Section - 9. Answer = 3

3-bit Tunstall Code :→ For 3-bit Tunstall Code, the maximum number of codewords in the codebook is $2^3 = 8$.

Symbol	Initial Probability
a_1	0.7
a_2	0.2
a_3	0.1

Taking the symbol with highest probability (i.e., a_1) and concatenate it with every other symbol and remove a_1 from the list. So, the entries in the codebook will be:

Sequence	Probability
a_2	0.2
a_3	0.1
a_1a_1	0.49
a_1a_2	0.14
a_1a_3	0.7

As number of codewords is less than maximum value again apply the same procedure with a_1a_1 (maximum probability)

Sequence	probability
a_2	0.2
a_3	0.1
$a_1 a_2$	0.14
$a_1 a_3$	0.7
$a_1 a_1 a_2$	0.098
$a_1 a_1 a_3$	0.049
$a_1 a_1 a_1$	0.343

We have to ~~stop~~ here as if we apply one more iteration, the number of codeword increase the maximum limit. Thus, the sequence will become:

Sequence	Codeword
a_2	000
a_3	001
$a_1 a_2$	010
$a_1 a_3$	011
$a_1 a_1 a_2$	100
$a_1 a_1 a_3$	101
$a_1 a_1 a_1$	110