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 1, 2016

DAY/DATE: as per timetable. TIME: 2 HOURS 10 MINUTES
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 Son 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 string.

5. For all sheets of paper on which rough/draft work has been done, cross it though and you MUST ATTACH to your answer scripts.

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

7. ANSWER ALL QUESTIONS.

8. Show all workings where necessary.

9. Do not use programmable calculators, especially the ones that does the conversions of number systems.

*10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM!***

Section A **Multiple Choice** **[30 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. An ideal operational amplifier has
   a) infinite output impedance
   b) zero input impedance
   c) infinite bandwidth
   d) All of the above

2. How many diodes are found in full – wave bridge single phase rectification?

   a) 2
   b) 4
   c) 1
   d) 8

3. If the supply frequency of a single phase is 50 hertz, the ripple frequency of a full-wave rectifier is:

   a) 100 Hz.
   b) 12.5 Hz.
   c) 25 Hz.
   d) 50 Hz.

4. What is the output voltage of the fixed regulator type?

   7924

   a) -792 V
   b) +82 V
   c) +24 V
   d) -24 V

5.The ratio between differential gain and common-mode gain is called:

   a) Amplitude
   b) differential-mode rejection
   c) common-mode rejection
   d) phase

6. What is the first procedure when troubleshooting any equipment?

a) Signal injection.
b) Visual check.
c) Powering the equipment on.
d) Visualising the waveform by using a CRO.

7. Name the part of the cathode ray oscilloscope where the beam of electrons is first seen.

a) Grids.
b) Deflection plates.
c) Filament.
d) Faceplate.

8. Troubleshooting a digital circuit by means of a _____ is the most reliable test instrument to use to measure the voltage.

a) Logic probe.
b) CRO.
c) DMM.
d) Signal generator.

9. Which of the following pin numbers represent the output terminal of LM741 operational amplifier?

a) 2
b) 3
c) 4
d) 6

10. Single – phase bridge rectifier normally uses:

a) Two diodes in it's operation.
b) One diode in it's operation.
c) Four diodes in it's operation.
d) None of the above.

11. VCE approximately equals _____ when a transistor switch is cut off.
    a) VCC
    b) VB
    c) 0.2V
    d) 0.7V

12. Identify the term that describes the value of the waveform that will produce the same heating effect whether if the system is DC or AC.

    a) Maximum value.
    b) Average value.
    c) Root mean square value.
    d) Peak value.

13. Name the device used to convert AC to DC:

    a) Inverter.
    b) Rectifier.
    c) Converter.
    d) Filter.

14. During troubleshooting, the appropriate test instrument; _____ is used for signal injection.

    a) CRO
    b) Signal Generator
    c) DMM
    d) Both a) and b)

15. Which type of filters is used in DC power supplies?

    a) High pass filters.
    b) Band – pass filters.
    c) Band – stop filters
    d) Low pass filters

16. Which test instrument is used to measure the precise resistance of a 100 Ω resistor?

    a) CRO.
    b) Voltmeter.
    c) Ohmmeter.
    d) Ammeter.

17.Unregulated DC power supplies normally have:

a) No regulator connected after the rectifier stage.
b) No regulator connected after the filter stage.
c) A regulator connected after the filter stage.
d) A regulator connected before the filter stage.

18.Another name for astable timer is:

a) Free running
b) One shot
c) Disruptive running
d) No running

19. The output of a NOT gate is high when

a) The input is LOW
b) The input is HIGH
c) The input changes from LOW to HIGH
d) Voltage is removed from the gate.

20. Which two components are commonly used in light dimmers?

a) SCR and Diac
b) SCR and Triac
c) Triac and Diac
d) MOSFET and Diac

21. To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction?

a) collector-emitter
b) base-collector
c) base-emitter
d) collector-base

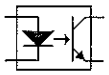
22. A transistor has a β_{dc} of 250 and a base current, I_B, of 20 μA. The collector current, I_C, equals:

a) 500 μA
b) 5 mA
c) 50 mA
d) 5 A

23. Name the component used to emit light and is used as an indicator

a) Diode
b) Photo diode
c) Photo transistor
d) LED

24. Name the component used to interface two circuits of different current magnitudes.



a) LED
b) Photo transistor
c) LED and photo transistor
d) Opto-coupler

25. The output of an AND gate is LOW

a) All the time
b) When any input is LOW
c) When any input is HIGH
d) When all inputs are HIGH

