



COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME: CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 3

UNIT CODE: EEE391

TITLE: ELECTRICAL PRINCIPLES (TRADE) 2

FINAL EXAMINATION – PENSTER 1, 2016

ROOM: AS PER TIMETABLE

TIME: 2 HOURS 10 MINUTES

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

[20 MARKS]

1.0 What is the phase relationship between V and I in the circuits?

1.1 Purely Resistive

1.2 Purely Capacitive

1.3 Purely Inductive

(3 marks)

2.0 If a 1kW load is connected to a 250 V a.c supply, find the current flowing at:

2.1 Unity power factor

2.2 Power factor = 0.8

2.3 Power factor = 0.4

2.4 Sketch the phasors

(7 marks)

3.0 Write formulas for finding the impedance of a series R-L circuits.

(2 marks)

4.0 A series resonant circuit consists of $L = 100\text{mH}$, $C = 0.18\mu\text{F}$ and $R = 45\Omega$ is connected to a supply.

4.1 Calculate the frequency supply at resonance

4.2 What is the impedance value at resonance?

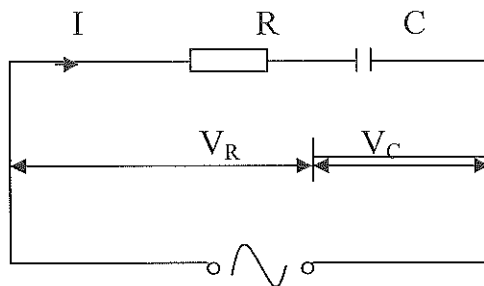
4.3 Calculate the current at resonance

(8 marks)

SECTION B

[20 MARKS]

1.0



For the circuit shown above.

1.1 Draw to scale the phasor diagram when $I = 4\text{A}$, $R = 2\Omega$, $X_C = 3\Omega$
(3 marks)

1.2 Use the phasor diagram from 1.1 to determine the applied voltage, V and the phase angle Θ .
(3 marks)

2.0 A coil with an inductance of 0.4H . what would be the voltage required to produce a current at 5A of:

2.1 50Hz (3 marks)

2.2 100Hz (3 marks)

3.0 What would be the effect on the current if the supply frequency were halved and the voltage maintained the same value. (2 marks)

4.0 Explain what series resonance circuit is. (2 marks)

5.0 Give two methods that can be done to achieve resonance. (2 marks)

6.0 Give one danger if resonance occurs in electrical installation. (2 marks)

SECTION C

[30 MARKS]

1.0 A resistor of 8Ω and an inductor of 0.12H are connected in parallel to a 240V , 50Hz supply. Calculate:

- 1.1 The current flowing in the resistor (2 marks)
- 1.2 The current flowing in the inductor (2 marks)
- 1.3 The total current supply (2 marks)
- 1.4 The total impedance of the circuit (2 marks)
- 1.5 The power factor (3 marks)

2.0 For an R-L-C series circuit:

Which of the following quantities should be increased and which decreased to produce resonance if V_L is greater than V_C ?

- 2.1 Frequency (2 marks)
- 2.2 Inductance (2 marks)
- 2.3 Capacitance (2 marks)
- 2.4 Capacitive reactance (3 marks)

3.0 Explain what you understand about the term, power factor. (3 marks)

4.0 What are the two causes of low power factor in an electrical installation? (4 marks)

5.0 List three factors that affect the capacitance of a capacitor. (3 marks)

SECTION D

[30 MARKS]

1.0 With an aid of a diagram show:

- The basic construction of the source of emf.
- Explain the basic principle of how emf is produced.

Choose one of the following:

- a) Chemical cells and batteries
- b) Alternator
- c) Photovoltaic cell

(10marks)

2.0 List down five advantages of three phase connection.

(5 marks)

3.0 Name two types of three phase connection

(2 marks)

4.0 Three coils each having a resistance of 21Ω and an inductive reactance of 28Ω are connected in delta to a 415V, 3 phase supply. Determine:

- a) Phase current
- b) Line current
- c) Power factor
- d) Total power

(3 marks)

(3 marks)

(3.5 marks)

(3.5 marks)

*****JH&ND*****



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	Apr - Per TT	
Duration of Examination	✓	
Instructions	✓	
Total Number of Pages	✓	
Other Pages		
Footer	✓	
Page Number	✓	
Unit Code	✓	
Examination Period	✓	
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	Syocalla Jua	

DISPATCHED BY (SCHOOL REP)

NAME: Syocalla Jua

SIGN: [Signature]

DATE: 19/02/2016

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