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

Question Paper Code: 44405

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Electronics and Communication Engineering

14UEC405 - ANALOG COMMUNICATION

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The highest modulation frequency typically used in AM broadcast is

   (a) 5*kHz* (b) 10*kHz* (c) 15*kHz* (d) 25*kHz*

2. Threshold effect is exhibited in the modulation of

   (a) AM (b) DSBSC (c) SSB (d) PPM

3. From bandwidth point of view, narrowband FM is equivalent to

   (a) AM (b) PM (c) SSB (d) DSB SC

4. The signal $cos\omega_c t + 0.5cos\omega_m t sin\omega_c t$ is

   (a) FM only (b) AM only
   (c) both AM and FM (d) Neither AM nor FM

5. A random variable is uniformly distributed between 3 and 6. Its variance is

   (a) 0.75 (b) 0.25 (c) 1 (d) 0.5

6. The auto correlation of a constant is

   (a) Constant (b) Zero
   (c) Infinite (d) an impulse function

7. The ideal value of noise figure is

   (a) 1 dB (b) 0 dB (c) Infinite (d) 100 dB

8. Pre-emphasis circuit is used

(a) After modulation (b) Before modulation
(c) Before detection (d) After detection

9. A Pulse Amplitude Modulation signal may be generated using

(a) impulse sampling (b) a sample and hold circuit
(c) natural sampling (d) a clipper circuit

10. Types of analog pulse modulation systems are

(a) Pulse amplitude modulation (b) Pulse time modulation
(c) Frequency modulation (d) Both a and b

PART - B (5 x 2 = 10 Marks)

11. The carrier amplitude after modulation varies between 4*V* and 1*V*. Calculate the modulation depth.

12. The carrier frequency of a broadcast signal is 100 *MHz*; maximum frequency deviation is 75 *KHz*. If the highest audio frequency modulated by the carrier is 15 *KHz*. What is the bandwidth of the signal?

13. What are the properties of an autocorrelation function?

14. What is white noise? Give its characteristics.

15. How is PPM obtained from PWM?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the low-level and high-level modulation methods with help of figures. (8)

(ii) With help of diagram explain ring modulator method to generate DSB-SC AM signal. (8)

Or

(b) Discus the coherent detection of DSB-SC modulated wave with a block diagram of detector and Explain. (16)

17. (a) (i) Derive the mathematical representation of FM waves. (10)

(ii) When the modulating frequency in an FM system is 400 *Hz* and the modulating voltage is 2.4 *V*, the modulation index is 60. Calculate the maximum deviation. What is the modulating index when the modulating frequency is reduced to 250 *Hz* and the modulating voltage is simultaneously raised to 3.2 *V*? (6)

Or

(b) Derive the expression for the frequency modulated signal. Explain what is meant by narrowband FM and wideband FM using the expression. (16)

18. (a) Define and explain about auto correlation and cross correlation and its properties. (16)

Or

(b) (i) Explain the Central limit theorem and comment on the importance of the theorem. (10)

(ii) Distinguish between Strict-Sense Stationary and Wide-Sense Stationary with regard to a random process. (6)

19. (a) Explain about shot noise, thermal noise and white noise process with suitable diagram. (16)

Or

(b) Explain the working of super heterodyne receiver with its parameters. (16)

20. (a) Explain the Generation and Demodulation procedure for PAM signal. (16)

Or

(b) Give short notes about time division multiplexing. (16)

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