

exam 2020 answers

by Nicholas Regan

FILE	12125_NICHOLAS_REGAN_EXAM_2020_ANSWERS_254542_1723258310.DOCX (1.21M)		
TIME SUBMITTED	11-MAY-2020 03:23PM (UTC+0100)	WORD COUNT	249
SUBMISSION ID	127076371	CHARACTER COUNT	1171

Module code ACDA5000
Communications and protocols
HND Electronic Engineering
Nick Regan



1a) 16Kbps

1b)

1c)



1d)

1e)

2a)

A CRC-enabled device calculates a short, fixed-length binary sequence, known as the *check value* or *CRC*, for each block of data to be sent or stored and appends it to the data, forming a *codeword*.

When a codeword is received or read, the device either compares its check value with one freshly calculated from the data block, or equivalently, performs a CRC on the whole codeword and compares the resulting check value with an expected *residue* constant.

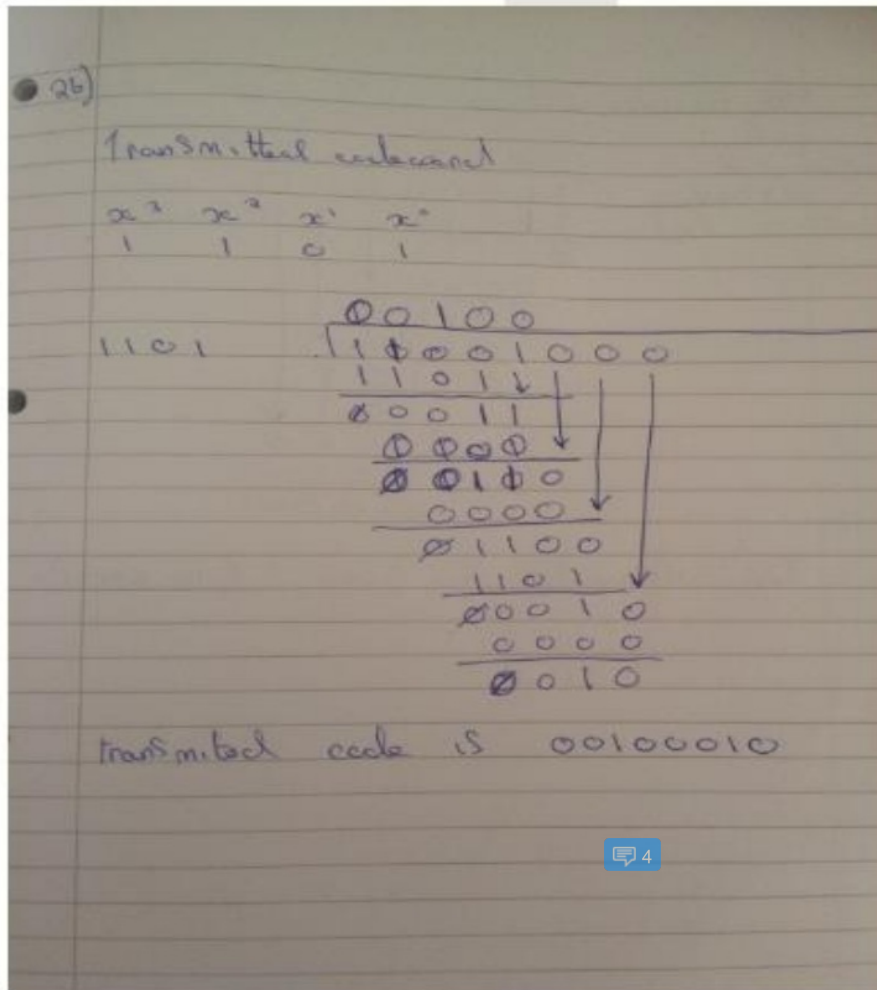
If the CRC values do not match, then the block contains a data error.

