FNU FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)
SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 4

EEE448- ELECTRONICS FOR ELECTRICIANS 2

FINAL EXAMINATION– PENSTER 4, 2015

DATE/DAY: AS PER TIMETABLE **TIME:** AS PER TIMETABLE **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 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 a programmable calculator is prohibited.
8. Attempt **ALL** questions.
9. Attach**page 10** with the **Answer Booklet.**

Section A Multiple Choice [20 marks]

Select the best answer from the options given by circling the letter (A, B, C or D) in the matrix supplied at the end of the Question Paper and attach to your Answer Booklet.

1 The output voltage of a 7812 voltage regulator is:

A -12V
B -7V
C +12V
D +8V (1 mk)

2 In a power supply diagram, which block indicates a smooth dc output?

A. Transformer
B. Regulator
C. Filter
D. Rectifier (1 mk)

3 What values does a DMM measure on DC?

A Peak
B Average
C Peak-to-peak
D RMS (1 mk)

4 What circuit does a logic probe analyse?

A Digital
B Power
C Radio
D Analog (1 mk)

5 The PIV of a diode used in a half-wave rectifier cct is

A $V_M/\sqrt{2}$
B $\sqrt{2}V_M$
C $2V_M$
D V_M (1 mk)

6 The AC voltage from FEA is stated as 240V, 50 Hz. This is:

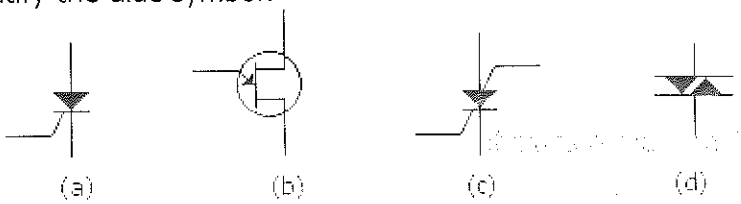
A Peak
B Root-mean-square

C Peak-to-peak
D Average (1 mk)

7 An AND logic gate will produce an output of "1"if:

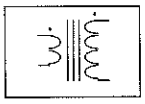
A All inputs are high
B Any input is low
C Any input is high
D All inputs are low (1 mk)

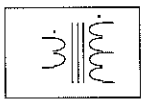
8 Identify the diac symbol?

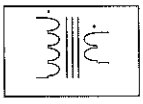


A. a
B. b
C. c
D. d (1 mk)

9 Which symbol is a centre-tapped transformer?

A. 

B. 

C. 

D. All of the above. (1 mk)

10. The primary and secondary winding of transformer are linked each other by
A. Conduction.
B. Mutual induction.
C. Not linked at all.
D. Self induction. (1 mk)

11 The two important maximum ratings of a DC power supply are its output
A Current and impedance

B Voltage and impedance
C Voltage and current
D Current and frequency (1 mk)

12 A digital multimeter on "diode" test when connected across with the Red lead on the gate terminal and black on cathode of a good SCR will read
A Low
B High
C Short
D Infinite (1 mk)

13 A lamp dimmer usually uses
A A triac and a optocoupler
B An SCR and a diac
C A diac and an optocoupler
D A diac and a triac (1 mk)

14 Choose the component that contains discrete circuitries?
a) Transistor.
b) Capacitor.
c) Inductor.
d) Integrated circuit (1 mk)

15 The forward voltage drop across an LED is typically
A 2.5V
B 2.0V
C 0.7V
D 0.3V (1 mk)

16. Which of the following properties should an ideal op amp have?

A. Infinitely wide bandwidth, infinitely high output impedance and perfect linearity.
B. High DC gain, low input reactance and perfect linearity.
C. Infinitely high input impedance, perfect linearity and zero noise.
D. Infinitely high gain, perfect linearity and zero input impedance. (1 mk)

17 If the supply frequency of a single phase is 50 hertz, the ripple frequency of a half-wave rectifier is:
A 50 Hz.
B 12.5 Hz.
C 25 Hz.
D 100 Hz. (1 mk)

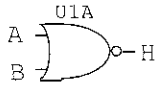
18 What is the first procedure when troubleshooting any equipment?

A Signal injection.
B Visualising the waveform on the CRO
C Powering the equipment on.
D Visual checks (1 mk)

19. Which of the following is the most efficient voltage regulator?

a) Shunt
b) Series
c) Switching
d) Buck (1 mk)

20 Which Boolean expression represents the output of the gate shown.



A $H = \overline{A.B}$
B $H = \overline{A+B}$
C $H = A.B$
D $H = A+B$ (1 mk)

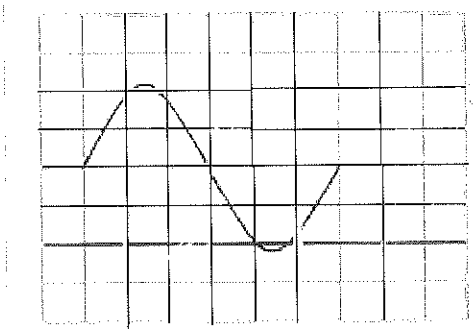
Section B **Test Equipment** [40 marks]

