

ITS 323 – QUIZ 3 (ITB)

First name: _____ Last name: _____

ID: _____

Total Marks: _____

out of 10

Question 1 [3 marks]

An error correcting code maps 2-bits of data into a 4 bit codeword according to the following scheme:

- 00 => 1001
- 01 => 0111
- 10 => 1011
- 11 => 1100

The Hamming distance is used to correct errors.

For the following received codewords, indicate what the receiver does. That is, either:

- Assumes NO ERROR;
- Successfully DETECTs and CORRECTs error;
- DETECT ONLY, but cannot correct;

If NO ERROR or DETECT/CORRECT, indicate the received data.

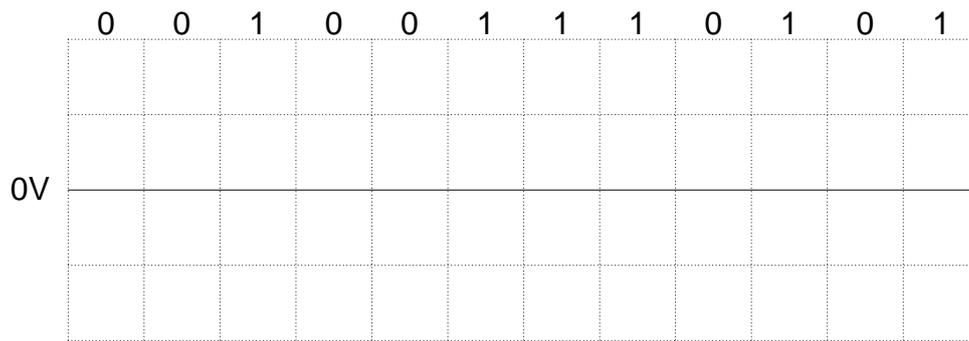
a) 0000 NO ERROR DETECT/CORRECT DETECT ONLY
 Received Data: _____

b) 0101 NO ERROR DETECT/CORRECT DETECT ONLY
 Received Data: _____

c) 1001 NO ERROR DETECT/CORRECT DETECT ONLY
 Received Data: _____

Question 2 [2 marks]

Draw the analog signal used to transmit the digital data below if Frequency Shift Keying is used.

**Question 3** [2 marks]

A single bit odd parity check is applied to an 8-bit data frame. For the following cases of errors, indicate if the receiver can detect the error or not (circle the answer):

- | | | |
|--|--------|------------|
| a) The parity bit is in error | DETECT | NOT DETECT |
| b) The first bit of the data frame is in error | DETECT | NOT DETECT |
| c) The first two bits of the data frame are in error | DETECT | NOT DETECT |
| d) The first three bits of the data frame are in error | DETECT | NOT DETECT |

Question 4 [3 marks]

What is the maximum throughput of the Stop and Wait Flow Control protocol.

You can assume:

- Data rate is 1Mb/s
- Data frame size is 10,000 bits
- ACK size is 100 bits
- Propagation time is 10msec
- No processing delay