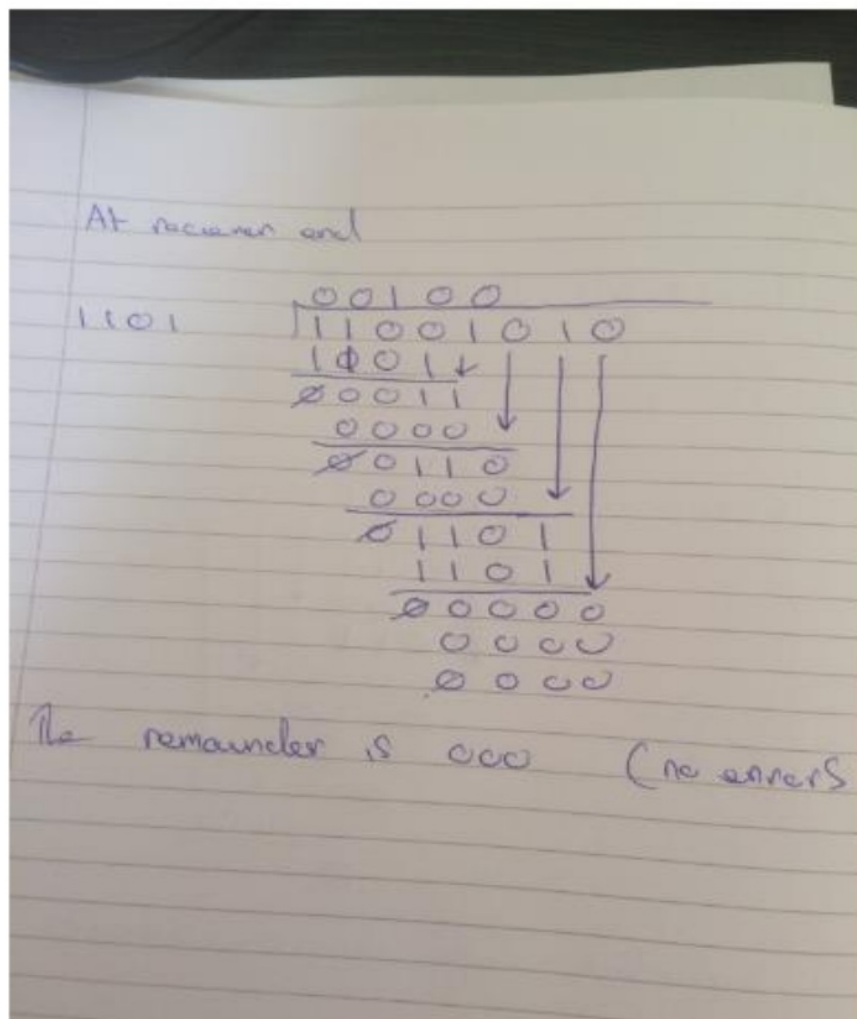
The device may take corrective action, such as rereading the block or requesting that it be sent again. Otherwise, the data is assumed to be error-free (though, with some small probability, it may contain undetected errors; this is inherent in the nature of error-checking)

This has a good effect on transmitted data as it can detect and correct errors in data however this could take a while if data needs to be sent again, also this could prove to be expensive if there is a lot of incorrect data. This could also have a bad effect if there is a problem with the device.



2b)





2c) the main difference between selective repeat and go-back-n is that go-back-n re transmits all the frames where as selective repeat re transmits only the frame that is damaged