1 Fill in the blank spaces.

Name of the Test Equipments	Function	Operating Parameters (Voltage / Current)	Application of such Test Meters/Equipments
Series Test Lamp			
Clamp meter			
Neon Test Lamp (Screwdriver)			
Logic Probes			

(6 marks)

2. From the given diagram, calculate the:



a) Time for one cycle (1.5 marks)
b) Frequency (1.5 marks)
c) V_{P-P}. (1.5 marks)
d) V_P (1 mark)
e) V_{RMS} (1.5 marks)

3 Refer to Root-Mean-Square (RMS):

A Briefly describe what it means in practice. (2 marks)

B If the peak-to-peak voltage of a sinusoidal waveform is 10V, calculate the RMS value. (2 marks)

4 Name the four (4) main sections of a basic DC power supply operated from an AC mains power source, stating the function of each section. (8 marks)

5 In Soldering, 2 important factors are heat and cleanliness. Briefly explain these. (2 marks)

6 List in the correct sequence four steps a technician would follow in carrying out faultfinding on a defective or faulty equipment. (4 marks)

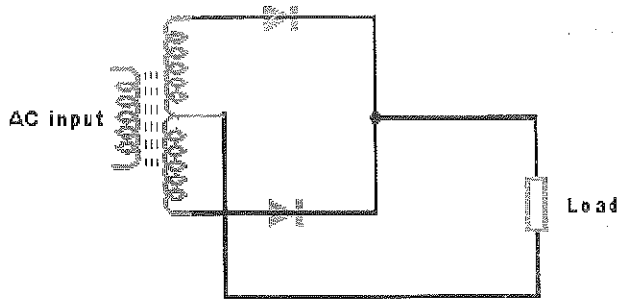
7 List three (3) comparison of Digital and Analogue meters (3 marks)

8. List Four (2) characteristics of a practical Op-amp. [2 marks]

9. The Cathode Ray Oscilloscope (CRO) has several applications. Name any 4 of them. (4 marks)

Section C Electronic Circuits [40 Marks]

1 A certain circuit is shown:



A Identify the application. (1 mark)

B Summarize the operation of the circuit using suitable waveforms. (4 marks)

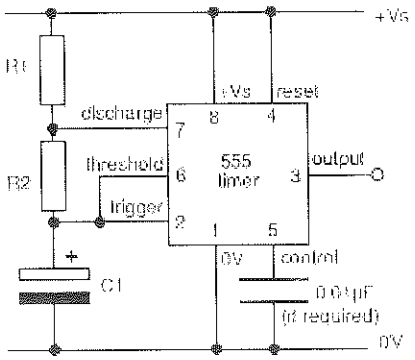
2. A single phase bridge rectifier has an ac input voltage of 24 Volts at 50 hertz and load resistance of 1kΩ:

A	Draw the circuit diagram explain above.	(2 marks)
Determine the following:		
B	Output voltage;	(1 mark)
C	load current;	(1 mark)
D	ripple frequency;	(1 mark)
E	dc ripple voltage;	(1 mark)
F	diode PIV.	(1 mark)

3 Summarise the operation of the logic gates:

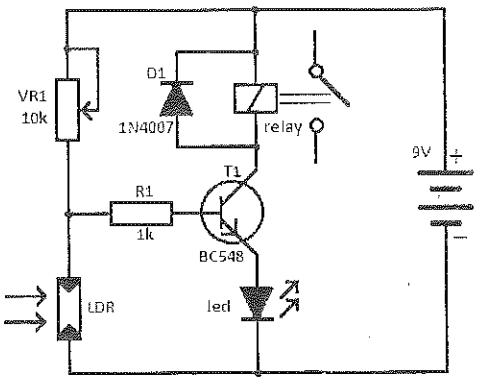
A	NAND and	
B	NOR by supplying the following respective:	
	1 Symbols	(2 marks)
	2 Truth Tables for 2 inputs A & B	(4 marks)

4 A certain circuit is given:



A	Identify the application.	(1 mark)
B	State the shape of the waveform at the output.	(1 mark)
C	What is the frequency of the O/P signal if R1 = 1 kΩ, R2 = 220Ω and C1 = 0.1 µF?	(2 marks)

5 Analyse the switching circuit given.



A Identify the application. (1 mark)

B State the property of the LDR. (1 mark)

C Name the functions of the following components:

(a) 9V battery (1 mark)

(b) LED (1 mark)

(C) T1 (1 mark)

(d) R1 (1 mark)

(e) D1 (1 mark)

D Summarize the action of the circuit when:

(a) The LDR is in "darkness". (2 marks)

(b) Light shines on the LDR. (2 marks)

6 Refer to Transformers as important devices in circuits.

A Name the four main parts of a transformer. (4 marks)

B State the three uses of transformers. (3 marks)

.....END OF EXAM PAPER.....

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Candidate No: .....

Section A **Multiple-Choice Matrix** [20 marks]

Circle correct letter (A, B, C or D) against each of numbers 1 through 20 in the matrix below.

Remove and attach to your Answer Booklet.

1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D