



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY

SCHOOL OF ELECTRICAL AND ELECTRONICS

ENGINEERING

CERTIFICATE IV IN ELECTRICAL ENGINEERING – STAGE 2

EEE329-ELECTRICAL PRINCIPLES (TRADE 1)

FINAL EXAMINATION – PENSTER 2, 2016

INSTRUCTIONS TO STUDENTS

1. *You are allowed 10 minutes Extra reading time during which you are NOT to write*
2. *Two hours only is the time allocated for candidates to do this examination paper*
3. *Begin each answer on a fresh page and use both sides of the sheet.*
4. *Write your candidate-number at the top of each attached sheet.*
5. *Insert all written foolscaps, graph paper, drawing, etc. in their correct sequence and secure with string.*
6. *For all sheets of paper on which rough/draft work has been done, cross it through and you MUST ATTACH to your answer scripts.*
7. *Write clearly the number(s) of the question(s) attempted on top of each sheet.*
8. **ANSWER ALL QUESTIONS.**
9. *Show all workings where necessary.*
10. *Do not use programmable calculators, especially the ones that do the conversion of number systems.*
11. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM.**

MULTIPLE CHOICE - (27 MARKS)

Question 1. (2 Marks)

Which of the following statements does not represent ohm's law?

- A. current/potential difference = constant
- B. potential difference/current = constant
- C. potential difference = current \times resistance
- D. current = resistance \times potential difference

Question 2. (1 Mark)

The unit of current is derived as:

- A. ampere
- B. watt
- C. volt
- D. coulomb

Question 3. (2 marks)

Two resistances of $100\ \Omega$ and $0\ \Omega$ connected in parallel. What will be the total resistance?

- A. $100\ \Omega$
- B. $50\ \Omega$
- C. $25\ \Omega$
- D. $0\ \Omega$

Question 4. (2 Marks)

Three resistors $2\ \Omega$, $3\ \Omega$ and $4\ \Omega$ are connected so that the equivalent resistance is $9\ \Omega$. Describe the type of connection used.

- A. all in series
- B. all in parallel
- C. $2\ \Omega$ and $3\ \Omega$ in parallel and the combination in series with $4\ \Omega$.
- D. $2\ \Omega$ and $3\ \Omega$ in series and the combination in parallel with $4\ \Omega$.

Question 5. (1 Mark)

What is matter composed of?

- A. molecules and atoms
- B. charged electrons
- C. protons and neutrons
- D. solid

Multiple choice (Cont'd)**Question 6. (1 Mark)**

The magnitude of the induced e.m.f. in a coil is directly proportional to the rate of change of flux linkage. This is known as:

- A. Jule's law
- B. Faraday's second law of electromagnetic induction
- C. Faraday's first law of electromagnetic induction
- D. Coulomb's law

Question 7. (1 Mark)

The emf induced in a coil due to the change of its own flux linked with it is called

- A. a mutually induced emf
- B. dynamically induced emf
- C. statically induced emf
- D. self induced emf

Question 8. (1 mark)

If the solenoid is gripped by the right hand with the fingers pointing the direction of the current flow, the outstretched thumb will then point the north pole. This is known as

- A. right hand rule
- B. helix rule
- C. end rule
- D. cork screw rule

Question 9. (1 Mark)

The phenomenon by which attracting pieces of iron

- A. magnetism
- B. electromagnetism
- C. naturalism
- D. materialism

Question 10. (1 Mark)

The force which sets up or tends to set up magnetic flux in a magnetic circuit

- A. dynamic force
- B. electromotive force
- C. potential difference
- D. magnetomotive force

Multiple choice (Cont'd)**Question 11. (1 Mark)**

The magnetic potential in a magnetic circuit can be measured in terms of

- A. mmf
- B. emf
- C. farad
- D. coulomb

Question 12. (1 Mark)

A voltaic cell with metal plates of copper and zinc and immersed in the following solutions to obtain a potential difference. Choose a solution that would not react with the two electrodes.

- A. sulphuric acid
- B. hydrochloric acid
- C. H_2O
- D. lemon juice

Question 13. (1 Mark)

What is the electrolyte used for a leclanche' cell.

- A. sulphuric acid
- B. hydrochloric acid
- C. citric acid
- D. sal-ammoniac

Question 14. (1 Mark)

Name the paste type polarizing agent for "question 12".

- A. carbon dioxide
- B. lead oxide
- C. zinc oxide
- D. manganese dioxide

Question 15. (1 Mark)

What is the unit of charge for a capacitor?

