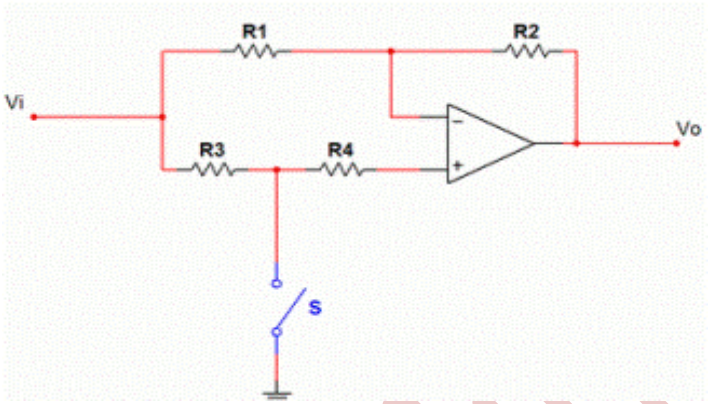
Electronics and Semiconductor

1. The ratio of the output to input voltage for the given circuit is-



   a. +1 when S is open, (1 + R2/R1) when S is closed
   b. +1 when S is open, – (R2/R1) when S is closed.
   c. – 1 when S is open, (1 + R3/R4) when S is closed.
   d. (R4/R3 – R2/R1) when S is open, + 1 when S is closed.

2. A diode is operated in reverse biased region with a very high frequency. Which of the following statements is false?

   a. There won't be any shunt capacitive effect on diode's operation.
   b. Storage capacitance will be dominant and will affect diode's operation.
   c. Both transition and storage capacitance will affect diode equally.
   d. Both 2 and 3
   e. Both 1 and 3

3. The Boolean expression f (A,B,C)= A[B+C(AB+AC)']can be simplified to – (http://allcomputertopics.blogspot.com/2012/11/simplification-of-boolean-expressions.html)

   a. A
   b. AB
   c. 1
   d. B'

4. A series string of 5 diodes is connected through a resistor R to a 10 V supply. For diodes having 0.7 V drop at 1 mA and a 0.1 V/decade characteristic, what value of R is required to establish a total voltage drop across all the diodes to be 4 V?

    a. 700 Ohms
    b. 500 Ohms
    c. 300 Ohms
    d. 400 Ohms

5. Which of the following is/are false?
   A) According to continuity equation- Electrons and holes cannot mysteriously appear or disappear at a given point, but must be transported to or created at the given point via some type of carrier action.
   B) The continuity equation satisfies the condition that particles should be conserved.
   C) According to continuity equation change in carrier density over a period of time is due to the generation of electron hole pairs and recombination of electron hole pairs only. There is no role of incoming and outgoing flux of carrier.

    a. B
    b. C
    c. Both A and B
    d. Both A and C

6. In a MOSFET, which of the following secondary effects is caused by short channel?

   (I) Threshold voltage variation (II) Mobility degradation

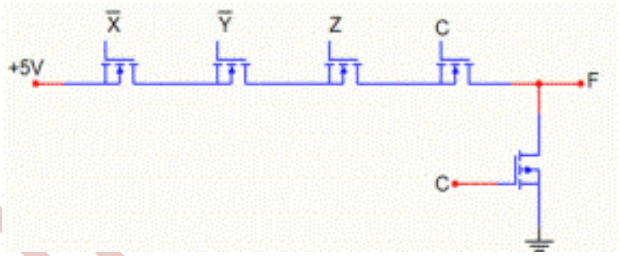
   (III) Velocity saturation

    a. (I)
    b. (II) & (III)
    c. (III)
    d. (I), (II) & (III)

7. Which of the following is true if two identical RC low pass filters are cascaded?
    a. As the order of the filter decreases, the actual stop band responses of the filter approaches its ideal stop band characteristics.
    b. 2nd order filters can be used to design any other higher order filter system.
    c. Due to cascading the resulting gain at the respective cut-off frequency is reduced.
    d. The roll-off slope of the filter will be 1/4*(-20db/decade).

8. Which of the following will not happen In a CMOS inverter, if the supply voltage is reduced to just below threshold voltage of the transistors?
    a. The CMOS inverter stops working as both transistors get switched off
    b. The CMOS inverter works with a slightly reduced gain, due to sub threshold conduction.
    c. The CMOS inverter works with a very low gain and high delay.
    d. Only A
    e. Both A and B

9. Identify the function F (X, Y, Z, C) implemented by the CMOS circuit shown below-



    a. X'YZ'C'
    b. XYZ'C'
    c. (X' + Y' + Z).C
    d. XY'Z'C
    e. none of these