No. of Printed Pages : 3

BIEL-014

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

00804

Term-End Examination

June, 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 principle of cross-correlation function with example. *5*

(b) Explain central limit theorem. *5*

2. (a) Write down the expression of auto-correlation function of energy signals and power signals with necessary explanation. *5*

(b) Find the auto-correlation function of the sine wave signal expressed as below : *5*

$$x(t) = A \sin(\omega_1 t + \phi)$$

where $\omega_1 = \frac{2\pi}{t}$

3. (a) What do you mean by coherent and non-coherent detection techniques ? Give an example of each technique. *4+1*

(b) A 400 Watts carrier is modulated to a depth of 75%. Find the total power in the amplitude modulated wave. Assume the modulating signal to be a sinusoidal one. *5*

4. (a) Explain the square-law diode modulation method for AM generation with suitable diagrams. *5*

(b) Explain ring modulation technique for DSB-SC signal with suitable diagrams. *5*

5. (a) What are the advantages and disadvantages of DSB-SC and SSB-SC techniques over VSB-SC ? Explain briefly. *5*

(b) State the properties of Hilbert transform, briefly. *5*

6. Write technical notes on any ***two*** of the following : *2×5=10*

(a) Frequency Translation

(b) Frequency Division Multiplexing

(c) PLL

7. (a) Explain the effect of modulation index variation on the spectrum of FM signal. *5*

(b) The maximum deviation allowed in an FM broadcast system is 75 kHz. If the modulating signal is a single-tone sinusoidal of 8 kHz, determine the bandwidth of FM signal. What will be the bandwidth, when modulating signal amplitude is doubled ? *5*

8. (a) Differentiate narrow band FM and wide band FM. *5*

(b) Explain non-linear effects in FM systems. *5*

9. Determine the noise figure for the cascaded stages of amplifiers with suitable diagrams. *10*

10. (a) Discuss the effect of noise in FM receiver. *5*

(b) An amplifier operating over the frequency range from 18 to 20 MHz has a 10 kΩ input resistor. Calculate the rms noise voltage at the input to this amplifier, if the ambient temperature is 27°C. *5*
