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Time Response of Reactive Circuits MCQ Test

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Q1. How to measure transient response time T in RC circuit, when R is the value of the resistor in ohms and C is the value of the capacitor in Farads?

- **A. $R \times C$, in seconds**
- B. R/C , in seconds
- C. $R - C$, in seconds
- D. $R + C$, in seconds

Q2. A steady-state condition is reached when the output voltage reaches _____.

- **A. the average value of the input voltage**
- B. approximately 63% of the input voltage
- C. the effective value of the input voltage
- D. the input voltage

Q3. An RC differentiator acts as a _____.

- A. low-pass filter
- B. band-pass filter
- **C. high-pass filter**
- D. band-stop filter

Q4. What is the average value of the output in an RC differentiator, responding to repetitive pulses?

- **A. is zero**
- B. is equal to the input voltage
- C. is 63 percent of the input voltage
- D. cannot be determined

Q5. The output of an RC integrator is taken across the _.

- A. diode
- **B. capacitor**
- C. resistor
- D. source

Q6. In an RC differentiator, the sum of the capacitor voltage and the resistor voltage at any instant ____.

- A. must be zero
- **B. must be equal to the applied voltage**
- C. cannot be determined
- D. is less than the applied voltage but greater than zero

Q7. The expression of current in R- C circuit is?

- A. $i = (V/R) \exp(t/RC)$
- **B. $i = (V/R) \exp(-t/RC)$**
- C. $i = (V/R) - \exp(t/RC)$
- D. $i = (V/R) - \exp(-t/RC)$

Q8. In an R-C circuit, when the switch is closed, the response ____.

- A. do not vary with time
- **B. decays with time**
- C. rises with time
- D. first increases and then decreases

Q9. Determine the voltage across the capacitor in the circuit shown in the question 6 is?

- **A. $V_C = 60(1 - e^{-t})V$**
- B. $V_C = 60(1 + e^{-t})V$

- C. $V_C = 60(1 - e^{-t})V$
- D. $V_C = 60(1 + e^{-t})V$

Q10. The rising and falling edges of a pulse waveform contain the higher frequency component.

- A. True
- B. False

Q11. The flat portions of a pulse waveform contain low-frequency components.

- A. True
- B. False

Q12. What is the highest frequency contained in a pulse that has a rise and fall time equal to 10 microseconds (10 s)?

- A. 35 kHz
- B. 3.5 kHz
- C. 10 kHz
- D. 100 kHz

Q13. If the capacitor in an integrator becomes leaky:

- A. the time constant will be effectively reduced
- B. the waveshape of the output voltage across C is altered
- C. the amplitude of the output is reduced
- D. All of the above

Q14. After how many time constants, the transient part reaches more than 99 percent of its final value?

- A. 2
- B. 3
- C. 4
- D. 5

Q15. If the RC time constant of an integrator is increased, as the time constant is increased ____.

- **A. the capacitor charges less during a pulse and discharges less between pulses**
- B. the capacitor charges more during a pulse and discharges less between pulses
- C. the capacitor charges less during a pulse and discharges more between pulses
- D. the capacitor charges more during a pulse and discharges more between pulses

Q16. To understand how the output voltage is shaped by a differentiator, you must consider ____.

- A. the response to the rising pulse edge
- B. the response between the rising and falling edges
- C. the response to the falling pulse edge
- **D. All of the above**

Q17. An integrator consists of a 3.3 k resistor and a 2 F capacitor. A single 30 V, 6 μ s pulse is applied to the input. How much will the capacitor charge?

- A. 10.3 V
- **B. 17.91 V**
- C. 12.09 V
- D. 30 V C

Q18. With an RL integrator, at the instant of the rising pulse edge:

- A. all the input voltage is across the resistor
- **B. all the input voltage is across the inductor**
- C. 63 percent of the input voltage is across the resistor
- D. 63 percent of the input voltage is across the inductor

Q19. What is Time Response?

- **A. output of control system for an input varies with respect to time**
- B. input of control system with respect to time
- C. Both A and B
- D. None of the above

Q20. In an RL differentiator, when the input pulse goes from its low level to its high level, _____.

- **A.** Voltage across the inductor instantly reaches 63% of input voltage
- **B.** Voltage across the inductor is zero
- **C.** The inductor prevents a sudden change in voltage B.
- **D. The inductor prevents a sudden change in current**

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