, cross it though and you MUST ATTACH to your answer scripts.*
6. *Write clearly the number(s) of the question(s) attempted on the top of each sheet.*
7. **ANSWER ALL QUESTIONS.**
8. *Show all workings where necessary.*
9. *Do not use programmable calculators, especially the ones that does the conversions of number systems.*

SECTION A-----Multiple Choice----- (20 Marks)

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

1. A resistance of 50 k ohm has a conductance of:
 - a) 20 S
 - b) 0.02 S
 - c) 0.02 mS
 - d) 20 kS

2. Which of the following statements is incorrect?
 - a) $1\text{N} = 1\text{ kgm/s}^2$
 - b) $1\text{V} = 1\text{ J/C}$
 - c) $30\text{mA} = 0.03\text{A}$
 - d) $1\text{ J} = 1\text{N/m}$

3. The power dissipated by a resistor of 10ohms when a current of 2A passes through it is:
 - a) 0.4W
 - b) 20W
 - c) 40W
 - d) 200W

4. A mass of 1200 g is accelerated at 200 cm/s² by a force. The value of the force required is:
 - a) 2.4N
 - b) 2,400N
 - c) 240 kN
 - d) 0.24N

5. A charge of 240 C is transferred in 2 minutes. The current flowing is:
 - a) 120A
 - b) 480A
 - c) 2A
 - d) 8A

6. A current of 2A flows for 10 h through a 100ohm resistor. The energy consumed by the resistor is:
 - a) 0.5 kWh
 - b) 4 kWh
 - c) 2 kWh
 - d) 0.02 kWh

7. The unit of quantity of electricity is the:
- volt
 - coulomb
 - ohm
 - joule
8. Electromotive force is provided by:
- resistance's
 - a conducting path
 - an electric current
 - an electrical supply source
9. The ohm is the unit of:
- charge
 - resistance
 - power
 - current
10. The unit of current is the:
- volt
 - coulomb
 - joule
 - ampere
11. What must be known in order to calculate the energy used by an electrical appliance?
- voltage and current
 - current and time of operation
 - power and time of operation
 - current and resistance
12. Voltage drop is the:
- maximum potential
 - difference in potential between two points
 - voltage produced by a source
 - voltage at the end of a circuit
13. A 240V, 60W lamp has a working resistance of:
- 1400 ohm
 - 60 ohm
 - 960 ohm
 - 325 ohm
14. A battery consists of:
- a cell
 - a circuit
 - a generator
 - a number of cells

15. Electrostatics is a branch of electricity concerned with
- a) energy flowing across a gap between conductors
 - b) charges at rest
 - c) charges in motion
 - d) energy in the form of charges
16. The capacitance of a capacitor is the ratio
- a) charge to p.d. between plates
 - b) p.d. between plates to plate spacing
 - c) p.d. between plates to thickness of dielectric
 - d) p.d. between plates to charge
17. One of the factors that reduce or destroy the magnetic powers of a magnet is:
- a) Age
 - b) Make
 - c) Color
 - d) Size
18. 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
19. Which band in a four band resistor do you find the tolerance band?
- a) 1st
 - b) 2nd
 - c) 3rd
 - d) 4th
20. 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

SECTION B-----Short Answers-----40 (Marks)

1. What does 'SI units' mean? (1 mark)
2. What do you understand by the term 'potential difference'? (1 mark)
3. Define electric current in terms of charge and time (1 marks)
4. Name the units used to measure: (3 marks)
 - (a) the quantity of electricity
 - (b) resistance
 - (c) conductance
5. Define electrical energy and state its unit (2 marks)
6. What is electromotive force? (1 mark)
7. Write down the symbols for the following quantities: (2 marks)
 - (a) electric charge (b) work (c) e.m.f. (d) p.d.
8. What is a capacitor? (1 mark)
9. State five practical applications of capacitors (5 marks)
10. Name three characteristics of a series circuit (3 marks)
11. Sketch the pattern of the magnetic field associated with a bar magnet. Mark the direction of the field. (2 marks)
12. To measure the following quantities: [Voltage, resistance and Current] draw the circuit diagram. (3 marks)
13. Produce an a.c waveform showing the RMS, Average and Peak values. (2 marks)
14. What is the essential difference between a primary and a secondary cell? (1 mark)
15. List four factors that affect the resistance of a conductor. (4 marks)
16. Outline one characteristic for each of the following (3 marks)
 - i) Conductors.
 - ii) Insulators.
 - iii) Permanent Magnet.
17. List five safety precautions to be taken when working with secondary cells. (5 marks)

