

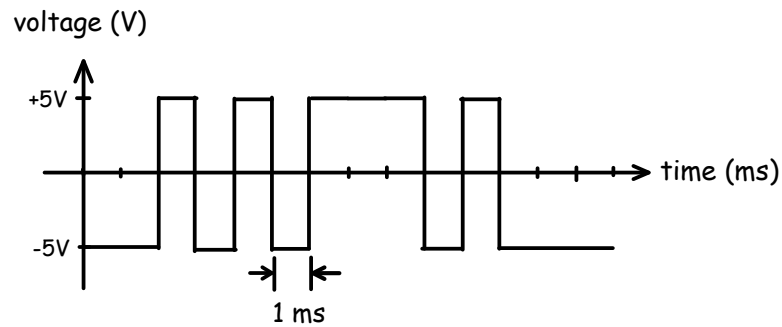
MID-TERM EXAMINATION
9:30 – 10:20 AM
April 15, 2014

This exam has three (3) questions on two (2) pages. The marks for each question are as indicated. There are a total of 12 marks. Answer all questions. Write your answers in the exam book provided. Show your work. Numerical answers must include units. You may answer the questions in any order. Books and notes are allowed. No electronic devices other than calculators are allowed. You may keep this exam paper.

Show your work.

Question 1 (5 marks)

You observe the following “RS-232” serial interface signal:



- (a) What character (glyph) was transmitted assuming one character with 8 data bits was transmitted? Show how you obtained your result.
- (b) What was the bit rate? Show your calculation.
- (c) Do the signal levels comply with the RS-232 standard? Why or why not?

Question 2 (3 marks)

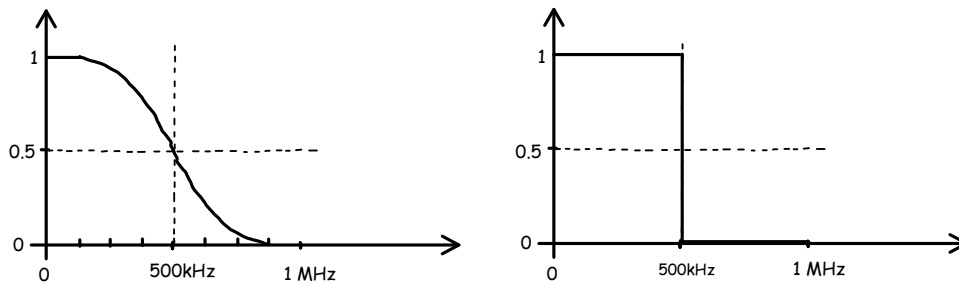
You wish to transmit the bits in the two bytes:

0x5F 0x4F

in MS-to-LS bit order using HDLC framing. The HDLC frame should begin and end with HDLC flags. The HDLC frame should include any bit stuffing required to avoid embedded flag sequences from being interpreted as data. Do not add any other bits to the frame. For example, do not add an HDLC header.

Question 3 (4 marks)

Given the following channel transfer functions:



- (a) What is the maximum symbol rate that could be transmitted without inter-symbol interference (ISI) over the first channel? Over the second channel? Explain how you obtained your answers.
- (b) Which of the two channels above would have a wider “eye” opening?