



Staple!

NT-Cryptography  
MAT4930 2H22  
MAT6932 21BH

Class-X

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Ord: \_\_\_\_\_

X5: \_\_\_\_\_ 155pts

Total: \_\_\_\_\_ 155pts

Please PRINT your name and ordinal. Ta:

Ord: \_\_\_\_\_

Please fill-in every *blank* on this sheet.

\_\_\_\_\_

**X5:** Show no work. Write DNE in a blank if the described object does not exist or if the indicated operation cannot be performed.

**a** Bitstring “000100010111111101101001”, via the Elias code, decodes to \_\_\_\_\_,

a sequence of *natnums* [hint: gun-blip-blip], followed by noise-bits \_\_\_\_\_.

Conv, Elias(84)= \_\_\_\_\_ (bitstring)

\_\_\_\_\_

**b** Using dictionary 0:  $\epsilon$ , 1: “1”, 2: “0”, compute

EnZiv(11001010)= \_\_\_\_\_,

in  $\langle 7 \rangle 1 \langle 34 \rangle 0 \dots$  notation. In bits, EnZiv(11001010) is

\_\_\_\_\_

**c** Bits 010010100100001110001101101100111 decode in Idx-form, e.g.  $\langle 7 \rangle 1 \langle 3 \rangle 1 \langle 9 \rangle 0 \dots \langle 3 \rangle 1 \langle 0 \rangle \langle 4 \rangle$ , to

As 15 bits, it is \_\_\_\_\_

having used Ziv seeded with  $\langle 0 \rangle = '0'$ ,  $\langle 1 \rangle = '1'$ , and  $\langle 2 \rangle = '0'$ .

Employing our fivebit-code, the 15 bits decode to symbols \_\_\_\_\_.

\_\_\_\_\_

**d** Consider  $\mathbf{p} := (.11, .14, .16, .19, .40)$ , a probability vector. Give an estimate for distropy  $\mathcal{H}(\mathbf{p}) \approx$

\_\_\_\_\_

as a decimal. A length-tuple  $\vec{\ell}$  [satisfying the binary Kraft Inequality] whose (binary)-ECL barely exceeds this distropy is  $\vec{\ell} = ( \dots, \dots, \dots, \dots, \dots )$ .

Its  $\mathbf{p}$ -ECL is precisely \_\_\_\_\_.

\_\_\_\_\_

End of Class-X