



Printed Pages : 3

TIC501

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3095

Roll No.

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**B.Tech**

(SEM V) ODD SEMESTER THEORY EXAMINATION 2009-10  
ANALOG & DIGITAL COMMUNICATION SYSTEM

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1 Attempt any two of the following :  $10 \times 2 = 20$ 

- (a) Show that for a R-C low pass filter, the noise bandwidth  $B_N$  and system bandwidth  $B_{3dB}$

$$\text{are related as : } B_N = \frac{n}{2} B_{3dB}$$

Also give the reasons why a cascade amplifier has improved noise performance.

- (b) Define and explain noise figure. Explain the sources of noise with suitable illustrations and examples.
- (c) Obtain a relationship for available power of an R-L-C networks. Prove that the available noise power is independent of the source resistance.

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[Contd...

2 Attempt any two of the following : 10×2=20

- (a) Show that the collector circuit efficiency in a collector modulation remains unchanged after modulation.
- (b) Prove that an AM system using synchronous detection does not suffer from the threshold effect.
- (c) List the various types of AM transmitters. Explain each category with suitable illustrations.

3 Attempt any two of the following : 10×2=20

- (a) Compare AM and FM for common channel interference, channel bandwidth and transmission efficiency.
- (b) A single tone modulating signal  $E_m \cos W_{mt}$  frequency modulates a carrier  $A \cos w_{ct}$ . Obtain figure of merit  $Y$  and also prove that the detector output signal to noise ratio is proportional to the square of bandwidth of the Fm signal.
- (c) What are the basic types of FM discriminators? Explain each with suitable illustrations and examples.

4 Attempt any two of the following : 10×2=20

- (a) Explain synchronous and asynchronous time division multiplexing of PCM signals with suitable examples and their illustrations.

- (b) What is quantisation error? How does it depend upon the step size? What are the methods to overcome the difficulties encountered when the modulating signal amplitude swing is large?
- (c) Define Shannon-Hartley theorem. Use this theorem to derive capacity of a Gaussian channel.

5 Write technical notes on any two of the following : 10×2=20

- (a) Narrow band vs broad band communication
- (b) Fibre optical communication
- (c) Optimum Filters and their applications.