



RADIO ELECTRONICS AND TELEVISION SERVICEMAN CERTIFICATE

EXAMINATION PENSTER 4 - 2016

EEE201 BASIC ELECTRONICS

DATE: As per Timetable TIME: As per Timetable

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 - 20 MARKS

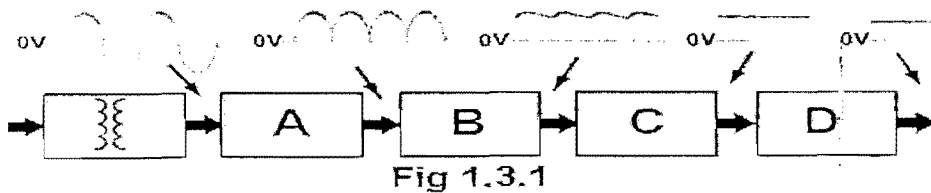
Write on your answer sheet the column number that has the word or number that matches the statement.

STATEMENT		ANSWER is in A B or C		
		A	B	C
1	In colour coded resistors, a silver 4th band indicates tolerance of ;	5%	10%.	0%
2	With a 6KΩ resistance in series with a 2KΩ, the total resistance R_T equals	2KΩ	8KΩ.	10KΩ
3	During the negative half cycle, the current in a bridge rectifier flows through	1 diodes	2 diodes.	3 diodes
4	A 250μH inductor is in series with a 50 Ω resistor. The time constant is	5 μsec.	25 μsec	50 μ
5	What is the ripple frequency for the Centre-tapped Full wave Rectifier?	f	2f.	3f
6	What is the positive charge in the electronic engineering?	protons.	neutrons	electrons
7	Capacitance of a capacitor is measured in?	farads.	ohms	henries
8	In a parallel capacitive circuit of 47μF, 10μF and 22μF with 12v battery, the total capacitance of the circuit is?	12 μf	47 μf	79 μf.
9	In a simple circuit consisting of resistance 100k and capacitance of 100micro, find out the time constant of the circuit?	100 sec	100 min	10 secs.
10	In Question 8 above, calculate the frequency of the circuit?	100 Hz	10 Hz	0.01 Hz.
11	In the schematic symbol for a transistor, the line with the arrowhead represents the	cathode	base	Emitter.
12	In the schematic symbol for a p-n junction diode, the arrowhead part of the symbol represents	base	anode	cathode.
13	The units of capacitance can be	micro farads	pico farads	both.
14	The core of an atom is called	valence	shell	nucleus.
15	1 millisecond can be written down as	1×10^{-3} sec	0.01sec	0.0001sec
16	10 microsecond can be written down as	1/10000	0.01se	10×10^{-6} .
17	1 megaohm is equal to	1000KΩ.	10MΩ	0.06 Ω
18	1 nanofarad is also equal to	1×10^9 f	100f	1×10^{-9} f.
19	The unit of flow of current in a circuit is	volts	Ampere.	hertz
20	The unit of mutual inductance is	Henry.	ohm	Weber

SECTION B - 10 MARKS

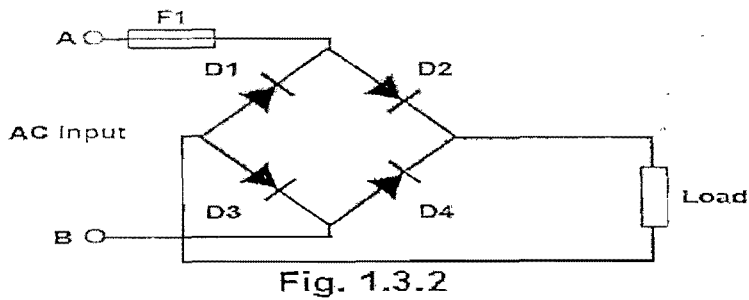
Four answers are given following each question below. Select the correct one and write down in your answer sheet the letter representing the correct answer. Each answer carries 1 mark.

