

CT-2(18CSS201J-Analog & Digital Electronics)

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Attempt all the questions.

Each question carry one mark.

Voltage shunt feedback amplifiers are also called as *

1 point

- ☐ Non-inverting amplifier with feedback
- ☐ Non-inverting amplifier without feedback
- ☒ Inverting amplifier with feedback
- ☐ Inverting amplifier without feedback

When a transistor is in “ON” condition then the collector to emitter voltage is approximately..... *

1 point

- ☐ VCC
- ☒ VBE
- ☐ VCE
- ☐ Zero



The piezoelectric effect in a crystal is *

1 point

- ☒ A voltage developed because of mechanical stress
- ☐ A change in resistance because of temperature
- ☐ A change in frequency because of temperature
- ☐ None of the above

The common-mode voltage gain is *

1 point

- ☒ smaller than differential voltage gain
- ☐ equal to differential voltage gain
- ☐ greater than differential voltage gain
- ☐ Zero

The output voltage of a certain op-amp circuit changes by 20 V in 4 μ S.
what is its slew rate? *

1 point

- ☒ 5 V/ μ S
- ☐ 20 V/ μ S
- ☐ 25 V/ μ S
- ☐ 30 / μ S



For an Op-amp with negative feedback, the output is *

1 point

- ☐ equal to the input
- ☐ increased
- ☒ fed back to the inverting input
- ☐ fed back to the non-inverting input

The feedback oscillator would oscillate at all frequencies for which *

1 point

- ☐ $A\beta = 0$
- ☐ $A\beta \leq 1$
- ☒ $A\beta \geq 1$
- ☐ $A\beta = 1$

The inverting summing amplifier has the following I/P, $R_F=R_1=R_2=R_3=R=1$ K Ω , $V_1=2$ V, $V_2=3$ V, $V_3=4$ V and the supply voltages are ± 15 V. Determine the output voltage. Assume that the op-amp is initially nulled. *

1 point

- ☒ 5V
- ☐ 3V
- ☐ -1V
- ☐ -9V



For a given op-amp, $CMRR=10^5$ and differential gain $A_d=10^5$. What will be the common mode gain of the op-amp. *

1 point

- ☐ 2
- ☐ 5
- ☒ 1
- ☐ 3

In the given logic family which belongs to saturated log family... *

1 point

- ☒ DTL
- ☐ RTL
- ☐ ECL
- ☐ IIL

When the signal feedback to the amplifier circuit is proportional to the output current rather than output voltage, an amplifier is said to have *

1 point

- ☐ Power feedback
- ☐ Voltage feedback
- ☒ Current feedback
- ☐ Signal feedback



The condition for inversion layer formation in a MOSFET is..... *

1 point

- ☒ $V_{gs} \leq V_t$
- ☐ $V_{gs} \leq 0$
- ☐ $V_{gs} > V_{ds}$
- ☐ $V_{gs} > V_t$

Relaxation oscillators are also known as _____ *

1 point

- ☒ Multivibrator
- ☐ Phase shift oscillators
- ☐ Blocking oscillators
- ☐ Saw tooth generator

The difference bit output of a half subtractor is the same as *

1 point

- ☐ Difference bit output of a full adder
- ☐ Carry bit output of a half adder
- ☒ Sum bit output of a half adder
- ☐ Sum bit output of a full adder



The inverting input inverting of the voltage shunt feedback resistor is a commonly named as..... *

1 point

- ☐ Terminal ground
- ☒ Virtual ground
- ☐ Virtual input
- ☐ Resistive input

The negative feedback is applied in many oscillator circuits to *

1 point

- ☐ Increase its output impedance
- ☐ Decrease its output impedance
- ☐ Stabilize the frequency of the oscillators
- ☒ Stabilize the output amplitude

In ECL logic family logic-0 and logic-1 is represented by.... *

1 point

- ☐ -0.8V and 1.7V respectively
- ☐ -0.8V and -1.7V respectively
- ☒ -1.7V and -0.8V respectively
- ☐ 0.8V and -1.7V respectively



If a MUX have M inputs and N selection lines than which relation is correct * 1 point

- ☒ $N = \log_2 M$
- ☐ $M = \log_2 N$
- ☐ $N = \log_{10} M$
- ☐ $M = \log_{10} N$

When both nMOS and pMOS transistors of CMOS logic design are in OFF condition, the output is: *

- ☐ 1 or Vdd or HIGH state
- ☐ 0 or ground or LOW state
- ☒ High impedance or floating(Z)
- ☐ None of the mentioned

In case of depletion type N-channel MOSFET, when it is working in Depletion mode then gate should be.... *

- ☒ Negative potential
- ☐ Positive potential
- ☐ Zero potential
- ☐ Either it may be positive or negative



Power consumed by the gate when fully driven by all its inputs is called... * 1 point

- ☒ Power dissipation
- ☐ Fan in
- ☐ Fan out
- ☐ Noise Margin

What is the value of gain in voltage follower? * 1 point

- ☐ 3
- ☐ 4
- ☐ 0
- ☒ 1

CMOS inverter has _____ input impedance. * 1 point

- ☐ low
- ☒ high
- ☐ very high
- ☐ Very low



In TTL logic, the input transistor has a number of equal to the desired fan-in of the circuit. *

