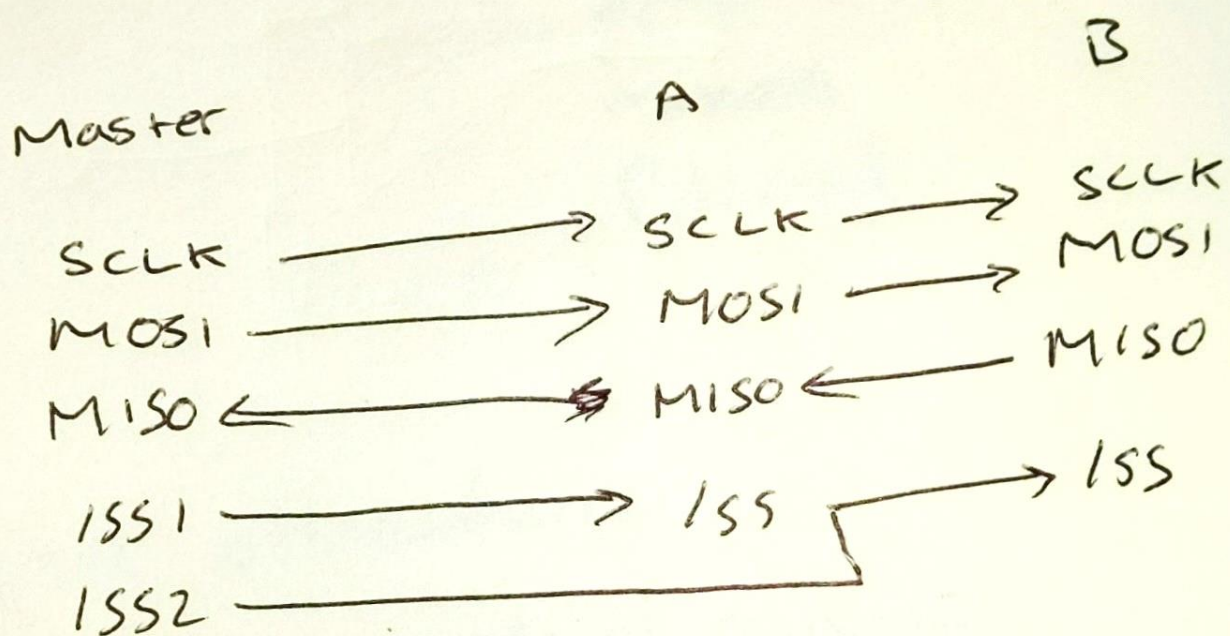


ACDA 4009

2 JULY 2022

SIGNALS and SYSTEMS



a) identify the transmission protocol

SPI

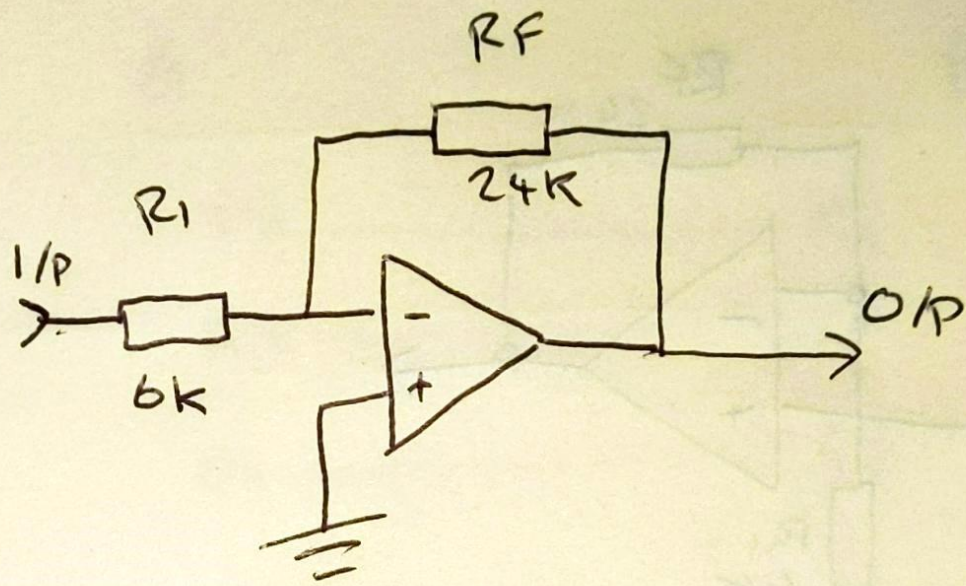
b) classify

point to many

c)