26. Identify the transformer used to change the voltage from 240Vac to 12 Vac.

a) Matching transformer
b) Step-down transformer
c) Step-up transformer
d) Isolation transformer

27. Name the best test instrument to measure frequency.

a) DMM
b) Frequency counter
c) CRO
d) All of the above

28. The Boolean expression $Y = \overline{AB}$ is logically equivalent to what single gate?

a) NAND
b) NOR
c) AND
d) OR

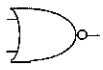
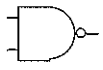
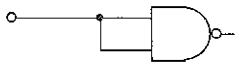
29. If you have to measure current, which selection will you choose?

a) Ammeter
b) Ohmmeter
c) Voltmeter
d) Capacitance meter.

30. Choose the best test instrument that has a multi – selection applications for measuring any quantity instead of having more than one test instrument.

a) CRO
b) Multimeter
c) Ammeter
d) Ohmmeter

SECTION B: Matching [30marks]

1	Block diagram	A	
2	LM317	B	
3	Step up transformer	C	
4	Circuit Diagram	D	
5	LM555	E	
6	Component layout diagram	F	Illustrates the exploded views of an equipment
7	Soldering	G	12 Vac to 240 Vac

8	Step down transformer	H	+ve adjustable regulator
9	NAND gate	I	Components used to interface a high current circuit to a low current circuit
10	LM741	J	Shows a design in a logical fashion that contains component symbols
11	Analogue multimeter	K	-5V
12	Inverting amplifier	L	Instrument that visualizes any waveform
13	AND gate	M	Removing of solder
14	Dual DC power supply unit	N	240 Vac to 12 Vac
15	Photo diode	O	+ 12 V
16	Desoldering	P	In phase
17	Focus Knob	Q	+ve and –ve voltages
18	NOR gate	R	Bonding of two metals
19	Light emitting diode	S	
20	7812	T	180° out of phase
21	Make trace to increase or decrease in amplitude	U	Time/division knob
22	NOT gate	V	OP-Amp
23	AC, GND, DC	W	Input switch
24	Make trace to increase or decrease in time period	X	Timer IC
25	Non-inverting amplifier	Y	Shows the stages of any equipment by the indications of arrows
26	Cathode Ray Oscilloscope	Z	Volts/division knob
27	OR gate	AA	Part of the CRO that functions as a trace clarity knob

28	Opto-couplers	AB	D2 
29	7905	AC	Abbreviated as VOM
30	Assembly Diagram	AD	Shows the physical sizes of the components onto a PCB

SECTION C:Definitions, Statements of Facts, & Formulas [10 marks]

1. Briefly define the following terms as they refer to semiconductors:

a) Doping (1mark)

b) Holes (1mark)

2. The Cathode Ray Oscilloscope (CRO) has several applications. Name any4of them. (4 marks)

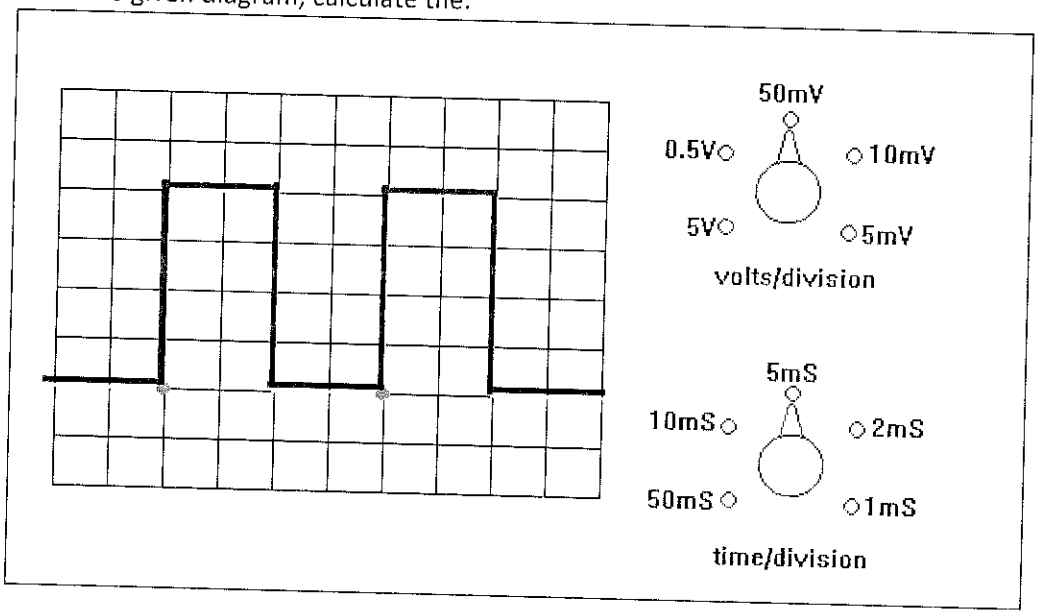
3. Fill in the blank spaces.

