

MADAN

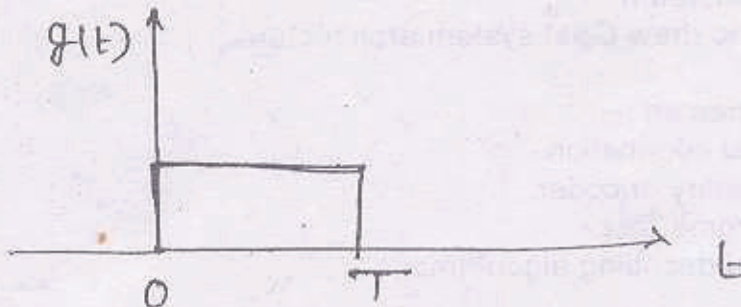
- N.B.** (1) Question No. 1 is **compulsory**.
 (2) Solve any **four** questions out of the remaining **six** questions.
 (3) Figures to the **right** indicate **full marks**.

1. (a) State and explain information capacity theorem. 20
 (b) State and explain Kepler's laws of satellite motion.
 (c) Explain and draw binary PSK transmitter.
 (d) Differentiate between systematic and non systematic codes.
2. (a) Define entropy. Derive an expression for entropy. 10
 (b) Explain the working of a two-cavity klystron with a neat sketch. 10
3. (a) A discrete memoryless source has an alphabet of seven symbols whose probabilities of occurrence as described here. 10

Symbol	s_0	s_1	s_2	s_3	s_4	s_5	s_6
Probability	0.25	0.25	0.125	0.125	0.125	0.0625	0.0625

Compute Huffman codes.

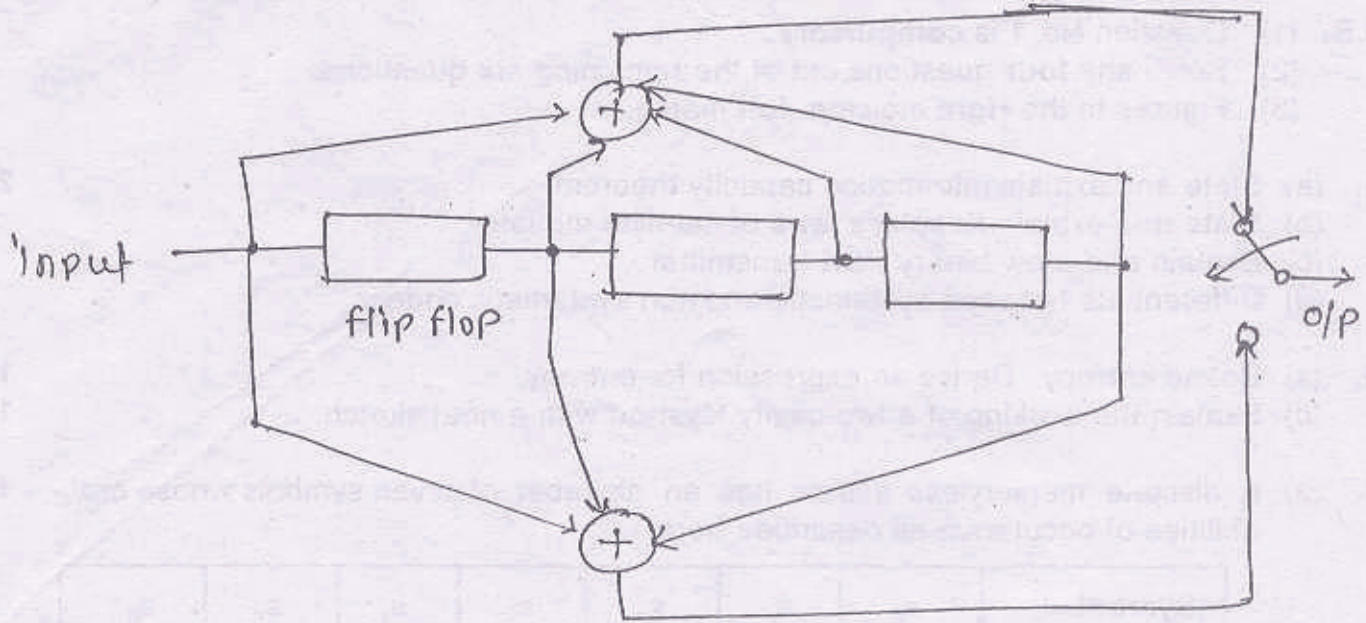
- (b) Explain the properties of matched filter and generate the matched filter output for signal $g(t)$ shown. Explain the generation of o/p. 10



4. (a) Explain coherent binary FSK transmitter and receiver with signal space diagram. 8
 (b) Explain coherent QPSK transmitter and receiver. Draw signal space diagram. Show the QPSK waveform for input bit sequence of 0 1 1 0 1 0 0 0. 12

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5. (a) Construct the code tree for the convolutional encoder of figure shown below. Trace the path through the tree that corresponds to the message sequence 1 0 1 1 1. 10



- (b) Different the followings :- 10
 (i) BPSK and DPSK
 (ii) ISI and ICI.
6. (a) Derive the relation for bit error rate in DPSK. Explain generation and reception of DPSK waveform. 10
 (b) Explain and draw GSM system architecture. 10
7. Write short notes on :- 20
 (a) Mutual Information.
 (b) Duobinary encoder.
 (c) Syndrome Test.
 (d) Viterbi decoding algorithm.