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**Question Paper Code: 43806**

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

Third Semester

Information Technology

14UIT306-ANALOG AND DIGITAL COMMUNICATIONS

(Regulation 2014)

Duration: Threehours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. What is the bandwidth of AM?  
(a)  $F_m$                       (b)  $2F_m$                       (c)  $F_m/2$                       (d)  $4F_m$
2. The modulation index for FM is given as  
(a)  $F_m/\Delta F$                       (b)  $2\Delta F/F_m$                       (c)  $\Delta F/F_m$                       (d)  $\Delta F * F_m$
3. The technique that may be used to increase average information per bit is  
(a) Shannon-Fano algorithm                      (b) ASK  
(c) FSK                      (d) Digital modulation techniques
4. The technique that may be used to increase average information per bit is  
(a) Shannon-Fano algorithm                      (b) ASK  
(c) FSK                      (d) Digital modulation techniques
5. Analog to digital conversion includes  
(a) Sampling                      (b) Quantization  
(c) Both (a) and (b)                      (d) None of these

6. \_\_\_\_\_ transmits only one bit per sample instead of N bits transmitted in PCM.  
 (a) Delta modulation (b) Digital modulation  
 (c) Phase modulation (d) Spread spectrum modulation
7. The quantization error in PCM system has \_\_\_\_\_ distribution  
 (a) Gaussian (b) Uniform (c) Poisson (d) None of them
8. The minimum bandwidth required to transmit the PCM signal is  
 (a) 64KHZ (b) 8 KHZ (c) 16 KHZ (d) 32 KHZ
9. The bandwidth of spread signal is \_\_\_\_\_  
 (a)  $1/T_C$  (b)  $1/T_S$  (c)  $1/T_f$  (d)  $1/T_P$
10. The bandwidth of spread signal is \_\_\_\_\_  
 (a)  $1/T_C$  (b)  $1/T_S$  (c)  $1/T_f$  (d)  $1/T_P$

PART - B (5 x 2 = 10 Marks)

11. Define bandwidth efficiency.
12. List the disadvantages of frequency modulation compared to amplitude modulation.
13. Define bandwidth efficiency.
14. What is the need for error control coding?
15. List the advantages of spread spectrum techniques.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Show the expression for a amplitude modulated wave and draw its spectrum. (8)  
 (ii) A modulating signal  $10\sin(2\pi \times 10^3 t)$  is used to modulate a carrier signal  $20\sin(2\pi \times 10^4 t)$ . Find the modulation index, percentage modulation, frequencies of the sideband components, amplitudes and bandwidth of the modulated signal? (8)

Or

- (b) Derive the voltage and power equation for AMDSBFC and draw its spectrum. (16)

17. (a) Discuss how carrier recovery is achieved by the squaring loop and Costas loop circuits. (16)

Or

(b) Explain the operation of QPSK transmitter and receiver. (16)

18. (a) Write short notes on: (i) Noise and fading (ii) Non-linear sequences. (16)

Or

(b) (i) Discuss the concepts involved in switched telephone channels. (8)

(ii) Explain about light wave system model. (8)

19. (a) Explain the operation of DPCM transmitter and receiver. (16)

Or

(b) (i) Explain the delta and adaptive delta modulation technique with a neat block diagram. (10)

(ii) Define ISI and how it can be minimized. (6)

20. (a) Describe slow and fast frequency hopping. (16)

Or

(b) (i) Describe the application of CDMA in wireless communication system. (8)

(ii) Explain the basic principle of TDMA. (8)

