

QUIZ – ANSWER KEY

QUIZ NO: 156

TOPIC: ELECTRICAL ENGINEERING

DATE: 24/01/2023

1. Which circuit converts irregularly shaped waveform to regular shaped waveforms?

- [A] Schmitt trigger
- [B] Voltage limiter
- [C] Comparator
- [D] None of the mentioned

Answer: A

Explanation: Schmitt trigger are also called as squaring circuit because, this type of circuit converts an irregularly shaped wave to a square wave or pulse.

2. What happens if the threshold voltages are made longer than the noise voltages in schmitt trigger?

- [A] Eliminate false output transition
- [B] Reduce the transition effect
- [C] Enhance the output signal
- [D] All the mentioned

Answer: A

Explanation: In schmitt trigger, if the threshold voltage V_{UT} and V_{LT} are made

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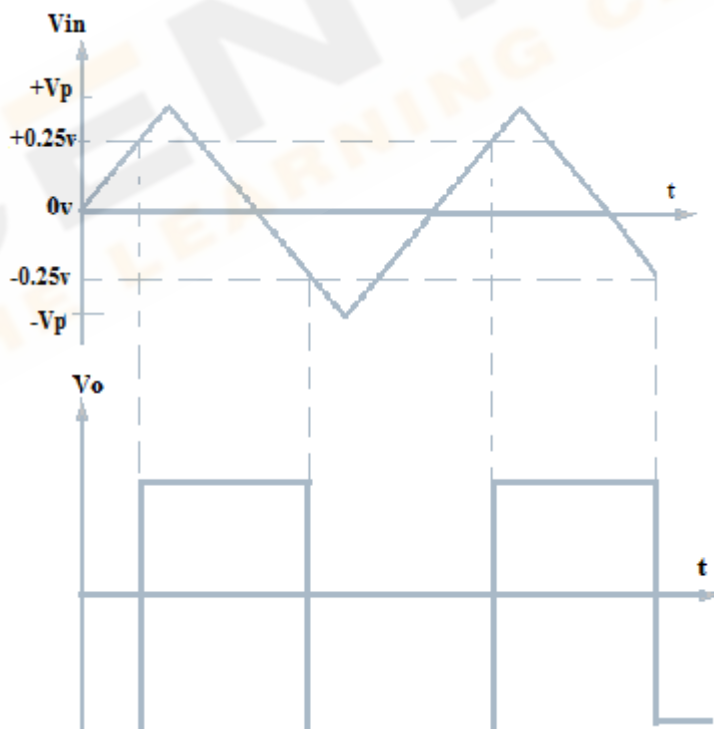
larger than the input noise voltage. The positive feedback will eliminate the false output transition.

3. To a schmitt trigger in non-inverting configuration an input triangular wave of $1V_p$ is applied. What will be the output waveform, if the upper and lower threshold voltages are $0.25v$?

- [A] Square waveform
- [B] Pulse waveform
- [C] Sawtooth waveform
- [D] Cannot be determined

Answer: A

Explanation: The input waveform has a threshold level of $\pm 0.25v$.



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4. In which configuration a dead band condition occurs in schmitt trigger ?

- [A] Differential amplifier with positive feedback
- [B] Voltage follower with positive feedback
- [C] Comparator with positive feedback
- [D] None of the mentioned

Answer: C

Explanation: The comparator with positive feedback is said to exhibit hysteresis, a dead band condition, when the input of comparator exceeds upper threshold voltage. At this condition, output switch from $+V_{sat}$ to $-V_{sat}$. It reverts back to its original state, $+V_{sat}$ when the input goes below lower threshold voltage.

5. How to limit the output voltage swing only to positive direction?

- [A] Combination of two zener diodes
- [B] Combination of zener and rectifier diode
- [C] Combination of two rectifier diodes
- [D] All of the mentioned

Answer: B

Explanation: To limit the output voltage swing to positive or negative direction, the basic op-amp comparator should be connected with a combination of zener and rectifier diode in the feedback path.

6. A basic op-amp circuit has a zener and rectifier diode connected in the feedback path. Calculate the maximum positive voltage. Where, zener voltage = 5.1 v and voltage drop across the forward biased zener = 0.7v?

- [A] $V_O = 5.8v$
- [B] $V_O = 9.9v$
- [C] $V_O = 4.7v$

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[D] $V_O = 7.1\text{v}$

Answer: D

Explanation: Initially, rectifier diode will be reverse biased and makes the op-amp to operate in open loop configuration. So, the output voltage is obtained till the rectifier diode is forward bias and zener goes into avalanche condition. Hence, the maximum positive output voltage $V_{OZ} + V_D$ ($V_D \rightarrow$ voltage drop across rectifier diode).

$\Rightarrow V_O = 5.1\text{v} + 0.7\text{v} = 5.8\text{v}$.

7. The voltage level at which the comparator saturated by a differential input equal to greater than a specified voltage is called ?

- [A] Zero output level
- [B] Positive output level
- [C] Negative output level
- [D] All of the mentioned

Answer: C

Explanation: The negative output level or output low voltage is the negative dc output voltage with comparator saturated by a differential input equal to or greater than specified voltage.

8. The special designed comparators are compatible with ?

- [A] RTL
- [B] MOS Logic
- [C] TTL
- [D] All of the mentioned

Answer: D

Explanation: The special designed comparator outperforms the op-amp type. They are optimized for the most desirable promoters like speed and accuracy. So, their output is compatible with RTL, DTL, TTL and MOS Logic.

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9. Depending on the value of input and reference voltage a comparator can be named as ?

- [A] Voltage follower
- [B] Digital to analog converter
- [C] Schmitt trigger
- [D] Voltage level detector

Answer: D

Explanation: A comparator is some time called as voltage level detector because, for a desired value of reference voltage, the voltage level of the input can be detected.

10. Why clamp diodes are used in comparator?

- [A] To reduce output offset voltage
- [B] To increase gain of op-amp
- [C] To reduce input offset current
- [D] To protect op-amp from damage

Answer: D

Explanation: The diodes protect the op-amp from damage due to excessive input voltage. Because of these diodes the difference input voltage of the op-amp is clamped to 0.7v or -0.7 v, hence these diodes are clamp diodes.

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