- SCLK → Serial clock
- MOSI → Master out Slave in
- MISO → Master in Slave out
- SS → Slave Select

2)a.



a) inverting opamp

b) $\text{Gain} = -R_F / R_1$

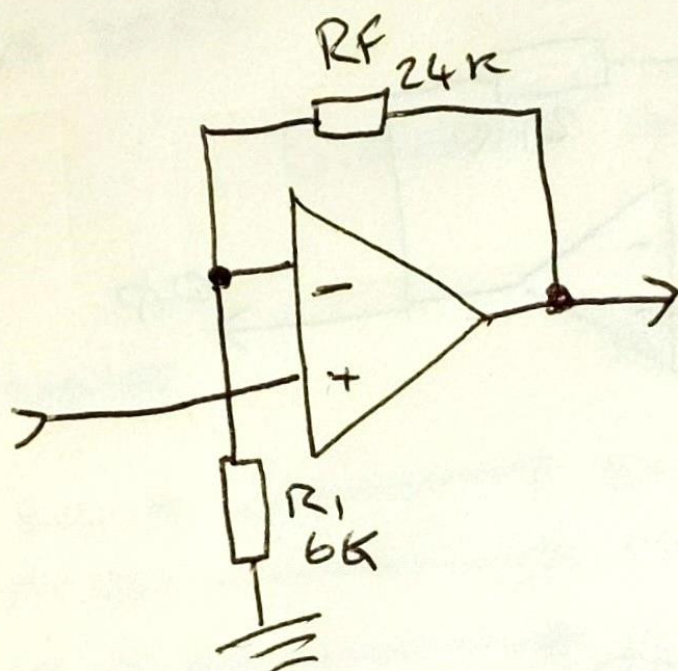
c) $\frac{-24k}{6k} = -4$

d) if $0.2V$ P-P input

output $0.8V$ inverted

e) 180° out of phase

b



a) non-inverting amplifier

