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 :   **10×2=20**

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

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

        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.

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)   Fible optical communication

(c)   Optimum Filters and their applications.