C

Reg. No. : | | | | | | | | | | |

Question Paper Code: 53806

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Information Technology

15UIT306-ANALOG AND DIGITAL COMMUNICATION

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Process of changing the amplitude of carrier proportion with the instantaneous value of modulating signal is called_____ modulation. CO1- R

   (a) Frequency (b) Phase (c) Amplitude (d) Angle

2. In BPSK, the phase difference of output signal and analog carrier when the binary input 0 is applied _____. CO2- R

   (a) 0^0 (b) 90^0 (c) 180^0 (d) -90^0

3. Alising occurs if _____ CO3-R

   (a) $fs \geq 2fa$ (b) $fs = 2fa$ (c) $fs \leq 2fa$ (d) $fs < 2fa$

4. Frequency hopping involves a periodic change of transmission ___ CO4-R

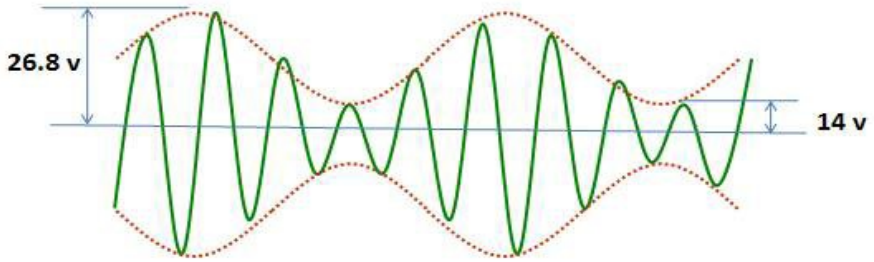
   (a) Signal (b) Frequency (c) Phase (d) Amplitude

5. Syndrome is calculated by CO5-R

   (a) HT/r (b) rHT (c) rH (d) None of the above

PART – B (5 x 3= 15Marks)

6. An AM modulated waveform is shown below. CO1- R



The amplitude of the carrier is 15 V. Determine the modulation index, amplitude of upper and lower side frequencies.

7. Determine peak frequency deviation and bandwidth for a binary FSK signal with a mark frequency of 50 KHz and space frequency of 54 KHz and input bit rate of 4 Kbps. CO2-R

8. State Shannon limit for information capacity. CO3- R

9. Differentiate between TDMA and CDMA. CO4- R

10. Define convolution codes. CO5- R

PART – C (5 x 16= 80Marks)

11. (a) (i) For an AM modulator with modulation index of 0.2 and peak carrier amplitude of 16V. Determine the following CO1- App (8)

(a) Amplitudes of the side frequency components. Plot the frequency spectrum.

(b) If carrier power Pc=2000watt determine the total sideband power and total power present in the AM wave.

(ii) Describe frequency modulation and sketch its waveforms. CO1- App (8)

Or

(b) (i) One input to a conventional AM modulator is a 500kHz carrier with an amplitude of 20V.The second input is a 10kHz modulating signal that is of sufficient amplitude to cause a change in the output of $\pm$7.5V.Determine CO1- App (12)

(a) Upper and lower side frequencies
(b) Modulation coefficient and percent modulation
(c) Peak amplitude of the modulated carrier and the upper and lower side frequency voltages
(d) Maximum and minimum amplitudes of the envelope
(e) Expression for the modulated wave.
(f) Draw the output spectrum
(g) Sketch the output envelope

(ii) Apply the different methods to calculate bandwidth requirements of angle modulated waves. CO1- App (4)

12. (a) For the BPSK and QPSK modulators with a carrier frequency of 70 MHz and an input data rate of 10 Mbps, determine the maximum and minimum upper and lower side frequencies, draw the output spectrum, determine the minimum double sided Nyquist bandwidth, and calculate the baud rate. Also compare the results and analyze which one is the best and give the reasons. CO2-App (16)

Or

(b) Analyze how the FSK demodulator works with coherent, Non coherent and PLL type of methods. CO2-Ana (16)

13. (a) Analyze the operation of each block in PCM transmitter and receiver and explain in detail. CO3-Ana (16)

Or

(b) Analyze a delta modulation technique and its errors in detail. CO3-Ana (16)

14. (a) Explain the principle of DS spread spectrum technique with a suitable diagram. CO4-U (16)

Or

(b) Analyze the slow and fast frequency hopping spread spectrum technique. CO4-Ana (16)

15. (a) Write short notes on CO5- U (16)

(i) Cyclic Codes

(ii)Viterbi Decoding Algorithm.

Or

(b) Given a (7,4) linear block code whose generator matrix is given by CO5- U (16)

$$G = \begin{matrix} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{matrix}$$

(i) Determine the parity check matrix

(ii) Find all the code words