1. Refer to Fig. 1.3.1. What is the function of block B?



- a) rectifier
 - b) reservoir capacitor
 - c) low pass filter
 - d) regulator
2. Refer to Fig 1.3.1. What is the function of block A ?
- a) Transformer
 - b) Full wave rectifier
 - c) Bridge rectifier
 - d) Reservoir capacitor
3. Refer to Fig 1.3.1. What will be the approximate value of the DC component of the waveform at the output of block A?
- a) $V_{PK} \times 0.318$
 - b) $V_{PK} \times 0.5$
 - c) $V_{PK} \times 0.637$
 - d) $V_{PK} \times 0.707$

4. Refer to Fig 1.3.2. If input B is more positive than input A, which diodes will be conducting?



- a) D1 and D2
 - b) D2 and D3
 - c) D1 and D4
 - d) D3 and D4
5. Refer to Fig 1.3.2. If D4 were to go short circuit, what would be the effect on the operation of the circuit?
- a) A decrease in the current through D1.
 - b) Fuse F1 would blow.
 - c) A higher voltage across the load.
 - d) A larger peak current through D2 and D3.
6. What is the action of the reservoir capacitor in a basic power supply circuit?
- a) To de-couple the DC component of the rectifier AC output
 - b) To increase the DC component and reduce the AC component of the AC wave.
 - c) To remove the DC component of the AC wave.
 - d) To regulate the AC wave.

7. Which of the following is an advantage of using a LC low pass filter rather than a RC low pass filter in a power supply?

- a) The reactance of L will be much lower than the resistance of R at mains frequency.
- b) The reactance of L will be much higher than the resistance of R at mains frequency.
- c) An inductor can dissipate more power than a resistor.
- d) LC filters are less expensive than RC filters

8. Refer to Fig 1.3.3. What is the power dissipated in R1?

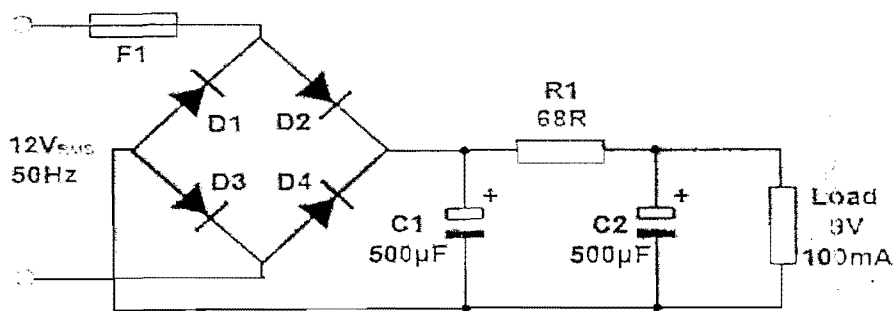


Fig. 1.3.3

- a) 5 W
- b) 1 W
- c) 0.5 W
- d) 0.25 W

9. Refer to Fig 1.3.3. What will be the approximate value of DC across C1?

- a) 3.8 V
- b) 7.6 V
- c) 10.8 V
- d) 14.5 V

10. Refer to Fig 1.3.3. What is the reactance of C2 at the ripple frequency?

- a) 6.4 Ω
- b) 0.3 Ω
- c) 5.1 Ω
- d) 3.2 Ω

SECTION C

Short Answers

(30 MARKS)

1. What is the colour coding for a 4 band resistor, which has a value of? **(4 marks)**
i) $12K \Omega \pm 10\%$
ii) $4.7K\Omega \pm 5\%$
2. What is the value of a 4 band resistor, which has a colour coding of? **(4 marks)**
i) Grey, Blue, Orange, Gold
ii) Blue, Yellow, Red, Silver
3. i) Find the current delivered by a 100V supply to an 250Ω resistor. **(2 marks)**
ii) Calculate the resistance of an electrical heater if it is connected to a 240V supply causing a current of 6mA to flow. **(2 marks)**
4. State 4 basic or universal gates? **(4 marks)**
5. Draw the 4 type of gates mentioned above? **(4 marks)**
6. Sketch the symbol for the following components **(3 marks)**
a. Diode
b. Transistor (PNP)
c. L.E.D (Light Emitting Diode)

