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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- April 2018
B.Tech IV Semester (ECE)

COURSE CODE: 17B11EC412 MAX. MARKS: 25
COURSE NAME: Analogue and Digital Communications
COURSE CREDITS: 4 MAX. TIME: 1 Hr 30 Min.

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1) What is sampling theorem? Prove the sampling theorem with the help of suitable example. [4]

Q2) Differentiate between narrow-band FM and wide-band FM communication system with help of mathematical and graphical analysis. What is the similarity between narrow-band FM system and Amplitude modulated system. [4]

Q3) What is power spectral density? Prove that SNR at the output of base band communication system is same as the SNR at the output of SSB-SC transmitted signal. [4]

Q4) How we can demodulate the AM signal with the help of envelope detector. A message signal $m(t)$ = cos2000 πt + 4cos4000πt modulates the carrier $c(t) = \cos 2\pi f_c t$ where $f_c = 1MHz$ to produce an AM signal. For demodulating the generated AM signal using an envelope detector, find the range of time constant RC of the detector circuit. [4]

Q5) In a FM system, a carrier of 100 MHz is modulated by a sinusoidal signal of 5 KHz. The bandwidth by Carson's approximation is 1MHz. If $Y(t)$ = (modulated waveform)^2, then by using Carson's approximation, find the bandwidth of $y(t)$ and the spacing of spectral components. [3]

Q6) A device with input $x(t)$ and output $y(t)$ is characterized by $y(t) = x^4(t)$. An FM signal with frequency deviation of 50 KHz and modulating signal bandwidth of 5 KHz is applied to this device. Find the bandwidth of the output signal. [2]

Q7) A modulating signal given by $x(t)$=5 $\sin(4\pi 10^3 t - 10\pi Cos(2\pi 10^3 t))$ is fed to a phase modulator with phase deviation constant K_P=5 rad/V . If the carrier frequency is 20 KHz, find the instantaneous frequency at 0.5 ms. [2]

Q8) Find the value of Y in dBm where Y= 100mW+(+30dBm) [2]