

(3 Hours)

[Total Marks: 80]

- N.B. : (1) Question No.1 is compulsory
 (2) Attempt **any three** from the remaining
 (3) Assume suitable data if necessary

- 1 Solve **any four** :- 20
 - (a) State and explain information capacity theorem
 - (b) Differentiate between systematic and non-systematic codes
 - (c) What is inter channel and inter symbol interference
 - (d) Compare BPSK and DPSK
 - (e) State and explain sampling theorem.
- 2 (a) Define Entropy. Derive an expression for entropy. 10
 - (b) What is Duo-Binary encoder with precoder. Explain with a example. 10
- 3 (a) Explain coherent binary FSK transmitter and receiver with signal space diagram. 10
 - (b) Draw the block diagram of a satellite earth station and explain the operation 10
- 4 (a) Construct the code for G matrix given below for a (6,3) code. 10

$$G = \begin{bmatrix} 0, 1, 1, 1, 0, 1 \\ 1, 1, 1, 0, 1, 0 \\ 1, 1, 0, 0, 0, 1 \end{bmatrix}$$

Also show that $d_{\min} = 3$

 - (b) What is Matched filter ? Derive error probability of Matched filter 10
- 5 (a) Draw and explain the block diagram for QPSK system 10
 - (b) Sketch the transmitted waveform for ASK, FSK and PSK for bit stream 1011001 with carrier waveform in each case. 10
- 6 Write short notes on :-
 - (a) Satellite communication. 10
 - (b) Source coding- Huffman code with example. 10