7. Shown below in **figure 1** is the logic switch representation.

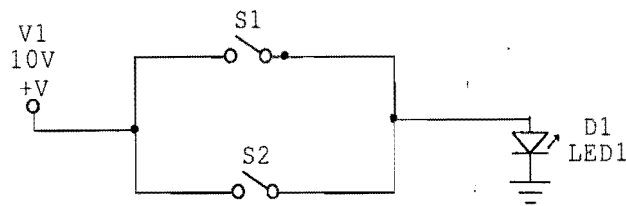


Figure 1.

- a) Draw the truth table showing the possibilities of LED 1 to light when S_1 and S_2 are switched on and off. **(4marks)**
- b) Draw the equivalent logic circuit for the above circuit by using logic gates. **(3 marks)**

SECTION D – Fill the blank with the correct word or number ?. 20 MARKS

NOTE: (Select your answer from the list of terms on the last row) and write in you answer sheet beside the question number.

1	Materials on which electric current does not flow easily are called _____.
2	The unit given to express the amount of potential difference between two parts of electrical circuit is the _____.
3	The unit given to express the amount of power dissipated across the terminal of a resistor source is the _____.
4	The unit given to express the value of a resistor is called the _____.
5	The core of an atom is called _____ and consists of proton and neutron
6	_____ are the part of an atom which orbit around the core
7	The materials which allow the current to flow easily are called _____.
8	The _____ is an electronic component which is made up of two plates and a dielectric
9	Like charges _____ and unlike charges _____.
10	The electronic component which is called the _____ allows current to flow in one direction only
11	The purpose of a transformer which is used in a mobile phone charger is to _____ the 240 volts .
12	The function of an oscillator is to generate _____ voltages
13	The frequency of the voltage at any FEA power point is _____.
14	The _____ dissipated by a resistor can be determined by the product of voltage and current
15	Ohms law is only true if the _____ is constant.
16	For current to flow in an electrical circuit it must _____.
17	The current cannot flow in an electrical circuit that has an _____ circuit
18	In order for a power supply to deliver voltage without ripple a _____ has to be used.
19	In order for a power supply to deliver constant voltage the _____ has to be used.
	Diode, reduce, AC voltage, 50 Hz, power, temperature, conductors, complete, electrons, nucleus, ohm, watts, volt, insulators, open, filter, regulator, repel, attract, capacitor,
	20 marks

SECTION E

(True or False)

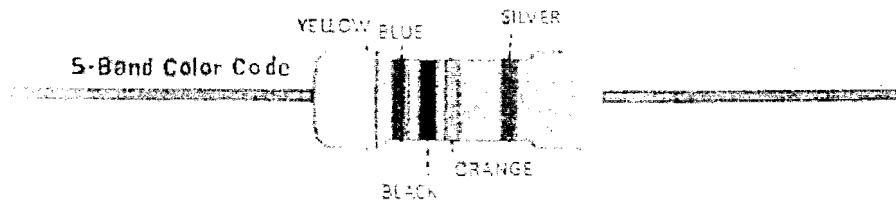
(10 MARKS)

Attempt all question in this section and write down your answers in your answer sheet provided. Write down the question number and answer beside it, the letter T if its true and F if its false?
[½ mark each except for 9-11 which is 1 mark each]

1. One diode can be used as a half wave rectifier and two diodes for a full wave rectifier
2. Only two digits are used in binary number systems namely 1 and 0.
3. There are two different materials used on the bipolar junction transistor.
4. Testing the transistor to determine if it is good or bad can be done by physically checking the continuity between leads
5. The forward biased barrier potential for germanium diode is approximately 0.3V.
6. For the two input AND gate, the output will be LOW only when both inputs are HIGH.
7. The mathematical expression used to describe 2 input AND gate is $A + B = X$.
8. To measure voltage drop across a resistor, the voltmeter has to be placed in parallel with the resistor.
9. The binary number for decimal number: 37 is 100101 (1 marks)
10. The decimal number for the binary number 1100110 is 112 (1 marks)
11. For the binary number 10110 is equivalent to 25 in decimal. (1 marks)
12. Atoms are comprised of electrons, protons and neutrons.
13. Electrons are found orbiting the nucleus of an atom at specific intervals based on their energy levels.
14. The outermost orbit of electrons are called valence orbit
15. The region beyond the valence band is called the conduction band.
16. Electrons in the conduction band are very difficult to be made to be free electrons
17. A wire is a good conductor but it is not perfect because it has some resistance to the flow of current.

