Started on Tuesday, 12 December 2023, 2:15 PM State Finished Completed on Tuesday, 12 December 2023, 3:00 PM Time taken 44 mins 35 secs Grade 40.00 out of 100.00 Question 1 Given a linear binary code with following parity check matrix: Correct Mark 10.00 out of 10.00 At the transmitter side message vector $\mathbf{u} = (001)$ is transmitted, F Flag question while at the receiver side vector $\mathbf{v} = (11001)$ is received. Determine the error vector which is added to the transmitted codeword when passing through the noisy channel! (10p) Expected format: sequence of zeros and ones with brackets, for example: (1001001) or (11111). (The vectors in the examples do not necessarily have the same dimension as the solution!) Answer: (11111) The correct answer is: (11111) Question 2 Determine what error vector will be identified at the receiver side Partially correct by running the error correction algorithm! (5p) Mark 1.00 out of Expected format: sequence of zeros and ones with brackets, for 5.00 example: (1001001) or (11111). (The vectors in the examples do not Flag question necessarily have the same dimension as the solution!) Answer: (10111) The correct answer is: (01000) Question 3 What is the detected message vector at the receiver side? (5p) Incorrect Expected format: sequence of zeros and ones with brackets, for Mark 0.00 out of example: (1001001) or (11111). (The vectors in the examples do not 5.00 necessarily have the same dimension as the solution!) F Flag question Answer: (11001) The correct answer is: (100) Question 4 Indicate the correct statements by a tick! (20p) Incorrect To score 20p you must indicate all the correct statements, Mark 0.00 out of otherwise Op is given! 20.00 Flag question

Select one or more:

a. At the receiver side of the generic binary error



×

Question 4

Incorrect

Mark 0.00 out of 20.00

F Flag question

Indicate the correct statements by a tick! (20p)

To score 20p you must indicate all the correct statements, otherwise Op is given!

Select one or more:

- a. At the receiver side of the generic binary error correcting coding scheme we always pick the detected codeword which has the maximum Hamming distance with the received vector.
- b. The public key of RSA algorithm includes the multiplication of two prime numbers.
- c. The average code length achieved by the Huffman code cannot be smaller than the source entropy.
- d. In the case of public-key cryptography the receiver deciphers the cyphertext by his public key.
- e. In the case of binary linear codes, we always pick that error vector from the group of error vectors belonging to the same syndrome vector which has maximal weight.

The correct answers are:

The average code length achieved by the Huffman code cannot be smaller than the source entropy.,

The public key of RSA algorithm includes the multiplication of two prime numbers.

Question 5

Incorrect

Mark 0.00 out of 6.00

Flag question

Given a source with the following distribution:

 $p_1 = 0.08333$

 $p_2 = 0.41666$

 $p_3 = 0.41666$

 $p_4 = 0.0833\dot{3}$

What is the average codelength if we compress the source by Huffman coding? (6p)

Expected format: a number, between 0 and 1, rounded to two decimal places, for example: 0.901 or 0.034

