

4. Consider the following Finite State Machines.

FSM 1 :- $A[k+1] = \overline{A[k]} + \overline{B[k]}$

$$B[k+1] = A[k]$$

FSM 2 :- $A[k+1] = \overline{B[k]}$

$$B[k+1] = A[k] \cdot \overline{B[k]}$$

FSM 3 :- $A[k+1] = A[k] \oplus B[k]$

$$B[k+1] = \overline{B[k]}$$

Now assume at every time instance, the probability of choosing one of the above three FSMs is $= \frac{1}{3}$.

- a) Find out the entropy rate.
- b). If the system is erroneously assumed to be discrete memoryless source, find out the entropy and compare with the entropy rate found in a).
- c) Design the optimal Huffman code.