

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 41445

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

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. VSB modulation is preferred in TV because
 - (a) it reduces the bandwidth requirement to half
 - (b) it avoids phase distortion at low frequencies
 - (c) it results in better reception
 - (d) none of the above
2. A 400 W carrier is amplitude modulated with $m = 0.75$. The total power in AM is
 - (a) 400 W
 - (b) 512 W
 - (c) 588 W
 - (d) 650 W
3. Which of the following is the indirect way of FM generation?
 - (a) Reactance bipolar transistor modulator
 - (b) Armstrong modulator
 - (c) Varactor diode modulator
 - (d) Reactance FM modulator
4. In a 100% amplitude modulated signal, the power in the upper sideband when carrier power is to be 100 W and modulation system SSBSC, is
 - (a) 100 W
 - (b) 66 W
 - (c) 50 W
 - (d) 25 W

5. The radio receivers mostly used now a days are
- (a) TRF receivers (b) Super heterodyne receivers
(c) CW receivers (d) Pulsed receivers
6. Which of the following types of noise assumes greater importance at high frequencies?
- (a) Transit time noise (b) Shot noise
(c) Impulse noise (d) Random noise
7. If transmission bandwidth is doubled in FM, SNR is
- (a) Doubled (b) Raised four times
(c) Decreased four times (d) Halved
8. The equation $v(t) = A \cos [\omega_c t + \varphi(t)]$ where A and ω_c are constant and $\varphi(t)$ is a function of base signal represents
- (i) Phase modulation
(ii) Amplitude modulation
(iii) Angle modulation
(iv) Frequency modulation
- Which of the above are true?
- (a) (i) only (b) (iii) and (iv)
(c) (i), (ii), (iii), (iv) (d) (i) and (iii) only
9. Quantizing error occurs in
- (a) TDM (b) FDM (c) PCM (d) PWD
10. AM amplifier having noise figure of 20 dB and available power gain of 15 dB is followed by a mixer circuit having noise figure of 9 dB. The overall noise figure as referred to input in dB is
- (a) 10.44 (b) 11.07 (c) 21.52 (d) 0.63

PART - B (5 x 2 = 10 Marks)

11. If a 10 kW amplitude modulated transmitter is modulated sinusoidally by 50%, what is the total RF power delivered?
12. Compare WBFM and NBFM.
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) Discuss on the frequency components present in a periodic and non periodic signal. (4)

(ii) Derive the equation of an AM wave. Also draw the modulated AM wave for various modulation index. (8)

(iii) The antenna current of an AM transmitter is 8 ampere when only the carrier is sent. The current increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. (4)

Or

(b) (i) Draw the VSB spectrum and explain the significance. (8)

(ii) How do you demodulate AM signal? Explain. (8)

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) (i) Explain the Armstrong method to generate FM signal. (8)

(ii) Apply the concepts of FM and PM with an angle modulated wave is described as $X_c(t) = 10 \cos[2\pi (10^6)t + 0.1 \sin(10^3) \pi t]$

(1) Considering $X_c(t)$ as PM signal with $K_p = 10$, find $m(t)$.

(2) Considering $X_c(t)$ as FM signal with $K_f = 10 \pi$, find $m(t)$. (8)

18. (a) (i) Describe and prove the properties of Gaussian process. (8)

(ii) Differentiate the strict-sense stationary with that of wide sense stationary process. (8)

Or

- (b) (i) Explain the following terms: mean, correlation, covariance and ergodicity. (8)
(ii) List the properties of the auto correlation function. (8)
19. (a) (i) Write notes on shot noise and thermal noise. (8)
(ii) Derive the relationship between noise figure and equivalent noise temperature. (8)

Or

- (b) (i) Describe and derive the figure of merit of a FM system. (8)
(ii) Infer FM threshold effect. (8)
20. (a) With a neat diagram explain the PAM modulation and demodulation process and derive an expression for PAM wave and depth of modulation. (16)

Or

- (b) (i) Explain how pulse position modulated signal is detected. (8)
(ii) What is quantization? Explain quantization process in detail. (8)
-