Answer: 0.750

The correct answer is: 1.75

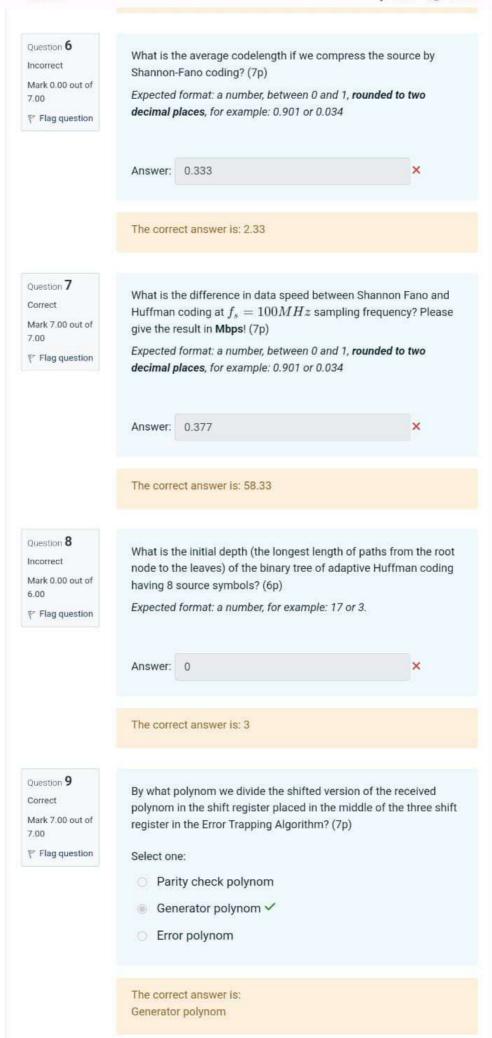
Question 6 Incorrect

Mark 0.00 out of 7.00

Flag question

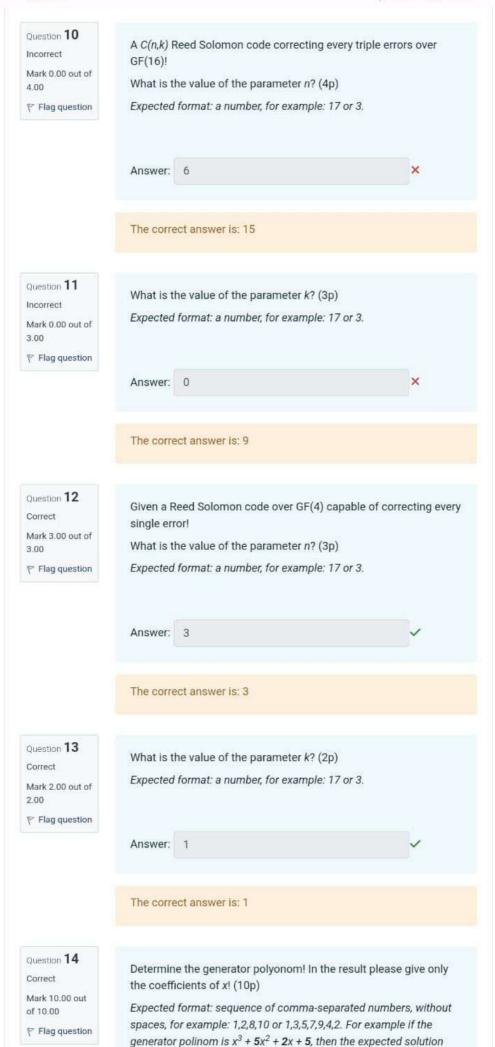
What is the average codelength if we compress the source by Shannon-Fano coding? (7p)

Expected format: a number, between 0 and 1, rounded to two decimal places, for example: 0.901 or 0.034



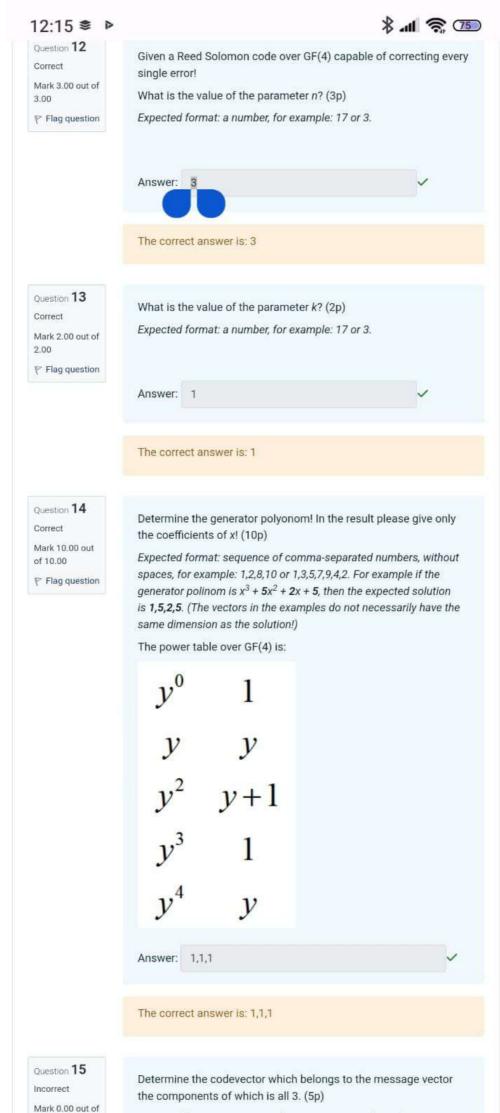
Question 10

A C(n,k) Reed Solomon code correcting every triple errors over



is 1,5,2,5. (The vectors in the examples do not necessarily have the

same dimension as the solution!)



Expected format: sequence of comma congreted numbers in

Question 13

Correct

Mark 2.00 out of 2.00

Flag question

What is the value of the parameter k? (2p) Expected format: a number, for example: 17 or 3.

Answer: 1

The correct answer is: 1

Question 14

Correct

Mark 10.00 out of 10.00

Flag question

Determine the generator polyonom! In the result please give only the coefficients of x! (10p)

Expected format: sequence of comma-separated numbers, without spaces, for example: 1,2,8,10 or 1,3,5,7,9,4,2. For example if the generator polinom is $x^3 + 5x^2 + 2x + 5$, then the expected solution is 1,5,2,5. (The vectors in the examples do not necessarily have the same dimension as the solution!)

The power table over GF(4) is:

$$y^{0} \qquad 1$$

$$y \qquad y$$

$$y^{2} \qquad y+1$$

$$y^{3} \qquad 1$$

$$y^{4} \qquad y$$

Answer: 1,1,1

The correct answer is: 1,1,1

Question 15 Incorrect

Mark 0.00 out of

Flag question

Determine the codevector which belongs to the message vector the components of which is all 3. (5p)

Expected format: sequence of comma-separated numbers, in brackets, without spaces, for example: (1,2,8,10) or (1,3,5,7,9,4,2).

Answer: (3,3,2,3,3)

The correct answer is: (3,3,3)

Finish review