FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY

SCHOOL OF ELECTRICAL AND ELECTRONIC ENGINEERING

CERTIFICATE IN ELECTRICAL SERVICEMAN'S COURSE – STAGE 1

EEE211 APPLIED ELECTRICITY- 1
FINAL EXAMINATION PAPER –PENSTER 3- 2014

DATE: _____ TIME: _____

VENUE: AS PER TIMETABLE

INSTRUCTIONS TO STUDENTS:

1. You are allowed 10 minutes extra reading time during which you are not allowed 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 answer sheet.

4. Insert all 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 through and you must attach to the answer booklet.

6. Write clearly the number(s) of the question(s) attempted on top of each sheet.

7. **ATTEMPT ALL QUESTIONS**

8. Show all workings where necessary.

9. Programmable calculators are not allowed.

Section A **MULTIPLE CHOICE** **(20 marks)**

Instructions:
Choose the best answer by circling the corresponding alphabet on the attached answer sheet.

1. A Substance that is made of atoms that are all the same is called:

    A. Compound
    B. Molecules
    C. Element
    D. Protons

    (1 mark)

2. The conventional current flow is from:

    A. Negative to positive
    B. Positive to negative
    C. Inwards
    D. None of the above

    (1 mark)

3. Electrons in outermost shell are called:

    A. Free Electrons
    B. Valence Electrons
    C. Neutrons
    D. Atoms

    (1 mark)

4. The rate of using energy is known as :

    A. Resistance
    B. Voltage
    C. Work done
    D. Power

    (1 mark)

5. In Flemings Right Hand rule, the thumb represent:

    A. Flux
    B. Current
    C. Voltage
    D. Motion of the conductor

    (1 mark)

6. A current induced in a conductor situated in a changing magnetic field is known as:

    A. Total current
    B. Eddy current
    C. Magnetic field current
    D. None of the above

    (1 mark)

7. The most common type of primary cell is:

    A. Lead acid cell
    B. Carbon – zinc cell
    C. Gates battery
    D. Sealed lead acid cell

(1 mark)

8. A device that converts mechanical energy to electrical energy is known as:

    A. Starter
    B. Alternator
    C. Electrical generator
    D. Motors

(1 mark)

9. The stationary part of a motor or alternator is called:

    A. Rotor
    B. Stator
    C. Field
    D. Armature

(1 mark)

10. A measure of its capacity to store an electric charge is:

    A. Resistivity
    B. Permittivity
    C. Capacitance
    D. Inductance

(1 mark)

11. One of the characteristic of magnetic lines of force:

    A. Cross each other
    B. Line each other
    C. Never cross each other
    D. Crisscross

(1 mark)

12. Choose best instrument that is best used to measure the operating voltage of a general power outlet:

    A. Voltmeter.
    B. Ohmmeter.
    C. Ammeter.
    D. Both a) and c).

(1 mark)

13. Neutrons have:

    A. No charge.
    B. Positive charge.
    C. One Charge.
    D. Negative charge.

(1 mark)

14. Choose the cell that can be recharged:

A. Carbon – Zinc Cell.
B. Alkaline cell.
C. Lead Acid Cell.
D. Silver- oxide cell.

(1 mark)

15. The outcomes of the magnetic field lines pattern for a straight conductor:

A. North to south of the conductor.
B. Into the page.
C. Concentric circles.
D. Out of page.

(1 mark)

16. In a parallel circuit:

A. Current is same
B. Voltage is same
C. Current is different
D. Both B and C

(1 mark)

17. Tesla is the SI unit for:

A. Current
B. Flux density
C. Induced EMF
D. Velocity of the conductor

(1 mark)

18. The density of the electrolyte n a cell s tested using:

A. Multimeter
B. Voltmeter
C. Hydrometer
D. None of the above

(1 mark)

19. Ammeters are always connect in:

A. Parallel
B. Series
C. Parallel and series
D. None of the above

(1 mark)

20. Materials that oppose the flow of electrons are known as;

A. Insulators.
B. Conductors.
C. Semi-conductors
D. Super conductors

(1 mark)

