

[This question paper contains 3 printed pages.]

Your Roll No. ....

3227

J

**MECTA**

Paper—CS.502

**BASICS OF ELECTRONICS AND  
COMMUNICATION ENGG.**

*Time : 3 Hours*

*Maximum Marks : 100*

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Answer any five Questions*

*All questions carry equal marks.*

1. (a) State and prove Nyquist Sampling Theorem for low pass signals. 10
- (b) A sinusoidal signal  $A_m \cos(2\pi f_c t)$  is applied to the input of a 'L' level quantizer (uniform). Show that the signal-to-quantization noise ratio in dB will be  
$$10 \log (\text{SNR})_Q = 1.8 + 20 \log L$$
 10
2. In a PCM system binary 1 is represented by V volt and 0 is represented by 0 volt. Assuming AWGN channel with noise spectral density  $N_0/2$  watt/Hz. Derive an expression for probability of bit error. 20

[P. T. O.]

3. Explain the following waveform coding schemes and compare their advantages and disadvantages :

(i) DM

(ii) DPCM 20

4. Consider the signal  $s(t)$  shown in fig. (1).

(i) Determine the impulse response of the matched filter to this signal and sketch it as a function of time.

(ii) Plot the Matched filter output as a function of time.

(iii) Determine the output at  $t = 0$ ,  $t = \frac{T}{2}$ ,  $t = \frac{3T}{2}$  and

$t = T$ . 20

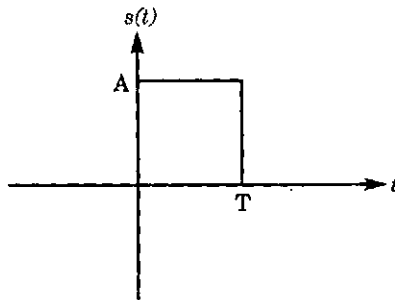


Fig. 1

5. (a) By giving an example, explain in detail the Synchronous Counters and Asynchronous counters.

10

(b) Design a decade counter using J-K flip-flops. 10

6. (a) Describe in detail different types of noise present in digital communication system. 10
- (b) Explain in detail : 10
- (i) ASK
  - (ii) FSK
  - (iii) PSK
  - (iv) QPSK
7. Write notes on any *four* of the following :  $4 \times 5 = 20$
- (a) Adaptive Delta modulation
  - (b) Huffman coding
  - (c) Gaussian Distribution of white noise.
  - (d) Superheterodyne receiver
  - (e) Companding.