Section F Calculation – Show ALL your working (30 Marks)

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



(2 marks)

2. Consider the circuit shown in figure below.

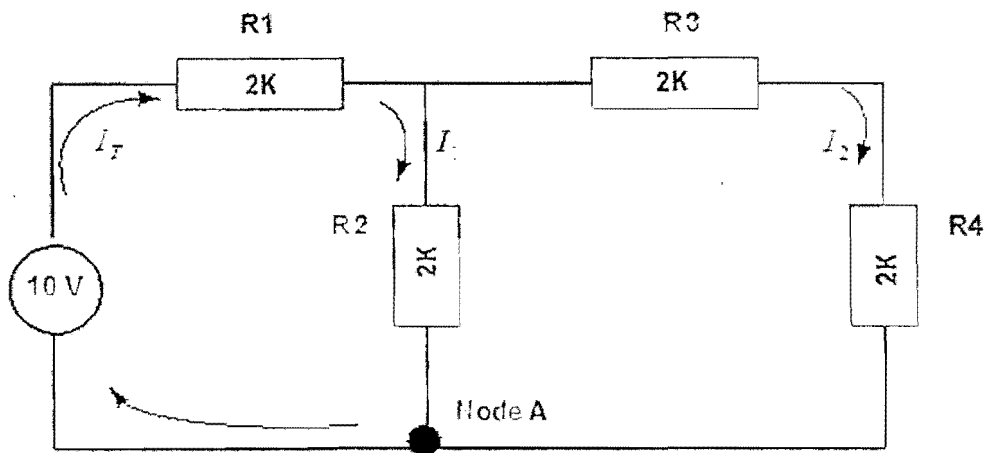
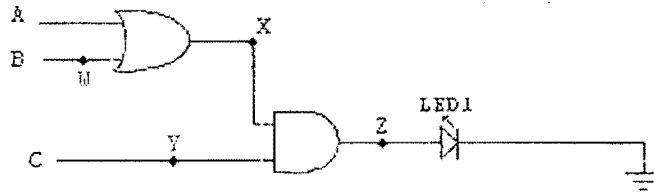


Figure 3 – Series Parallel Resistive Circuit

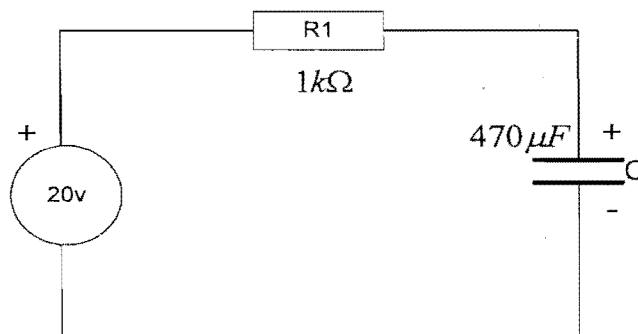
- a) Calculate the total Resistance (R_T) (4 marks)
- b) Calculate the total current (I_T). (3 marks)
- c) What is the voltage drop across R_1 (V_{R1}) (3 marks)
- d) Calculate the current through resistor R_3 . (I_{R3}) (3 marks)
- e) Calculate the current at node A (2 marks)

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

4. For the circuit in figure below:



shows typical RC=ζ circuit

- (a). Determine the time taken for capacitors to reach 100% of the supply voltage. (3 marks).
- (b). Determine the value of the resistance that would be required to give a full charging time of 10 sec. (5 marks).

TOTAL OF 120 MARKS

*****THE END *****