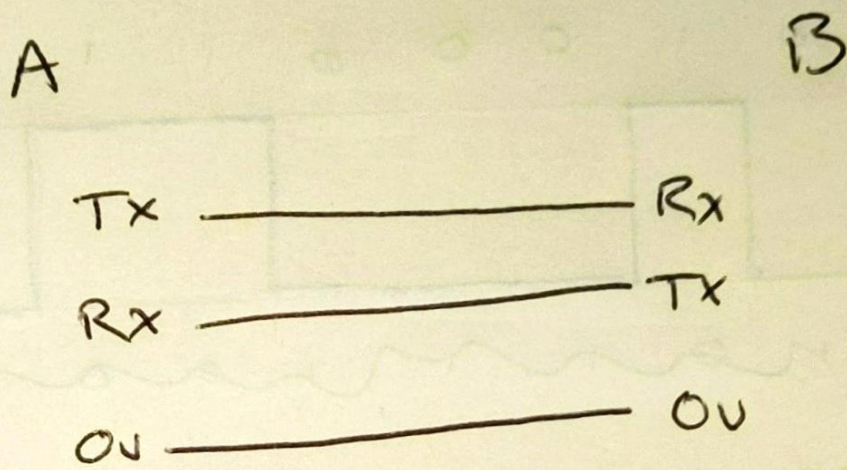
b) $\text{gain} = 1 + \frac{R_F}{R_1}$

c) $\text{gain} = 1 + \frac{24k}{6k} = 5$

d) 0.11 V p-p input
out 0.55 V p-p

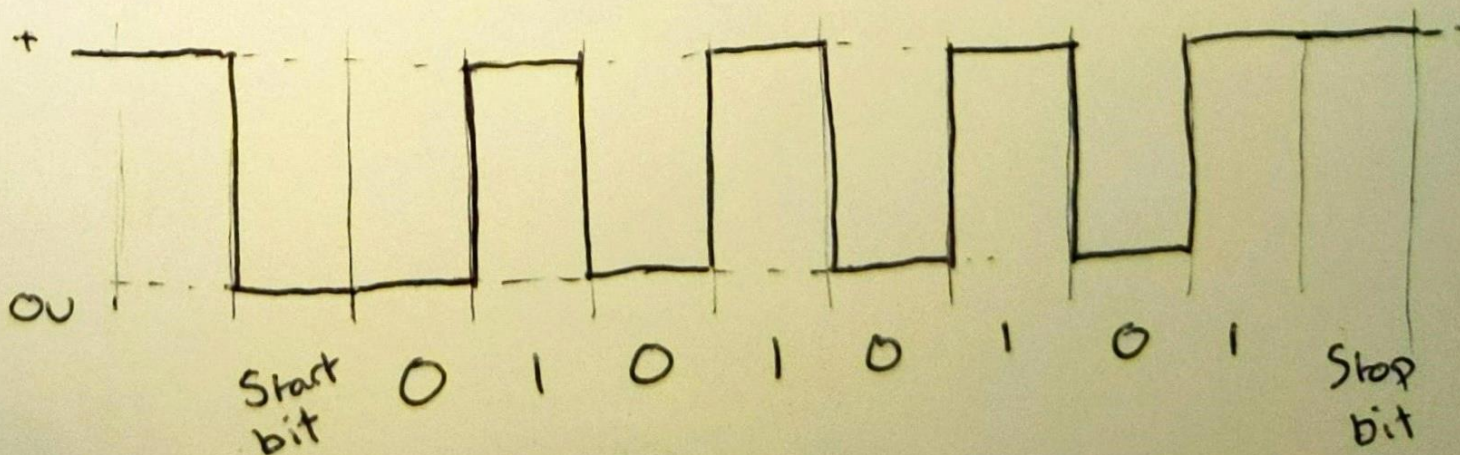
e) 0° in phase

3)

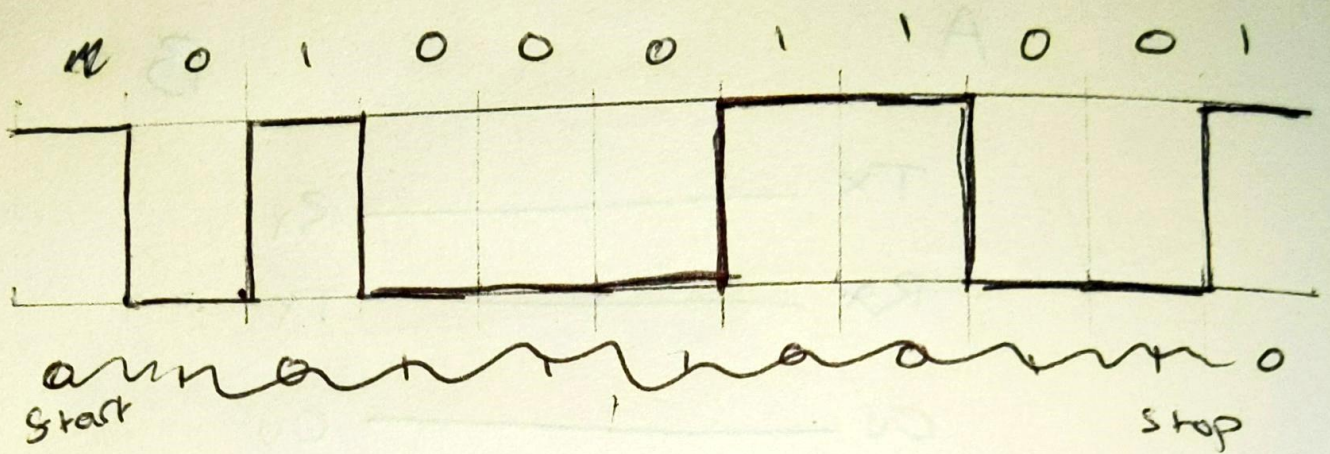


- RS-485
- point to point
- transmission of data between embedded systems up to 4000 ft apart
-