SECTION C-----Calculations-----40 (Marks)

1. A 100V battery is connected across a resistor and causes a current of 5mA to flow.
Determine the resistance of the resistor and If the voltage is now reduced to 25V, what will be the new value of the current flowing? (4 marks)

2. A 100W electric light bulb is connected to a 250V supply. Determine
(a) the current flowing in the bulb, and
(b) the resistance of the bulb. (4 marks)

3. When the maximum value of an alternating current is 15A, determine:
a. Average value? (2 marks)
b. R.M.S. value? (2 marks)
c. Peak value? (2 marks)
d. Peak – to – peak value? (2 marks)

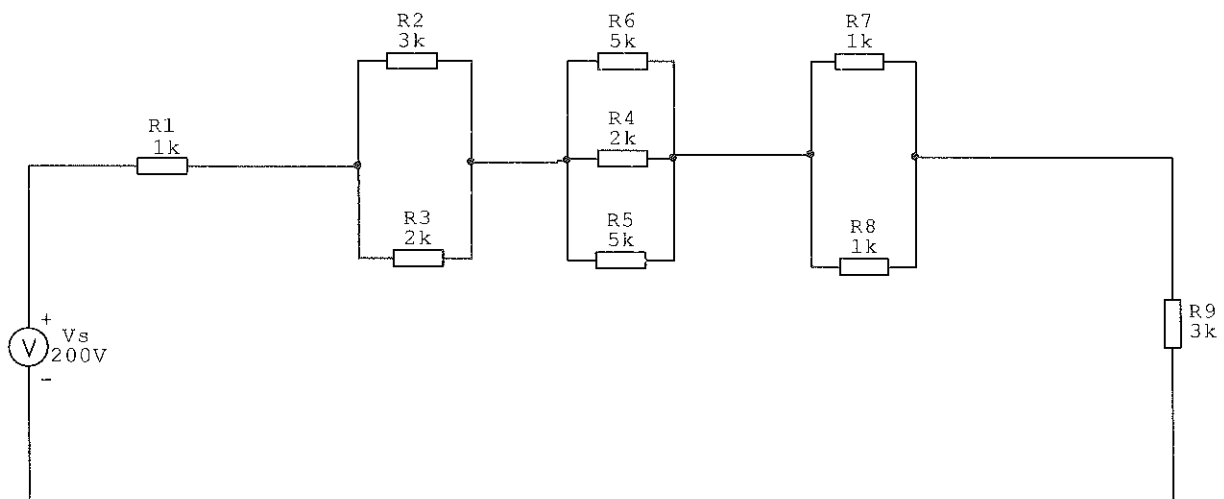
4. For the circuit shown below calculate:

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)

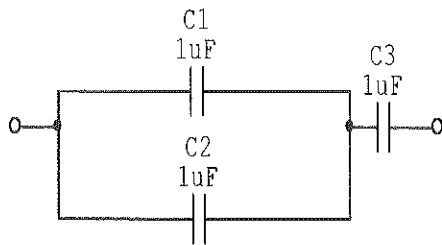
d) Current through R_2 (3 marks)



5. Determine the value of the resistor 4-band color codes:
- a) Green, black, red, gold. (2 marks)
 - b) Brown, green, black, silver (2 marks)
 - c) Violet, Red, orange, silver. (2 marks)
 - d) Orange, black, yellow, gold. (2 marks)

6. Find the resistance of a copper cable 85m in length if it has a diameter of 2mm.
The resistivity of copper is $1.72 \times 10^{-8} \Omega\text{m}$. (4marks)

7. From the given circuit, determine total capacitance, C_T . (3 marks)



-----The End-----

Color	Digit	Multiplier	Tolerance (%)
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