Exam.Code:0928
Sub. Code: 6583

2014

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-401: Communication Engineering

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Use of scientific calculator is allowed.

X-X-X

I. (a) Define image frequency. (1)
(b) What is frequency mixer? (1)
(c) What is companding? (1)
(d) Differentiate between narrow band and wide band FM. (1)
(e) What is capture effect in FM receivers? (1)
(f) What is Carson's rule? (1)
(g) Can we say that AM and NBFM signals have similar properties? Justify your answer. (2)
(h) What prior assumptions about channel noise are made while considering its effect on a communication system? (2)

Part- A

II. (a) Describe the working of a superheterodyne radio receiver with the help of its block diagram. (4)
(b) Explain coherent and non-coherent demodulation of AM. (6)

III. (a) Describe the demodulation of FM signal. (5)
(b) Describe indirect method of FM generation in detail. Draw the block diagram of indirect method to generate transmitter frequency of 95.3 MHz and frequency deviation of 75 kHz. A narrow band FM signal is available at a carrier frequency of 200 kHz and a frequency deviation of 12.2 Hz. You can use frequency doublers and tipplers. (5)

IV. (a) Explain and compare PAM, PPM and PWM. (4)
(b) State and explain sampling theorem. (3)
(c) Define modulation. Why is it required? (3)

Part-B

V. (a) Define pre-emphasis and de-emphasis. Why are these needed in FM system? Should they be used in AM systems? (4)
(b) What is a matched filter? Derive expression for its impulse response. What are its important properties? (6)

VI. (a) How quantization noise can be reduced? Explain noise-bandwidth tradeoff in PCM. (5)

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(b) Define figure of merit of a radio receiver. What is its significance? Derive its expression for a standard AM receiver. (5)

VII. (a) Describe working of delta modulator. What are its merits and demerits compared with pulse code modulation system? Explain. (5)

(b) What do you mean by line codes? Represent the bit stream 01101001 using the following line codes:

(1) Unipolar NRZ
(2) Polar NRZ
(3) Unipolar RZ
(4) Polar RZ
(5) Manchester code. (3)

(c) A PCM system that uses a uniform quantizer is followed by a 7-bit binary encoder. The bit rate of the system is equal to 50 Mb/s. What is the maximum message bandwidth for which the system operates satisfactorily? (2)

x-x-x