كلية التقنية الالكترونية
College of Electronic Technology - Tripoli
القسم:الاتصالات
لطلبة الفصل: السادس

أسئلة الامتحان النهائي لمادة : نظرية المعلومات والترميز
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اسم الطالب :........................
رقم القيد ....

Answer all the following questions

Q1. a- **(8 marks)** Consider the following codes:

Symbol	Code I	Code II	Code III
S0	0	0	00
S1	01	11	10
S2	011	01	111
S3	1111	11	01

For each code identify whether the code is: (i) distinct, (ii) instantaneous.

b- **(12 marks)** Design a code using the Shannon-Fano algorithm to encode a memoryless Source with 8 symbols using a binary encoded alphabet {0,1}, and calculate its efficiency. A sample of the source output is:-

ABCDEDAABBCCFGGHHA

a- **(8 marks)** Encode the following messages using Zero suppression:

60000000000020000000000003

b- **(12 marks)** Decode:

$$(0,0)a$$
$$(0,0)b$$
$$(0,0)r$$
$$(3,1)a$$
$$(4,3)c$$
$$(2,1)d$$
$$(7,4)$$

If it was encoded using (LZ77)

Q3.a- (8 marks) What is the minimum distance d_{min} for the set of codewords:

$$0001101$$
$$1110010$$
$$0110100$$

And how many errors can be detected d_d , corrected d_c ?

b- (12 marks) For the given binary cascaded symmetric channels:

(i) At the output of the first channel, find: $p(Y=1|X=1)$, $p(Y=0,X=0)$, $p(Y=0)$
(ii) At the output of the second channel, find: $p(Z=0|X=0)$, $p(Z=1,X=1)$, $p(Z=0)$