B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

00090   December, 2014

BIEL-014 : ANALOG COMMUNICATION

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. (a)   Explain the principles of autocorrelation function.   5

    (b)   Write down the properties of cross-correlation function for energy signals.   5

2. (a)   Differentiate correlation and covariance function briefly with necessary expressions.   5

    (b)   Find the constant c, so that the function

$$f(x) = \begin{cases} c(x-1) & 1 < x < 4 \\ 0 & \text{otherwise} \end{cases}$$

    is a density function. Also evaluate probability $P(2 < x < 3)$.   5

3. (a) Explain the envelope detector technique for AM demodulation with suitable diagram. 5

(b) Discuss square-law detector technique for DSB-SC signal with suitable diagram. 5

4. (a) An AM broadcast radio transmitter radiates 10 kW of power, if modulation percent is 60. Calculate how much of this is the carrier power. 5

(b) How can you obtain a DSB-SC signal ? What are the demodulation methods for DSB-SC signal ? 5

5. What is Costa's loop ? How is this used in Costa's receiver for asynchronous detection of AM suppressed carrier system ? *4+6*

6. (a) Explain phase-discrimination method for generating SSB modulated wave. 5

(b) Determine the percentage of power saving when the carrier wave and one of the side-bands are suppressed in an AM wave modulated to a depth of 50%. 5

7. (a) Compare DSB-SC, SSB-SC and VSB-SC modulation schemes. 5

(b) Explain the various applications of vestigial side-band modulation technique. 5

8. (a) Explain the indirect or Armstrong method of FM generation. *5*

(b) A 107·6 MHz signal carrier signal is frequency modulated by a 7 kHz sine wave. The resultant FM signal has a frequency deviation of 50 kHz. Determine the frequency swing of the FM signal and the modulation index of the FM wave. *5*

9. (a) Explain Pre-emphasis and De-emphasis in FM. *5*

(b) Explain Noise figure and equivalent noise temperature with required expressions. *5*

10. Write a short note on any *two* of the following :

2×5=10

(a) PLL

(b) Effect of noise on the performance of receiver

(b) Noise-equivalent bandwidth