



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

**SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING**

**PROGRAMME: CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 4**

**UNIT CODE: EEE444**

**TITLE: ELECTRICAL PRINCIPLES (TRADE) 3**

### **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****THREE PHASE CIRCUITS****(45 MARKS)**

1. List four advantages of a three phase system. (4 marks)
2. State the effects of phase reversal on a three phase star system. (3 marks)
3. Explain the differences between star and delta connections. Mention at least five (5) points in each case. (5 marks)
4. What are the different methods of measurement of power in 3-phase circuit. Explain two wattmeter method in brief and Also give three advantages of this method. (6marks)
5. A three-phase, four-wire distribution system carried the following unbalanced loads.  

Red Phase 120 A at power factor ( $\lambda$ ) = 0.79 lagging  
White Phase 147 A at power factor ( $\lambda$ ) = 0.85 lagging  
Blue Phase 215 A at power factor ( $\lambda$ ) = 0.80 lagging

Determine the current in the neutral wire by drawing a scaled phasor diagram of this loading. (10 marks)
6. Briefly explain the effects of an open-circuited neutral. (3 marks)
7. Three identical coils, each with resistance of 10 ohms and inductance of 20mH are connected in star to a 415 volts 50 hertz three phase supply, calculate
  - a) Inductive reactance of each coil
  - b) Impedance of each phase
  - c) Phase current
  - d) Line current
  - e) Power (10 marks)
8. When connected to a three phase motor, two wattmeter's gave readings of 4KW, and -1KW, Calculate
  - a) Total power
  - b) Power factor, assuming balance load. (4 marks)

**SECTION B****POWER FACTOR IMPROVEMENT****(35 MARKS)**

1. Draw the Power Triangle and explain the terms real power, apparent power and reactive power for ac circuits and also the units used.

(3 marks)

2. A welding plant set draws 25A from a 410V AC supply at a pf of 0.6 lagging.

Calculate:

- a) the kVA of the plant
- b) the power in kW
- c) the reactive power in kVAr
- d) determine the kVAr rating of a capacitor that will improve the pf to 0.9 lagging
- e) what current will be drawn from the supply by the corrected circuit

(10 marks)

3. Give four serious effects of low power factor on A.C supply system. (4 marks)

4. How adding capacitor in parallel with a load does improves power factor. (2 marks)

5. What are the disadvantages of low power factor? How can it be improved?(5 marks)

6. The power being supplied to a factory is 1100KW and apparent power is 1300KVA, calculate the power factor. (2 marks)

7. If a 2Kw load is connected to a 250 V a.c supply, find the current flowing at:

- a) The power factor is 0.9
- b) The power factor is 0.3
- c) The power factor is unity

(3 marks)

8. A motor takes a current of 10 A at 0.65 power factor, lagging, from a 240 V 50 Hz supply. Calculate the size of capacitor required to improve the power factor using a scaled phasor diagram. (6 marks)

**SECTION C**

**RECTIFIERS**

**(20 MARKS)**

- 1) Draw the circuit diagram of Single Phase Full-wave Bridge Rectifier, explaining its operation and also list down its advantages and disadvantages? (6 marks)
- 2) List down four protection required by SCR. (2 marks)
- 3) Draw the circuit diagram of the following rectifier circuits, giving the input and output waveforms.
  - a) Single phase half wave
  - b) Single phase bridge
  - c) Three phase full wave bridge (4 marks)
- 4) In a single phase full wave centre-tap rectification, the AC voltage is 100 volts at 50 hertz and load resistance of 10 ohms, Calculate,
  - a) The load voltage
  - b) The load current
  - c) The ripple voltage
  - d) The ripple frequency
  - e) The PRV. (8 marks)

*THE 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)
<b>Cover Page</b>	✓	
Fiji National University with Logo	✓	
College	✓	
School	✓	
Program	✓	
Unit Code	✓	
Unit Name	✓	
Examination Period	✓	
Duration of Examination	✓	
Instructions	✓	
Total Number of Pages	✓	
<b>Other Pages</b>		
Footer	Page Number ✓	
	Unit Code ✓	
	Examination Period ✓	
<b>Last Page</b>		
The End	✓	
<b>Overall</b>		
Proper Print	✓	
Examination Requirements (FNU/E-1)	✓	
Moderator's Report (FNU/E-3)		
ERRS (Class List)	✓	
Unit Coordinator/Principal Lecturer's Name	SUNGL, M. GOONDAR	

DISPATCHED BY (SCHOOL REP)

 NAME: SUNGL, M. GOONDAR

 SIGN: 

 DATE: 19/02/16.

RECEIVED BY (EXAMS REP)

NAME: \_\_\_\_\_

SIGN: \_\_\_\_\_

DATE: \_\_\_\_\_





Class Listing

School of Electrical & Electronics Engineering

Ba campus

Penster1

2016

EEE444 Electrical Principles (Trade 3) NL

StudentID	Name	Status	Mon	Sponsor	Outstanding Fee
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Certificate IV in Electrical Engineering 0

2011001720	Elvish Richelle Chand	EA			
2012010335	Izaz Azizz Ali	EA		- Full	
2013114616	Kavinesh Kartik Pillay	EA		- Full	
2013117599	Krishan Kamit Reddy	EA			
2012010863	Mohammed Shahil	EA			
2013113125	Mohammed Shahir	EA		- Full	
2007004827	Muni Krishn Chandiran	EA		- Full	
2013117399	Sahil Shafran Ali	EA			

8

Total Owing:

0.00

Total Count:

8

Grand Total:

0.00

