



**RADIO ELECTRONICS AND TELEVISION SERVICEMAN CERTIFICATE**

**EXAMINATION PENSTER 3 - 2017**

**EEE201 BASIC ELECTRONICS**

**DATE: TBA**

**INSTRUCTIONS TO STUDENTS**

1. You are allowed 10 minutes EXTRA time during which you are not to write.
2. Write your candidate number on the top of each sheet of the answer booklet.
3. Write all your answers in the ANSWER BOOKLET provided.
4. For all sheet of papers on which rough/draft work has been done, cross it through and attach these to your answer script.
5. Attempt ALL questions worth a total of 120 MARKS for 2 HOURS

**SECTION A – Complete the following statement by filling the blank with the correct word or number ?**

**1 mark per blank**

**30 MARKS**

1	Atoms are composed of three types of particles called _____, _____, and _____.	3m
2	Any materials like copper is called _____ because it can allow electrons to flow when connected to a voltage source, and the materials like _____ are called insulators because they do not allow electrons to flow when connected to a voltage source.	2m
3	For AC the minimum amount of current that cause death when a human body is in contact with, is _____ and for DC the minimum current is _____ milliamperes	2m
4	According to the voltage law if a resistance of 100 ohm is connected in parallel with another resistance of 50 ohm , and both connected in parallel to a voltage source of 12 volts then the voltage across the two resistors will be _____ volts. In this arrangement the current flowing through the 50 ohm will be _____amps and the current through 100 ohm will be _____amps	3m
5	The electronic component that can store electrons or energy is commonly called the _____ and the two main parts of this are _____ and _____	3m
6	When a voltage source is applied to the primary winding of a transformer that voltage causes another voltage to appear in the secondary winding by the principle called _____ inductance.	1m
7	The main purpose of an ac to dc power supply is its requirement of _____ and the main component to obtain this is the _____	2m
8	A good ac to dc power supply usually consists of the following stages in order of its sequence of operation; _____, _____, _____ and _____.	4m
9	A digital multimeter and an analog multimeter both measure a battery voltage of 12 volts. In the process, the analog meter points at the 12 volt mark using a _____ while the digital multimeter _____ the 12 digit.	2m
10	In a step-up transformer the number of wire turns in the primary is _____ than the wire turns in the secondary whereas in the step-down transformer the wire turns in the primary is _____ than that at the secondary winding.	2m
11	Complex digital circuits are made up of basic logic gates called _____, OR, NOT, NAND and EXCLUSIVE _____	2m
12	The two terminals of a PN diode are _____ and _____	2m
13	All flip-flops can be divided into four basic types: _____, JK, D and _____.	2m
<b>30 marks</b>		

**SECTION B – Match the term on the RHS to its meaning on the LHS . Write the question number on your answer sheet and the answer beside it ? 1 mark each 10 MARKS**

	LHS	RHS
1	The words electricity and electronics originated from the word	Less
2	Electrons are usually orbiting around the nucleus of an	EMF
3	The path that the electrons orbit around the nucleus are also called the	Electron
4	EMF stands for	Milliampere
5	The diode is usually made of material called	Atom
6	The material that do not carry electricity easily is called an	Shell
7	When one ampere is divided by 1000, one part of this is called	Semiconductor
8	When 1 farad is divided by one million, one part of that is called 1	Insulator
9	Ohm's law states that the current through a conductor between two points is directly proportional to the potential difference across the two points provided the _____ and temperature are constant	Microfarad
10	When two resistors are connected in parallel, the total resistance should be _____ than the value of each resistor	resistance
	<b>10 marks</b> <small>40</small>	

**SECTION C – Read the questions properly and write the best answer on the Answer script provided, beside the question number ? [1 mark each]**

1. In colour coded resistors, a silver 4<sup>th</sup> band indicates:

- a) 5% Tolerance
- b) 10% Tolerance
- c) 0% Tolerance
- d) 25% Tolerance

2. When two resistors are connected in parallel

- a) they must both have the same current
- b) the voltage across each must be same
- c) the total resistance must have bigger value
- d) here is only one path for the current through both resistors.