1 point

- ☐ Base
- ☒ Emitter
- ☐ Collector
- ☐ Gate

How many outputs will a decimal-to-BCD encoder have? *

1 point

- ☒ 4
- ☐ 8
- ☐ 12
- ☐ 16

The crystal oscillator frequency is very stable due to of the crystal *

1 point

- ☐ Rigidity
- ☐ Vibrations
- ☐ Low Q
- ☒ High Q



If the feedback fraction of an amplifier is 0.01, then voltage gain with negative feedback is approximately..... *

1 point

- ☐ 5000
- ☐ 10
- ☒ 100
- ☐ 50

The sum of two n-bit binary numbers can be generated as *

1 point

- ☐ Directly
- ☒ Serially
- ☐ Parallel
- ☐ Serial and parallel

IC number for 2-input E-XOR gate is *

1 point

- ☐ 7468
- ☐ 7645
- ☐ 7848
- ☒ 7486



The common-mode gain is *

1 point

- ☐ very high
- ☒ very low
- ☐ always unity
- ☐ unpredictable

Most of demultiplexers facilitate which type of conversion? *

1 point

- ☐ Decimal-to-hexadecimal
- ☐ Odd parity to even parity
- ☐ AC to DC
- ☒ Single input, multiple outputs

A decoder converts n inputs to _____ outputs. *

1 point

- ☐ n
- ☐ n^2
- ☒ 2^n
- ☐ n^n

In a MOSFET the MOS structure is behave as a..... *

1 point

- ☐ Transformer
- ☐ Resistor
- ☒ Capacitor
- ☐ Inductor



One condition for oscillation is *

1 point

- ☒ A phase shift around the feedback loop of 180°
- ☐ A gain around the feedback loop of one-third
- ☐ A phase shift around the feedback loop of 0°
- ☐ A gain around the feedback loop of less than 1

An oscillator converts *

1 point

- ☐ a.c. power into d.c. power
- ☒ d.c. power into a.c. power
- ☐ mechanical power into a.c. power
- ☐ none of the above

In a carry look ahead adder have the previous carry C_i , carry propagator P_i and Carry generator G_i then the next carry is _____ *

1 point

- ☒ $C_{i+1} = G_i + P_i C_i$
- ☐ $C_{i-1} = G_i + P_i C_{i+1}$
- ☐ $C_{i+1} = G_i - P_i C_i$
- ☐ $C_{i+1} = G_i + P_i C_{i+1}$



Which of the following are building blocks of encoders? *

1 point

- ☐ NOT gate
- ☒ OR gate
- ☐ AND gate
- ☐ NAND gate

When negative voltage feedback is applied to an amplifier, its voltage gain *

1 point

- ☐ Is increased
- ☒ Is reduced
- ☐ Remains the same
- ☐ None of the above

Buffer is used because _____ *

1 point

- ☒ it increases the speed
- ☐ decreases sensitivity to noise
- ☐ decreases speed
- ☐ does not affect speed



Which logic family has the highest power dissipation per gate..... *

1 point

- ☒ ECL
- ☐ TTL
- ☐ CMOS
- ☐ PMOS

In CMOS logic circuit the n-MOS transistor acts as: *

1 point

- ☐ Load
- ☐ Pull up network
- ☒ Pull down network
- ☐ Not used in CMOS circuits

Increasing fan-out _____ the propagation delay. *

1 point

- ☒ increases
- ☐ decreases
- ☐ does not affect
- ☐ exponentially decreases

As compared to TTL, ECL has..... *

1 point

- ☐ Lower power dissipation
- ☒ Lower propagation delay
- ☐ Higher propagation delay
- ☐ Higher noise margin



Write the formula for closed loop voltage gain of inverting amplifier with feedback using open loop voltage gain and gain of feedback circuit. * 1 point

- ☒ $AF = A/(1+AB)$
- ☐ $AF = -A/(1+AB)$
- ☐ $AF = -B/(1+AB)$
- ☐ $AF = B/(1-AB)$

The maximum noise voltage added to an input signal of a digital circuit that does not cause an undesirable change in the circuit output is called..... * 1 point

- ☐ Fan in
- ☐ Fan out
- ☒ Noise Margin
- ☐ Propagation delay

In a carry look ahead adder the inputs are A_i and B_i then the propagator P_i is * 1 point

- ☐ $P_i = A_i \cdot B_i$
- ☐ $P_i = A_i + B_i$
- ☐ $P_i = A_i - B_i$
- ☒ $P_i = A_i \oplus B_i$



In a carry look ahead adder the inputs are A_i and B_i then the carry generator G_i is *

1 point

- ☐ $G_i = A_i + B_i$
- ☒ $G_i = A_i \cdot B_i$
- ☐ $G_i = A_i \oplus B_i$
- ☐ $G_i = A_i - B_i$

For the inverting amplifier if $R_F = 10 \text{ K}\Omega$ and $R_1 = 1 \text{ K}\Omega$. Calculate the closed-loop voltage gain A_F of the amplifier and the feedback factor β . *

1 point

- ☐ 2
- ☐ 4
- ☐ .01
- ☒ 0.091

In case of depletion type N-channel MOSFET, when it is working in Depletion mode then gate should be.... *

1 point

- ☒ Negative potential
- ☐ Positive potential
- ☐ Zero potential
- ☐ Either it may be positive or negative



The binary subtraction of $0 - 1 = ?$ *

1 point

- ☐ Difference = 0, borrow = 0
- ☐ Difference = 1, borrow = 0
- ☐ Difference = 0, borrow = 1
- ☒ Difference = 1, borrow = 1

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