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Embedded Electronics degree apprenticeship, year 1

Signals and Systems Exam

ACDA4009

1)

a.) SPI (Serial Peripheral Interface)

b.) Master-Slave architecture (with single master).

c.) SCLK $\Rightarrow$ Synchronised Clock: a consistent clock pulse with peaks and troughs at regular intervals, allowing the processing* of information to be synchronised within the network

*and transmission

MOSI $\Rightarrow$ Master Out, Slave In. A data line that allows the master to transmit data for the slaves to receive.

MISO $\Rightarrow$ Master In, Slave Out. A data line that allows the slave to transmit data and the master to receive

/SS1 $\Rightarrow$ Slave Select 1, a signal that the master sends to slave 1 when it wants ~~slave 1~~ that peripheral to transmit data on the MISO line.

/SS2 $\Rightarrow$ Slave select 2, a signal that the master sends to slave 2 when it wants that peripheral to transmit data on the MISO line.

2.) A) a) An inverting amplifier

b) $\text{Gain} = -\frac{R_f}{R_i}$

c) $\text{Gain} = \frac{-24,000}{6,000} = \underline{\underline{-4}}$

d) $O_p = I_p \times A_v$
 $= 0.2 \times -4$

$O_p = \underline{\underline{-0.8 \text{ V (peak to peak)}}}$

e) The output signal will be 180° out of phase with the input signal.

B.) a) A non-inverting amplifier

b) $\text{Gain} = 1 + \frac{R_f}{R_i}$

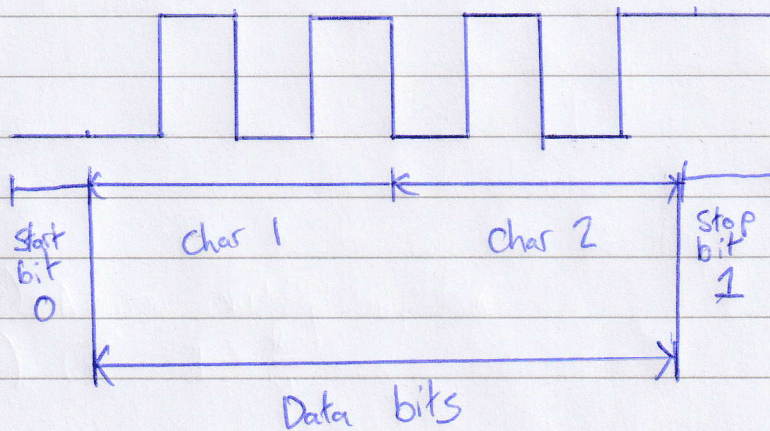
c) $\text{Gain} = 1 + \frac{24,000}{6,000} = 1 + 4 = \underline{\underline{5}}$

d) $O_p = I_p \times A_v$
 $= 0.11 \times 5$
 $= \underline{\underline{0.55 \text{ V (peak-peak)}}}$

e) The output and input signals will be in phase

- 3.)
- a) RS232
 - b) Point-to-Point transmission protocol
 - c) for transmitting ~~char~~ ASCII characters onto a terminal
 - d) 0xAA
 $A_{16} = 10_{10}$
 $= 1010_2$

0 0101 0101 1



8.)

4.)

A.)

a.)

0 1 0 0 0 1 1 0 0 1
| |
start bit data bits stop bit

b.)

1000

1100

0001

0011

#

Hex 1

Hex 3

Hex 31 ~~is character~~ 1

b.) Hex 31 = character "1"

B.)

a.)

0110001001

0010 0011

0x23

b.) 0x23 is character "#"