3. With a  $6\text{K}\Omega$  resistance in series with a  $2\text{K}\Omega$ , the total resistance  $R_T$  equals

- a)  $2\text{K}\Omega$
- b)  $8\text{K}\Omega$
- c)  $10\text{K}\Omega$
- d)  $12\text{K}\Omega$

4. To connect a current meter in series.

- a) open the circuit at one point and use the meter to complete the circuit
- b) open the circuit at the positive and negative terminals of the voltage source.
- c) short circuit the resistance to be checked and connect the meter across it.
- d) open the circuit at one point and connect the meter to one end.

5. A Capacitor consists of two

- a) Conductors separated by an Insulator
- b) Insulators separated by a Conductor
- c) Conductors alone
- d) Insulators alone

6. A Potentiometer is a:

- a) Two terminal device used to vary the current in the circuit
- b) Three terminal device used to vary the voltage in a circuit
- c) Fixed resistor
- d) Two terminal device used for varying voltage.

7. What is the positive charge in the electronic engineering?
- a) protons
  - b) neutrons
  - c) electrons
  - d) nucleus
8. A capacitance of a capacitor are measured in:
- a) farads
  - b) ohms
  - c) henrys
  - d) pico
9. In a simple circuit consisting of resistance  $100\text{k}\Omega$  and capacitance of  $100\mu\text{F}$ , find out the time constant of the circuit:
- a) 100 sec
  - b) 100 min
  - c) 10 min
  - d) 10 sec
10. In Question 9 above, calculate the frequency of the circuit?
- a) 0.1 Hz
  - b) 100 Hz
  - c) 10 Hz
  - d) 0.01 Hz

10 marks<sub>50</sub>

**SECTION D – Units and calculations**

1. Write down the unit of measurement of each of the following quantities ?

7m

	QUANTITY	UNITS
i	Unit of measurement of electric current	
ii	Unit of measurement of mass	
iii	Unit of measurement of length	
iv	Unit of measurement of time	
v	Unit of measurement of thermodynamic temperature	
vi	Unit of measurement of amount of substance	
vii	unit of measurement of luminous intensity	

2. Complete the following table by replacing each question mark with the correct name or symbol ? On your answer sheet write the Factor and the corresponding answer, eg the first row .....its  $10^{24}$  the answer is deci if the ? was there where deci is?

7m

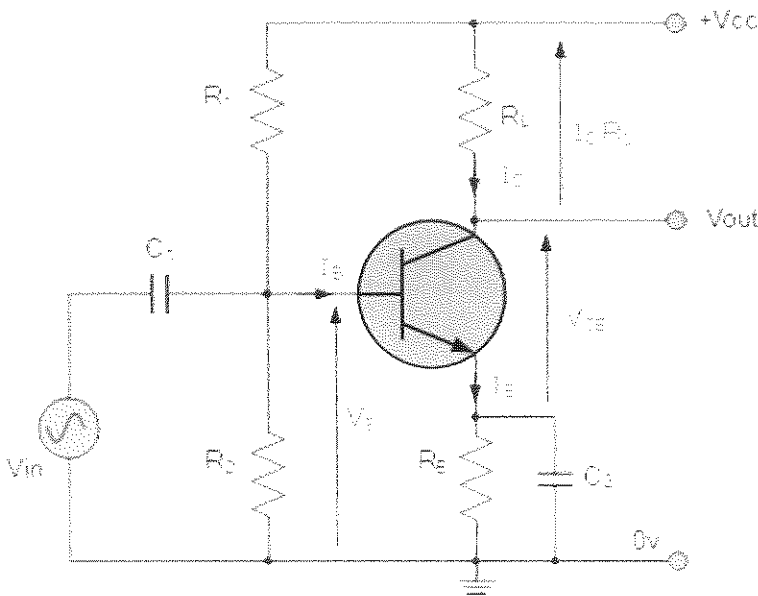
Factor	Name	Symbol	Factor	Name	Symbol
$10^{24}$	Yotta	Y	$10^{-1}$	deci	D
$10^{21}$	Zetta	Z	$10^{-2}$	centi	C
$10^{18}$	Exa	E	$10^{-3}$	?	M
$10^{15}$	Peta	P	$10^{-6}$	?	$\mu$
$10^{12}$	Tera	T	$10^{-9}$	?	N
$10^9$	?	G	$10^{-12}$	?	P
$10^6$	?	M	$10^{-15}$	femto	F
$10^3$	?	K	$10^{-18}$	atto	A
$10^2$	Hector	H	$10^{-21}$	zepto	Z
$10^1$	Deka	da	$10^{-24}$	yocto	?