- A. coulomb
- B. ampere
- C. volt
- D. farad

Multiple Choice (Cont'd)

Question 16. (2 marks)

Find the sum of series capacitance $16\mu F + 8\mu F$

- A. $7.0\mu F$
- B. $4.0\mu F$
- C. $5.3\mu F$
- D. $5.98\mu F$

Question 17. (2 marks)

Find the sum of parallel capacitance $16\mu F + 8\mu F$

- A. $24.0\mu F$
- B. $2.0\mu F$
- C. $0.5\mu F$
- D. $4.0\mu F$

Question 18. (1 mark)

The formula to find I when the values of V and R are known is

- A. $I = \frac{R}{V}$
- B. $I = VR$
- C. $V = IR$
- D. $I = \frac{V}{R}$

Question 19. (2 marks)

A resistor is connected across a 50V source. What is the current in the resistor if the color code is red, orange, orange and silver?

- A. 2.0 mA
- B. 2.2 mA
- C. 214 mA
- D. 21.4 mA

Question 20. (2 marks)

How much resistance is required to limit the current from a 12 V battery to 3.6 mA?

- A. $3.3k\Omega$
- B. $33k\Omega$
- C. $2.2k\Omega$
- D. $22k\Omega$

BRIEF ANSWER QUESTIONS – (40 MARKS)

Question 1. (3 Marks)

What are the three states of matter?

Question 2. (2 Marks)

Define Potential Difference

Question 3. (3 Marks)

Briefly describe the two electrical materials; an insulator and a conductor.

Question 4. (4 Marks)

Describe the structure of matter.

Question 5. (3 Marks)

Describe magnetic induction.

Question 6. (2 Marks)

Define Right- hand thumb rule for a solenoid.

Question 7. (3 Marks)

Briefly describe Reluctance (R_m) for magnetism.

Question 8. (4 marks)

Briefly describe a capacitor and capacitance.

Question 9. (6 Marks)

Describe the three factors affecting capacitance.

Question 10. (3 Marks)

Briefly describe the characteristics capacitors connected in series.

Question 11. (3 Marks)

Define ohm's law.

Question 12. (4Marks)

Describe the terms; directly proportional and inversely proportional as to potential difference, current and resistance.

CALCULATION – (33 MARKS)**Question 1. (3 Marks)**

A 0.1 metre length conductor is placed at right angles to a magnetic field which a flux density of 0.66 T. If a current of 25 A is passed through the conductor, calculate the force exerted on the conductor.

Question 2. (3 marks)

If a current of 5 A is flowing in a coil of 120 turns, find the value of m.m.f. creating a magnetic force.

Question 3. (5 Marks)

A 12 V battery requires 14.7 V to charge it at 20 A. Find the internal resistance of each cell. After charging has been completed and the battery voltage has stabilized, what is the terminal voltage if the battery supplies a 20 A load.

Question 4. (3 Marks)

A charged 200 μF capacitor has a potential difference of 30 V. Calculate the charge on the plate.

Question 5. (4 Marks)

Find the capacitance of a 4 μF and an 8 μF capacitor connected in series and then in parallel.

Question 6. (8 Marks)

Three resistors of 20 Ω , 50 Ω and 30 Ω are connected in series to a generator. If the current flowing is 2.5 A, calculate:

- the generated voltage,
- the voltage across each resistor,
- the power consumption of each resistor,
- the total power consumed by the circuit.

Question 7. (7 Marks)

Two resistors of 10 Ω and 40 Ω are connected in parallel and a third resistor of 16 Ω is connected in series with this parallel combination. A supply of 240 V is connected across the complete circuit. Calculate:

- the total circuit resistance,
- the current drawn from the supply,
- the total power consumed,
- the current flowing through the 10 Ω resistor.

END

EQP RECEIPT CHECKLIST FORM

Particulars		Details/Comments (To be filled by Unit Lecturer)	Tick if present on EQP (To be filled by exams staff)
Cover Page			
Fiji National University with Logo		/	
College		/	
School		/	
Program		/	
Unit Code		/	
Unit Name		/	
Examination Period		2 HRS	
Duration of Examination		2 HRS	
Instructions			
Total Number of Pages		9	
Other Pages			
Footer	Page Number	/	
	Unit Code	/	
	Examination Period	N/A	
Last Page			
The End		/	
Overall			
Proper Print		/	
Examination Requirements (FNU/E-1)		/	
Moderator's Report (FNU/E-3)		/	
ERRS (Class List)		/	
Unit Coordinator/Principal Lecturer's Name		Tateka Pitouti	

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 NAME: LILY M

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