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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electronics Engg.) (2012 Onwards)

B.Tech.(ECE/ETE) (2011 Onwards)

(Sem.-4)

ANALOG COMMUNICATION SYSTEMS

Subject Code : BTEC-401

Paper ID : [A1189]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Q1) Write briefly :**

- a) What is signal to noise ratio? Why is it important in communication systems?
- b) Find the modulation index if a 10 V carrier is amplitude modulated by three different frequencies with amplitudes of 1V, 2V and 3V respectively.
- c) Give two advantages of SSB operation compared with full carrier amplitude modulation.
- d) An FM modulator has deviation sensitivity of 30 kHz/V and operates at a carrier frequency of 175 MHz. Find the output frequency for an instantaneous value of modulating signal equal to 150mV.
- e) What is pre emphasis and de emphasis?
- f) Is it possible to use class C amplifiers to amplify an AM signal? Explain your answer.
- g) Why do some superheterodyne receivers use an RF stage while others do not?
- h) List three types of analog pulse modulation. Which pulse modulation scheme is used as an intermediate step in creation of pulse code modulation?
- i) Compare AM and FM (3 points).
- j) What are high level and low level modulation systems?

SECTION - B

- Q2) The carrier $c(t)=100 \cos(2\pi f_c t)$ is frequency modulated by the signal $m(t) = 5\cos 20,000 \pi t$ where $f_c = 10^8$ Hz. The peak frequency deviation is 20 KHz. Determine the amplitude and frequency components of all signal components that have a power level of atleast 10% of the power of unmodulated carrier component. Table of Bessels's function :

m_f	n or order					
	J_0	J_1	J_2	J_3	J_4	J_5
0	1.00					
.25	.98	.12				
.5	.94	.24	.03			
1.0	.77	.44	.11	.02		
1.5	.51	.56	.23	.06	.01	
2.0	.22	.58	.35	.13	.03	
2.5	-.05	.50	.45	.22	.07	.02

- Q3) An RC capacitive reactance modulator is used to vary the frequency of a 10 MHz oscillator by ± 100 kHz. An FET, whose transconductance varies linearly with gate voltage from 0 to .628 mS, is used in conjunction with a resistor whose value is one tenth of the capacitive reactance used. Calculate the inductance and capacitance of the oscillator tank circuit.
- Q4) Briefly explain Delta modulation and PPM (Pulse position modulation).
- Q5) What factors affect the choice of Intermediate frequency? How does dual conversion super heterodyne receiver remove the problem of image frequency?
- Q6) Explain the functioning of balanced ring modulator with appropriate waveforms.

SECTION-C

- Q7) Compare the three main systems of SSB generation by drawing up a table of outstanding characteristics of each system. Draw block diagram of each system mentioning the outputs of each block.
- Q8) Explain in detail the operation of Foster Seeley Discriminator along with its mathematical analysis and phasor diagrams.
- Q9) Write a note on SSB Product Demodulator and single sideband Envelope Detection Receiver.