

Q1).

a). SPI Transmission protocol.

b). Point to point

c). SCLK - Serial clock - used to keep the master and slave in phase and in sync when transmitting or receiving which allows them to receive each data byte correctly.

MOSI - Master out slave in - used to send the data/signal to the slave peripheral.

MISO - master in slave out - used to read data/signal to the master unit from the slave peripheral.

SS - slave select

- This is used to select which slave peripheral you want to send the data to. The main/master will have two SS outputs as there is two slave peripherals.

Q2) (A)

a). Inverting Amplifier

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

c). $\text{Gain} = -24/6$
 $= -4$

d). $0.2 \times -4 = 0.8$ peak to peak

e). ~~the~~ The signal will be 180° out of phase.

Q2). (B)

a). Non-inverting Amplifier.

b). $\text{Gain} = 1 + R_F/R_1$

$$\begin{aligned} \text{c). Gain} &= 1 + 24/6 \\ &= 5 \end{aligned}$$

d). $0.11 \times 5 = 0.55$ peak to peak!

e). The ^{input} signal ~~is~~ remains in phase with the output.

Q3).

a). RS232 Transmission Protocol.

b). Point to point

c). Connecting data terminal equipment to data communication equipment.
F. E from a personal computer to a printer. This method is outdated now.

d). Hex AA

8421 8421

 $A \mid A$

1010	1010
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1

Flip 

01010101 $\xrightarrow{\text{pad's start F, end bit}}$ 0010101011

$\xleftarrow{\text{Data}}$ $\xrightarrow{\text{Data}}$

End bit
← (1)

Start
bit
(0)

Q4).

(A)

a).

0100011001 $\xrightarrow{\text{Remove start, end bit}}$ 10001100 $\xrightarrow{\text{Flip}}$ 00110001

Data
↓

b).

8 4 2 1	8 4 2 1
0011	0001
3	1

→ 0x31 → 1

Hex character

(B)

a).

0110001001 $\xrightarrow{\text{Remove start, end bit}}$ 11000100 $\xrightarrow{\text{Flip}}$ 00100011

Data
↓

b).

8 4 2 1	8 4 2 1
0010	0011
2	3

→ 0x23 → #

Hex character