JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-2 EXAMINATION- April -2019
B.Tech. IV Semester

COURSE CODE: 17B11EC412 MAX. MARKS: 25

COURSE NAME: Analogue and Digital Communications

COURSE CREDITS: 04 MAX. TIME: 1 HRS 30 MINS

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

Q.1 (a) How DSB-SC signal is generated with the help of switching modulator?

(b) A DSB-SC signal is to be generated with a carrier frequency $f_c = 1MHz$ using a non-linear device with the input-output characteristic $V_o = a_0 v_i + a_1 v_i^3$ where a_0 and a_1 are constants. The output of the non-linear device can be filtered by an appropriate band-pass filter. Let $V_i = A_c^i Cos(2\pi f_c^i t) + m(t)$ where $m(t)$ is the message signal. Find the value of f_c^i (in MHz)? [CO1, CO3] [3+3]

Q.2 (a) A device with input $x(t)$ and output $y(t)$ is characterized by $y(t) = x^4(t)$. A FM signal with frequency deviation of 25 KHz and modulating signal bandwidth of 3.3 KHz is applied to this device. Find the bandwidth of the output signal.

(b) Consider the frequency modulated signal

$$20 \cos [2\pi * 10^5 t + 5 \sin(2\pi * 1500t) + 3\sin (2\pi * 1000t].$$

Find out the modulation index. [CO1, CO2] [3+3]

Q.3 (a) Why we use intermediate frequency 455 KHz in AM Super heterodyne receiver?

(b) Differentiate between RF and IF filter. [CO2] [2+2]

Q.4 (a) How we can reconstruct the signal from its samples? Explain it with considering suitable diagram.

(b) If a message signal $m(t) = \cos (10\pi t) + \cos (30\pi t)$ is sampled at 20 Hz and reconstruction is done using ideal LPF with cut off frequency = 20 Hz. What frequency component would present after reconstruction? [CO4] [2+2]

Q.5 Answer the following questions :

(a) What advantage is gained by using double conversion in a receiver? Is there any disadvantage of double conversion?

(b) Differentiate between db and dBm.

(c) What is typical application of SSB communication system?

(d) What is the sampling theorem? [CO1, CO2] [2+1+1+1]