0xAA → 1010 1010
 ↘ ↙
 0101 0101

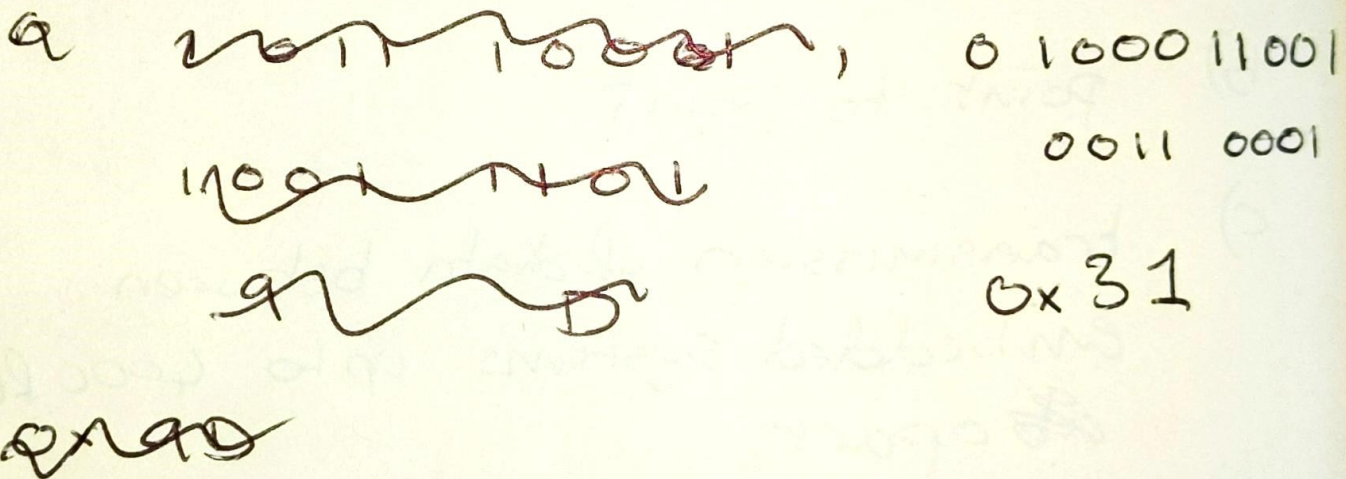


4) a



RS 232 signal

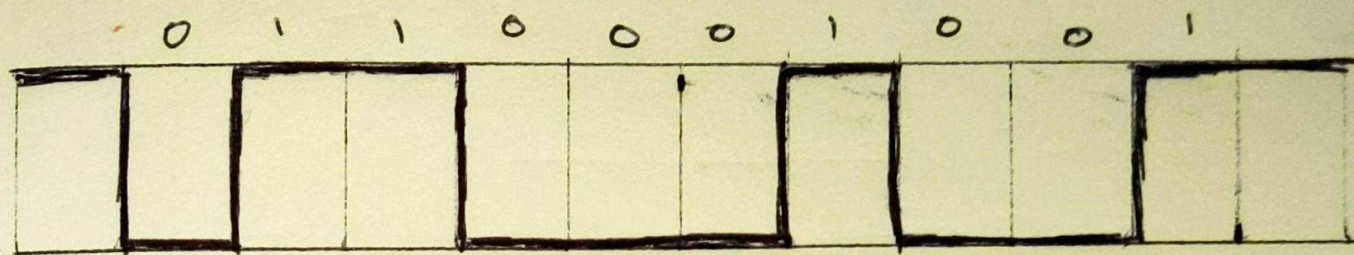
a)



b)

$$0x31 = \text{ASCII}(1)$$

4b)



RS232

a) 0 1100 0100 1

0010 0011

0x 2 3

b 0x23 = ascii(#)