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			

(4 marks)

Section D — Sketches, Analysis & Operation — [30 Marks]

1. From the given diagram, calculate the:



a) Frequency. **(2marks)**

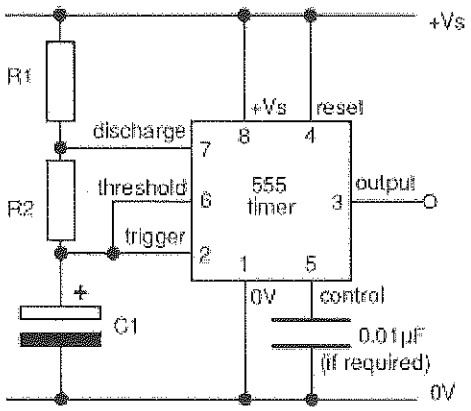
b) Amplitude. **(2 marks)**

2. List three (3) comparison of Digital and Analogue meters **(3 marks)**

3. With the use of suitable sketches clearly describe the operation of a Full-Wave Bridge Rectifier circuit.

(Marks: Cct-2, Waveforms-2, Operation-2) **(6 marks)**

4.A certain circuit is given:

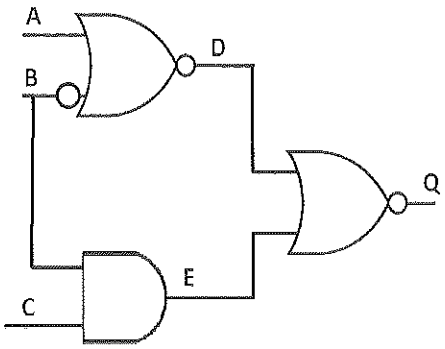


a) Identify the application. **(1 mark)**

b) Sketch the waveforms at Pins 2 and 3. Showing them on a common vertical axis. **(2 marks)**

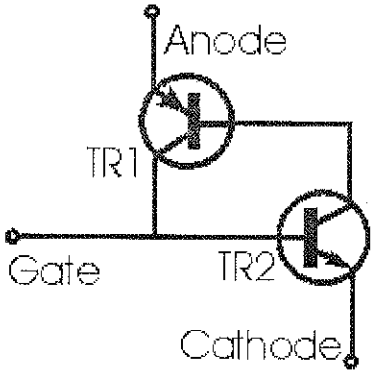
c) What is the frequency of the O/P signal if R1 = 1 kΩ, R2 = 10 kΩ and C1 = 0.1 μF? **(3 marks)**

5. Determine the output (Q) combination of the circuit given below. **(5marks)**



Inputs			Outputs		
A	B	C	D	E	Q
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

6.An SCR can be represented as shown:



a) State the voltage polarities at the Anode & Cathode. **(2 marks)**

b) What happens when a +ve pulse of current is applied to the Gate? **(2 marks)**

7.i) State the purpose of a filter in a DC power supply. **(1mark)**

ii) Sketch a basic LED voltage indicator, showing typical voltages and currents. **(2marks)**

THE END

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FNU/E-5

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Fiji National University

Class Listing

School of Electrical & Electronics Engineering | Ba campus | Penster1 | 2016

EEE448 Electronics for Electricians 2 NL

StudentID	Name	Status	Mon	Sponsor	Outstanding Fee
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			
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	Total Count:	8		**Grand Total:**	**0.00**