FIJI NATIONAL UNIVERSITY

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, 2015
Total Marks---100

Day/Date: As per timetable Time: As per timetable(2Hrs) 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**   **(15 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 and one 6 ohm resistor are connected in parallel, the total   resistance will equal to:
   a) 1 ohm
   b) 2 ohms
   c) 3 ohms
   d) 4 ohms

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

   a) Age
   b) Make
   c) Color
   d) Size

3. 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

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

   e) 1st
   f) 2nd
   g) 3rd
   h) 4th

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. 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.

9. 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

10. The property of a solenoid to oppose changes in current is called:

    a) Solenoid
    b) Capacitance
    c) Inductance
    d) Reactance.

11. Which of the following terms is associated with the flow of electrons?
    a) Resistance.
    b) Voltage.
    c) Inductance.
    d) Current.

12. One of the characteristic of magnetic lines of force:
    a) Cross each other
    b) Line each other
    c) Never cross each other
    d) Crisscross

13. The unit of inductance is:
    a) Volts.
    b) Hertz.
    c) Hendry.
    d) Lux.

14. What type of cells can be recharged?
    a) Primary cells
    b) Resistance cells
    c) Carbon-zinc
    d) Secondary cells

15. One kilo-watt-hour is equal to:
    a) 3.6 MJ
    b) 1000 Watts
    c) 1 Watt
    d) 1 MJ

Section B   (20 marks)

PART A-MATCHING

|			
1.	Series/ parallel connection	A.	Conductor
2.	Protons	B.	Have plenty free electrons
3.	Power	C.	A component that opposes current flow.
4.	Voltage	D.	Methods of component connection.
5.	Conductors	E.	Electrical pressure
6.	Electrons	F.	Positively charged particles
7.	Energy	G.	Watts
8.	Copper	H.	Negatively charged particles
9.	Insulator	I.	Product of power and time
10.	Resistor.	J.	Does not conduct electricity

(10 marks)

## PART B – TRUE/ FALSE   (10 marks)

Write true for the correct answer and false for the incorrect answer. One mark for each correct answer

1. In the Right-hand-rule regarding a straight conductor the thumb indicates the direction of current flow.

2. Capacitors in parallel do not have the same voltage across each one.

3. Black is denoted as number 1 for either the four or five band resistor

4. The Circuit shown below is that of a closed loop circuit:
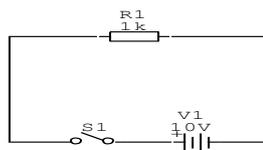
5. The SI unit of voltage is amperes.

6. The resistance of a resistor is measured with an ohmmeter.

7. A secondary cell is chargeable.

8. Capacitors in parallel is added together to give the total capacitances.

9. In the right hand thumb rule, the thumb represents the flow of current.

10. In Kirchhoff's current law, the total currents entering a node are not equal to the currents leaving that node

---

1. For the circuit shown below calculate:
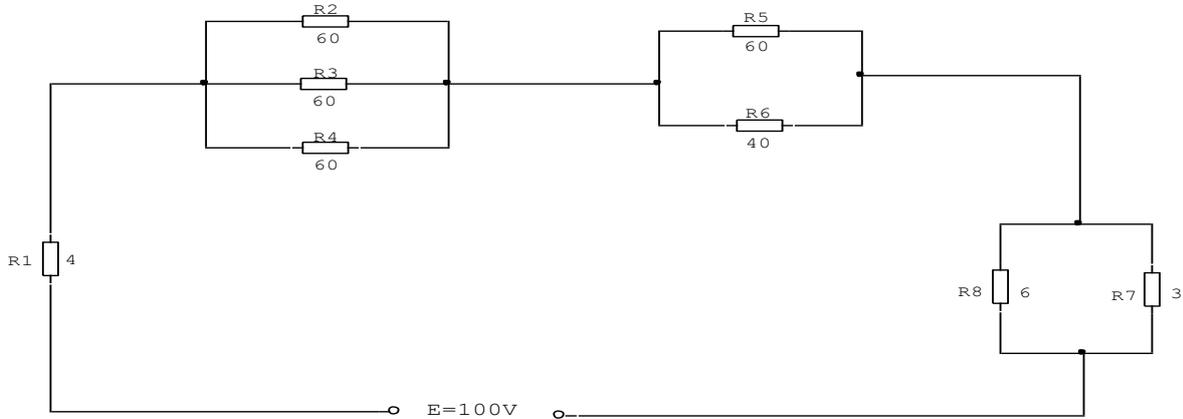
a)   Total resistance of the circuit   (2 marks)

b)   Total current of the circuit   (2 marks)

c)   Total power consumption by the circuit   (2 marks)

d)   Current through R_2 (2 marks)

e)   Current through R_3 (2 marks)

f)   Power dissipated through R_2 (2 marks)

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

3. Find the resistance of a copper cable 95m in length if it has a diameter of 2mm.
   The resistivity of copper is 1.72×10^{-8} Ωm.   (4marks)
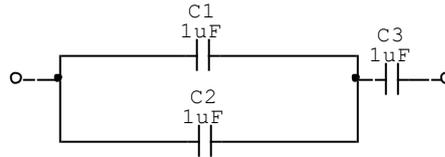
4.   For the given circuit diagrams and determine:
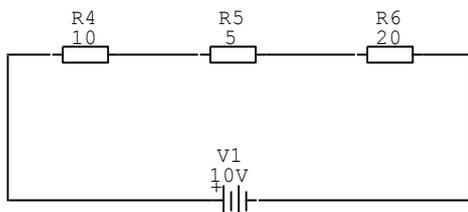
a. Total resistance, R_T in Ω.   (2 marks)

b. Total Current, I_T in A.   (2 marks)

c. Voltage across R_1 (2 marks)

SECTION D   (35 Marks)

1. From the given circuit, determine:
   a) total capacitance, C_T (3 marks)

   b) Outline one characteristic for each of the following   (3 marks)

   i) Conductors.
   ii) Insulators.
   iii) Permanent Magnet.

2. Find the total voltage if two batteries are connected in series. One battery has 14V whilst the other has 8.1V.

              (3marks)

3. When the maximum value of an alternating current is 10A, 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. Draw the magnetic field lines and show the direction with the indication of an arrow head of two bar magnets.
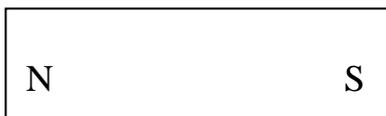
              (5 marks)

5. What is the essential difference between a primary and a secondary cell?   (3 marks)

6. . List four factors that affect the resistance of a conductor.   (4 marks)

7. Draw a circuit diagram and connect the appropriate meters to measure the following quantities
              (6marks)
   a)Voltage.
   b)Resistance.
   c) Current.

   -THE END-