00925

DEGREE IN ELECTRONICS AND COMMUNICATION ENGINEERING

Term-End Examination

June, 2012

BIEL-014 : ANALOG COMMUNICATION

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** question.*
*(ii) Use of scientific calculator is **allowed**.*

1. The random Variable z is Uniformly distributed having a Probability density function, **10**

$$fz(z) = \begin{cases} 1/2, & -1 \le z \le 1 \\ 0 & \text{other wise} \end{cases}$$

Show that the random variable $x = z$ and $y = z^2$ are uncorrelated despite of the fact that they are statistically dependent.

2. (a) A 400 w carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave. **4**

(b) Explain briefly the Balanced modulator method for DSB - SC generation. **6**

3. Describe the phase discrimination method for generating an SSB modulated wave. **10**

4. Discuss how the VSB modulation is used in Commercial TV signal. Discuss its merits and demerits. **10**

5. Determine the permissible range in maximum modulation index for : **10**
   (a) commercial FM that has 30 Hz to 15 kHz modulating frequencies.
   (b) narrow - band system that allows maximum deviation of 10 kHz and 100Hz to 3 kHz modulating frequencies.

6. What is a slope detector ? What is the need for balanced slope detector ? Explain it briefly. **10**

7. (a) What is thermal noise ? Write the expression for thermal noise generated in a Resistor. **5**
   (b) What is Pre - emphasis and Deemphasis in FM ? **5**

8. (a) A Receiver connected to an antenna whose resistance is 60Ω and has an equivalent noise resistor of 30Ω. Calculate the equivalent noise temperature. **5**
   (b) Describe the non-linear effects in FM systems. **5**

9. Derive an expression for figure of Merit for FM system. **10**

10. Write short notes on ***any two*** **2x5=10**
   (a) PLL
   (b) FDM
   (c) Central limit theorem