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PHY301 FINAL TERM PAPER SHARED BY STUDENT

ON AUGUST 22, 2016 AT 6:10PM

Assalamualaikum.

PHY301 exam held today:

- What is resistance level of PhotoDiode in darkness? (2 marks)
- Two figures were given. It was required to tell, which input signal is clipper, and for what input signal the output signal is Clamper. (2 marks)
- Define Diode. (2 marks)
- In which bias a diode conducts current? (2 marks)
- For the given circuit, convert left most voltage into current using Source transformation. Draw diagram. (3 marks)
- For a given circuit, value of I1 & I2 using mesh analysis was required. (3 marks)
- For the given circuit, how can we calculate only R_{TH} using Thevenin's Theorem? (3 marks)
- Consider a diode with n=2 biased at 1mA. Find the change in current as a result of changing the voltage by –20mV using small signal model. (3 marks)
- Consider a diode with n=2 biased at 1mA. Find the change in current as a result of changing the voltage by –20mV using the exponential model. (5 marks)
- Identify meshes in given circuit. Write its SuperMesh equation. (5 marks)
- For the given circuit, find Vo using Thevenin's Theorem. (5 marks)
- What are modes of operation of BJT? (5 marks)

PHY301 (26-8-2016)

1. Circuit was given. Which values are wrongly labelled in circuit.
2. What is Dopping? Why it is necessary?
3. Describe action of transformer.
4. In NPN transistor, what section is made very thin compared with other two section?
5. When BJT is said to be in saturation mode?
6. Write detailed steps of Thevenin's theorem.

Rest questions were from circuits and asked to solve.

ON AUGUST 27, 2016 AT 10:46PM

- One question about to define the polarity of reverse bias
- Write KVL equation. Circuit was given
- Circuit was given ask to write the KVL equation for a mesh
- Figure was given ask to identify the figure either as half wave rectifier or full wave rectifier
- Thevenin's theorem. Ask to find Rth. Circuit was given
- Norton's theorem and ask to find the Inor. Circuit was given
- Write the function of a transistor
- Figure was given ask to trace the polarities of AC and also points the polarity of load resistance (did not remember clearly)
- Ask to write three differences between n-p-n and p-n-p amplifier
- Ask to find the voltage by superposition principle considering only current source. Circuit was given
- Ask to write difference between the construction of simple diodes and tunnel diodes
- One question from transformer. Ask to find voltage in the circuit

on March 8, 2014 at 10:21pm

Describe the function of transistor.

In electronics, a transistor is a semiconductor device commonly used to amplify or switch electronic signals. A transistor is made of a solid piece of a semiconductor material, with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current flowing through another pair of terminals. Because the controlled power can be much larger than the controlling power, the transistor provides amplification of a signal. The transistor is the fundamental building block of modern electronic devices, and is used in radio, telephone, computer and other electronic systems. Some transistors are packaged individually but most are found in integrated circuits.

In a reverse biased PN-junction, which current carriers cause leakage current

In reverse biased leakage current is primarily limited by the supply of thermally generated minority carriers that are more or less independent of the reverse bias voltage, but tends to be very sensitive to temperature.

The leakage current is composed both of holes from the n-region seeing the potential and drifting to the p-region and electrons generated in the p-region drifting to the n-region, where both components generate a net negative current. If the doping of both sides of the junction are equal than the half of the current is from holes and half from electrons. As the doping becomes unequal the leakage becomes dominated by the minority carriers generated in the lighter doped region

Or

the minority carriers in the device is responsible for leakage current.
holes in n-type material and electrons in p-type cause the flow of leakage in the pn junction device

Describe Source Transformation method for simplifying circuit.

A source transformation is a process of representing a circuit from the point of view of the load, or of the next circuit. The concept of source transformation suggests that any power source can be represented as a voltage source or a current source. If the impedance presented to the load or next circuit can be calculated, analysis of the circuit is simplified. Source transformation is applied to the design and testing of various types of circuits – from relatively simple direct current (DC) circuits, for steady-state power computations, to more complex circuits. For high frequencies of alternating current (AC), such as radio frequencies, source transformation aids in designing impedance matching circuits for maximum power transfer.

Difference between half wave and full wave rectifier.

The difference between a half wave rectifier and full wave rectifier is that a half wave rectifier removes one of the positive or the negative half cycle of the wave and only either half of the cycle appears in the output whereas in the full wave rectifier both the cycles appear in the positive or negative cycle of the output. The efficiency of a full wave rectifier (81.2%) is too double of a half wave rectifier(40.6%) because the r.m.s. value in case of a full wave rectifier is Maximum current divided by 1.41 (under root of 2) whereas in case of a half wave rectifier the r.m.s current is half of maximum current during the wave cycle..

Forward biased or reversed baised diode.

Forward biasing is such an arrangement in which the positive terminal of the battery is connected to the P end, and negative terminal is connected to N end of P-N junction. Reverse biasing is the reverse of forward biasing. Forward and reverse biasing take place when a diode is connected with a battery.

State kirchhoff's current law(KCL).

 KIRCHHOF'S CURRENT LAW

Sum of all the currents entering in the node is equal to sum of currents leaving the node.

It can also be defined as

Sum of entering currents + sum of leaving currents =0

In the NPN transistor, what section is made very thin compared with the other two sections?

The P or base section

State the superposition theorem.

Superposition Theorem:

The principle of superposition, which provides us with the ability to reduce a complicated problem to several easier problems – each containing only a single independent source – states that "In any linear circuit containing multiple sources, the current or voltage at any point in the circuit may be calculated as the algebraic sum of the individual contributions of each source acting alone."

When determining the contributions due to independent sources, any remaining current sources are made zero by replacing them by open circuit and any voltage sources are made zero by replacing them by short circuit.

PHY301 FINAL TERM PAPER SHARED BY STUDENT

ON JULY 24, 2013 AT 11:42PM

What is the resistance level of photodiode in total darkness? (2 Marks)

Write constraint equation for given circuit? (2 Marks)

What is band gap energy? (2 Marks)

Determine the currant in secondary (about transformer)? (3 Marks)

Write KVL equation for outer loop? (3 Marks)

For the circuit shown in the figure using ideal diode, find the value of the voltage and count? (3 Marks)

Determine the DC load currant for the rectifier shown in fig.? (5 Marks)

Find V10 by division Rule? (5 Marks)

How we will convert 10v voltage source into currant in flowing circuit, what will be the value of currant source? (5 Marks)

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2014

Q No. 1: What type of bias causes a diode to conduct?

Q No. 2: What is the shape of output voltage waveform of clipper circuit?

Q No. 3: Why voltage conduct through the forward bias junction of NPN in one direction, namely from emitter to base.

Q No. 4: Find value of I_E of transistor if $I_B = 1.5$ mA and $I_C = 4$ mA.

Q No. 5: What is the formula of Turn Ratio, Current Ratio and Voltage Ration of transformer.

Q No. 6: If Voltage drop in Silicon diode is if **n = 1, v = 0.3** at **i = 1 mA** find voltage drop at **i = 0.1 mA & i = 5mA.**

Q No. 7: A bridge rectifier is fed by 18 V AC transformers determine the DC load voltage for the circuit with 2KΩ load.