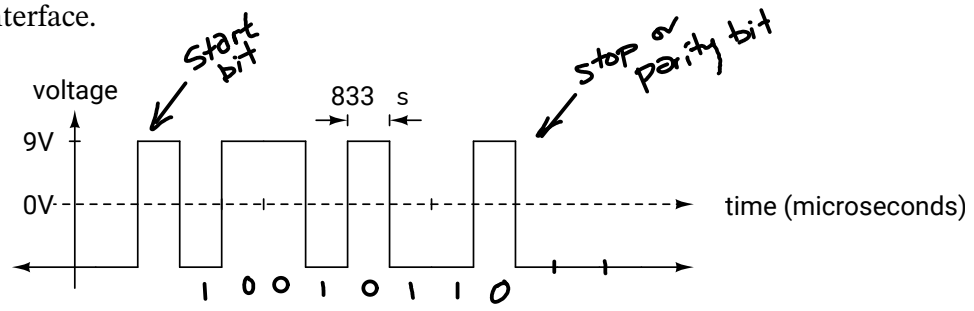
ELEX 3525 Quiz 2 **Paper, 1** A00123456 (0)

Show your work and underline your final answer. Numeric answers must include units. Books, notes and calculators allowed. No other electronic devices allowed.

1. You observe the following waveform being *output* on the RxD pin of an asynchronous ("RS-232") interface.



(a) What value was transmitted? Give your answer as a hexadecimal number.

from m.s. to l.s. bit:

$$\underbrace{0110}_{6}\ \underbrace{1001}_{9} = \underline{\underline{0x69}}$$

(b) What was the bit rate?

$$\frac{1}{833\times10^{-6}} \approx \underline{\underline{1200\ bps}}$$

(c) Is this interface wired as a DTE or DCE? Explain (briefly) your choice.

on a DCE RxD is an output
∴ this port must be wired as a DCE.

2. You measure a noise signal with a DMM and find it has a DC voltage of 2 V and an AC (RMS) voltage of 3 V. Assuming the noise has a Gaussian distribution, what fraction of the time is the noise voltage negative (less than zero)?

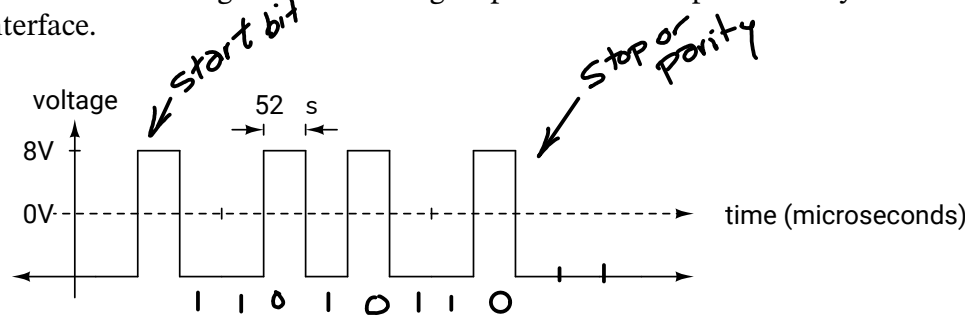
DC voltage is mean (average) $= \mu = 2V$
AC (RMS) voltage is std. deviation $= \sigma = 3V$
P(voltage < v = 0 V)?

normalized threshold $= t = \frac{0-\mu}{\sigma} = \frac{0-2}{3} \approx -0.66$

from graph in Lecture 3,
P(noise <− 0.66) ≈ 25 %

Show your work and underline your final answer. Numeric answers must include units. Books, notes and calculators allowed. No other electronic devices allowed.

1. You observe the following waveform being *output* on the TxD pin of an asynchronous ("RS-232") interface.



   (a) What value was transmitted? Give your answer as a hexadecimal number.

in order from m.s. to l.s:

$$\underbrace{0110}_{6}\ \underbrace{1011}_{B} = \underline{\underline{0x6B}}$$

   (b) What was the bit rate?

$$\frac{1}{52 \times 10^{-6}} \approx \underline{\underline{19{,}200 \text{ bps}}}$$

   (c) Is this interface wired as a DTE or DCE? Explain (briefly) your choice.

on a DTE TxD is an output
∴ this port must be wired as a DTE.

2. You measure a noise signal with a DMM and find it has a DC voltage of 1 V and an AC (RMS) voltage of 1.5 V. Assuming the noise has a Gaussian distribution, what fraction of the time is the noise voltage negative (less than zero)?

DC voltage is mean (average) $= \mu = 1$ V
AC (RMS) voltage is std. deviation $= \sigma = 1.5$ V
P(voltage < v = 0 V)?

normalized threshold $= t = \frac{0 - \mu}{\sigma} = \frac{0-1}{1.5} \approx -0.66$

from graph in Lecture 3,
P(noise < −0.66) ≈ 25 %