Section B **(20 marks)**

PART A-MATCHING

1. Atoms	A. Does not conduct electricity
2. Neutrons	B. A rechargeable battery
3. Voltage	C. The electrical force that causes current to flow in a circuit
4. Rotor	D. The rotating part of motor
5. Conductors	E. The basic unit of matter
6. Secondary cells	F. The height of waveform
7. Amplitude	G. Current passes through it easily.
8. Copper	H. Have plenty free electrons
9. Insulator	I. Have no charge
10. Capacitor	J. Stores an electrical charge

(10 marks)

PART B – TRUE/ FALSE

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

1. In a parallel resistive circuit, current is same.
2. In the Fleming's Right-hand-rule, the first finger indicates the direction of flux.
3. Electrons flow from positive to negative.
4. Primary cells are non-rechargeable.
5. The coils of wire that are used to produce a magnetic field are called field.
6. The potential difference across an ideal conductor is proportional to the current through it is Faraday's law
7. Capacitors in parallel is added together to give the total capacitances.
8. Voltage is measure with ohmmeter
9. The rate of flow of electric charge is called electric current.
10. Mica is a good conductor.

(10 marks)

Section C **(30 marks)**

1. In a workshop, 5 lights by 60 watts each, electric oven by 150watts and 3 electric fans of 40 watts were used for 8, 2, and 8 hours respectively per day. The students used lights, oven and fans for 5 days. If a unit costs 15 cents then what will be the total cost for 5 days?

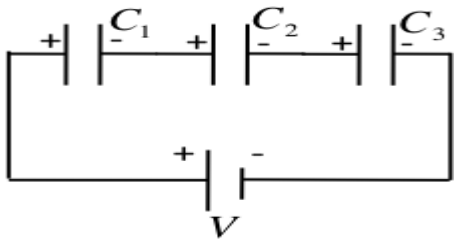
(7 marks)

2. A copper wire has a length of 160cm and a diameter of 2.5mm. If the wire is connected to a 12 volt battery, how much current flows through the wire? Hint resistivity of copper is = 1.72 x 10^{-8} Ω m

(4 marks)

3. From the given circuit, determine:

   A. The total capacitance
   B. Total charge
   C. Voltage in each capacitors



[V = 12 V DC; C_1 = 10F; C_2 =30F; C_3 = 5F]

(4 marks)

4. List four factors that affect the value of the induced voltage in a conductor and explain the effect of it in terms of voltage.

(8 marks)

5. List down three [3] characteristics of battery.

(3 marks)

6. List four types of secondary cells

(4 marks)

Section D **(30 marks)**

1 Draw and label an atomic structure

(3 marks)

2 When the maximum value of an alternating current is 30A, determine:

A. Average value? (2 marks)
B. Peak value? (1 mark)
C. R.M.S. value? (2 marks)
D. Peak – to – peak value? (1 mark)
E. Draw AC waveform

3 List down three [3] factors that determine the capacitance.

(3 marks)

4 Determine the value of the resistor 4-band color codes:

A. Brown, black, red, gold. (1 mark)
B. Violet, green, black (1 mark)
C. Red, violet, orange, silver. (1 mark)
D. Yellow, black, yellow, gold. (1 mark)

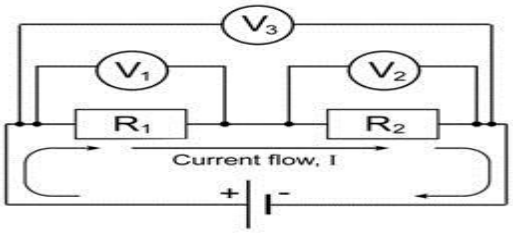
5 What is Ohm's Law?

(2 marks)

6 For the given circuit determine the following:

A. Total Resistance
B. Total Current
C. Voltage [V_1 , V_2 , V_3]
D. Total power dissipated in the circuit.

[V = 24VDC, $R_1 = 5k\Omega$, $R_2 = 1.5k\Omega$]



(7 marks)

7 A voltage transformer has 1500 turns of wire on its primary coil and 500 turns of wire for its secondary coil. If 240 volts is applied to the primary winding of this transformer, determine:

A. The turns ratio
B. Secondary voltage
C. Type of transformer

(5 marks)

########## THE END##########