5

6

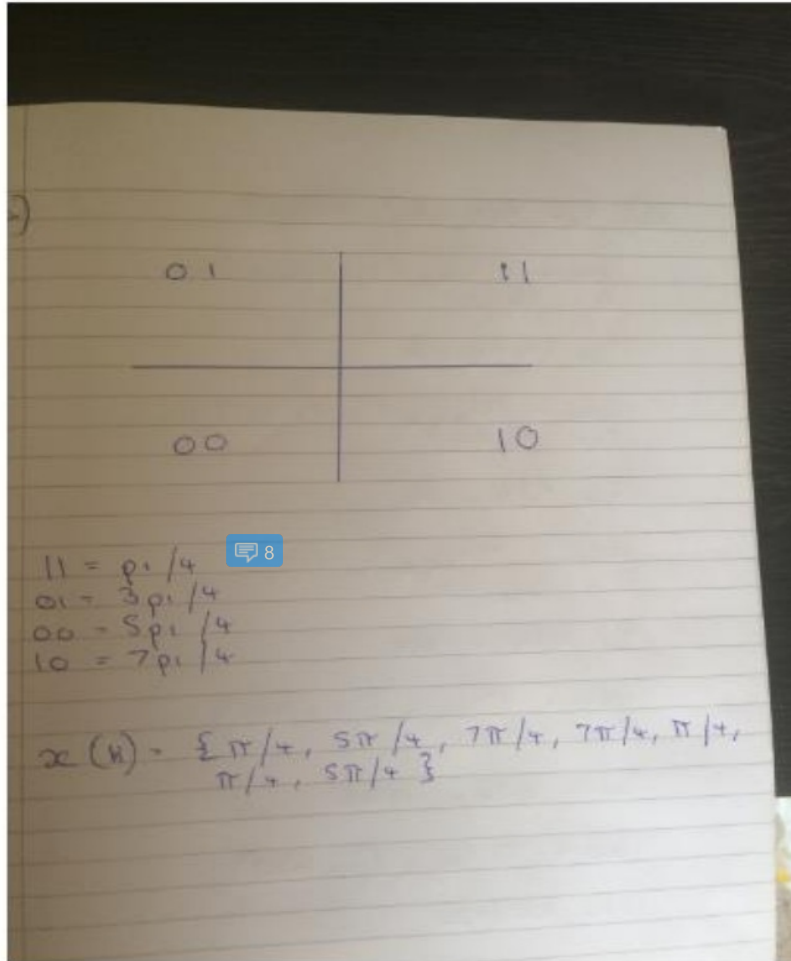
3a)



b)

c)

4a)



4b)

4b) For $S/N = 1$

$$1000 = B \log_2 (1+1) \text{ bits/sec}$$
$$B = 1 \text{ kHz}$$

For $S/N = 3$

$$1000 = B \log_2 (1+3) \text{ bits/sec}$$
$$B = 500 \text{ Hz}$$

For $S/N = 15$

$$1000 = B \log_2 (1+15)$$
$$B = 250 \text{ Hz}$$

For $S/N = 255$

$$1000 = B \log_2 (1+255)$$
$$B = 125 \text{ Hz}$$

For $S/N = 1023$

$$1000 = B \log_2 (1+1023)$$
$$B = 100 \text{ Hz}$$

4c)

4a) The Generator Matrix

$$\bar{G} = \begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 1 & 1 \end{array}$$

$u_1 = [0101] \cdot \bar{G}$

$$1 = [0101000]$$

$u_2 = [1101] \cdot \bar{G}$

$$= [1101010]$$

$u_3 = [1010] \cdot \bar{G}$

$$= [1010011]$$

FINAL GRADE

GENERAL COMMENTS

Instructor

45/100

PAGE 1



Comment 1

Total Marks = 36

Marks Available = 80

$36/80 \times 100 = 45\%$



Comment 2

Question 1

a) 0 Marks

b) 0 Marks

c) 0 Marks

d) 0 Marks

e) 0 Marks

If the system samples a signal every 125us and digitises is to 8 bits then it needs to transmit 8 bits every sample period so the bit period is $125\text{us}/8 = 15.625\text{us}$ and the bit rate is $1/15.625\text{us} = 64\,000$ bps



Comment 3

Q2 a) 4 Marks

PAGE 2



Comment 4

Q2b) 9 Marks

Transmitted codeword should be original data shifted plus remainder, as you have written it in the receiver sum below.

11001010

PAGE 3



Comment 5

Q2 c) 4 Marks



Comment 6

Q2 total 17 Marks

PAGE 4



Comment 7

Q3

a) 0 Marks

b) 0 Marks

c) 0 Marks

Q3 total = 0 Marks



Comment 8

Q4 a) 6 Marks

PAGE 5



Comment 9

Q4b) 3 Marks

No definition of Shannon's Noisy Channel Coding Theorem.



Comment 10

Q4 c) 10 Marks



Comment 11

Question 4 total 19 Marks