3. A 1000 pF capacitor is connected in series with 2000 uF . Use two methods of determining the total capacitance? For 1<sup>st</sup> method give the answer in nanofarad and 2<sup>nd</sup> method in uF? 3m

4. Calculate the total resistances of these two connected in parallel, with color code of Red, Brown, Red , Gold? 3m

20 marks<sub>70</sub>

**SECTION E – Refer to the diagram below and answer the questions that follow ?**



[i] Name the above circuit ? 1m

[ii] Show how the base voltage is calculated in terms of R1, R2 & Vcc as in the diagram ? 2m

[iii] Compare what should come out at Vout to that of Vin ? 3m

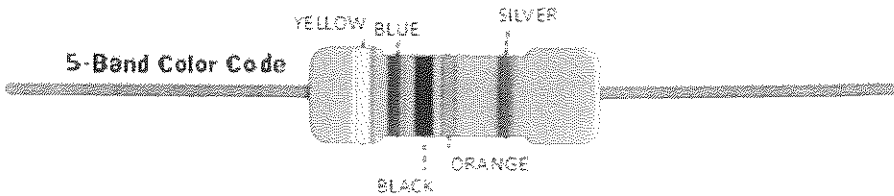
[iv] Explain how the circuit operate ? 4m

10 marks<sub>80</sub>

**SECTION F - Calculation – Show ALL your working**

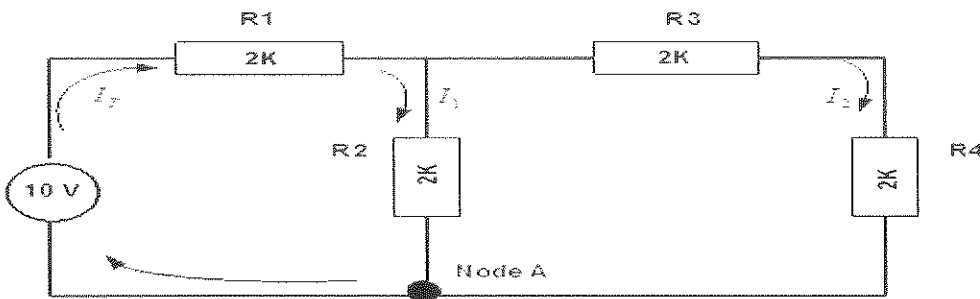
**(40 Marks)**

1. Calculate the value of the resistor given in figure below.



**(5 marks)**

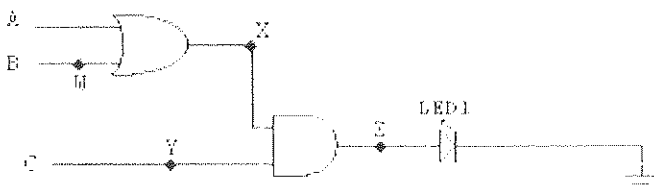
2. Consider the circuit shown in figure below.



**Figure 3 – Series Parallel Resistive Circuit**

- a) Calculate the total Resistance ( $R_T$ ) **(4 marks)**
- b) Calculate the total current ( $I_T$ ). **(3 marks)**
- c) What is the voltage drop across  $R_1$  ( $V_{R1}$ ) **(3 marks)**
- d) Calculate the current through resistor  $R_3$ . ( $I_{R3}$ ) **(3 marks)**
- e) Calculate the current at node A **(2 marks)**

3. For the combinational logic circuit in figure below, draw the truth table to determine which inputs will cause the LED1 to light. **(5 marks)**





*Sequential Logic Circuit*

**TOTAL MARKS = 120**

**END OF EXAMINATION PAPERS**

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