Code No: R09221001 | R09 | SET-1

B.Tech II Year - II Semester Examinations, April-May, 2012
PRINCIPLES OF COMMUNICATIONS
(COMMON TO ELECTRONICS AND INSTRUMENTATION ENGINEERING, INSTRUMENTATION AND CONTROL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Draw the block diagram of electrical communication system and explain.
b) Bringout the importance of Fourier transform technique. [15]

2.a) What do you mean by modulation? Why is it needed? How would you develop modulated signal?
b) A FM wave equation is expressed as follows
$x(t) = 15 \text{ Sin}(6.5\times10^8 t + 5.55\text{Sin}1260 t)$
Determine the following
i) Carrier frequency
ii) Maximum deviation
iii) Modulation index. [15]

3.a) Compare the amplitude modulation with frequency modulation.
b) Find out the percentage of power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of 70%. [15]

4.a) How do you generate and demodulate PAM pulses? Explain with a circuit diagram.
b) What is pulse width modulation? Describe with a diagram. [15]

5.a) Derive an expression for mean square quantization error.
b) Compare delta and adaptive delta modulation techniques. [15]

6.a) Discuss the coherent and non-coherent detection techniques to detect digital carrier modulation schemes.
b) Explain DPSK technique. [15]

7.a) Explain Shanon-Fano source coding technique with an example.
b) Bring out the importance of source coding. [15]

8. Write short notes on
i) Convolutional codes
ii) Block codes
iii) Huffman coding. [15]

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Code No: R09221001 | R09 | SET-2

B.Tech II Year - II Semester Examinations, April-May, 2012
PRINCIPLES OF COMMUNICATIONS
(COMMON TO ELECTRONICS AND INSTRUMENTATION ENGINEERING, INSTRUMENTATION AND CONTROL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) State and prove any four properties of autocorrelation function.
b) A triangular waveform is given by:

$$x(t) = \begin{cases} At & for\ 0 < t < T_0 \\ 0 & elsewhere \end{cases}$$

Where A is the amplitude and T_0 is the time period. Find Fourier transforms of the waveform. [15]

2.a) What is single side band modulation? How would you develop SSB signals?
b) What do you mean by demodulation? Show the mathematical expression for recovery of translated signal. [15]

3.a) What do you mean by frequency modulation? Explain in detail.
b) A 30 MHz carrier is modulated by a 500 Hz audio sine wave. If the carrier voltage is 5 volt and the maximum deviation is 12 KHz. Develop the voltage expression of the modulated wave for
i) FM ii) PM. [15]

4.a) What is the pulse modulation? Classify the pulse modulation.
b) What is the need for sampling theorem in pulse modulation? Explain in detail. [15]

5.a) What is ADPCM? Explain.
b) With a neat block diagram explain the PCM. [15]

6.a) What is DPSK? Explain the generation of DPSK.
b) Compare FSK and PSK. [15]

7.a) Define coding efficiency and rate of information. Explain with examples.
b) Discuss Shanon-Fano coding with an example. [15]

8. Write short notes on:
a) Block codes
b) Entropy
c) Modems. [15]

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Code No: R09221001 | R09 | SET-3

B.Tech II Year - II Semester Examinations, April-May, 2012
PRINCIPLES OF COMMUNICATIONS
(COMMON TO ELECTRONICS AND INSTRUMENTATION ENGINEERING, INSTRUMENTATION AND CONTROL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Compare digital communication over the analog communication.
b) Find the autocorrelation function of a periodic function. Show that it is periodic. [15]

2.a) Compare the amplitude modulation with frequency modulation.
b) A particular transmitter radiates 9.5 KW with the carrier unmodulated and 10.5 KW when the carrier is sinusoidally modulated. Find out the modulation index. If another sine wave having 45% modulation is transmitted simultaneously, find out the total radiated power. [15]

3.a) Explain the practical circuit of FM generator.
b) Compare the frequency modulation with phase modulation. [15]

4.a) How do you generate and demodulate PAM pulses? Explain.
b) How many types of pulse amplitude modulation are there? Explain with a diagram. [15]

5.a) What is quantization error? Derive an expression for mean – square quantization error?
b) What is granular noise? Explain. [15]

6.a) Distinguish between coherent detection and non – coherent detection.
b) Explain the generation of PSK. [15]

7.a) Define the following
i) Information ii) Entropy iii) Rate of information
b) Explain Shanon – Fano coding with an example. [15]

8. Write short notes on
a) Block codes
b) Convolutional codes
c) Modems [15]

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Code No: R09221001 | R09 | SET-4

B.Tech II Year - II Semester Examinations, April-May, 2012
PRINCIPLES OF COMMUNICATIONS
(COMMON TO ELECTRONICS AND INSTRUMENTATION ENGINEERING, INSTRUMENTATION AND CONTROL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Derive the relationship between autocorrelation function and power spectral density.
b) A signal is defined as x(t) = 30 Cos 50 t + 60 Cos 100 t. Find the autocorrelation function for x(t). [15]

2.a) What do you mean by amplitude modulation? What is the modulation index of amplitude modulation? Describe the circuit diagram of an amplitude modulation.
b) The antenna current of a transmitter is 11.5 ampere when it is modulated to a depth of 45% by an audio sine wave. It enhances to 12.5 ampere on account of simultaneous modulation by another audio sine wave. Find out the modulation index on account of the second wave. [15]

3.a) Explain the mathematical expression for frequency modulated signal.
b) Compare the amplitude modulation with frequency modulation. [15]

4.a) State and prove sampling theorem in time domain.
b) How do you generate and demodulate PWM signal? Explain with a circuit diagram. [15]

5.a) Compare the delta modulation and adaptive delta modulation.
b) Explain the following
i) Granular noise ii) Slope over load distortion. [15]

6.a) With a neat diagram explain QPSK modulation.
b) Compare the following
i) ASK ii) FSK iii) PSK. [15]

7.a) What is the importance of source coding?
b) Explain Huffman coding with an example. [15]

8. Write short notes on
a) Convolutional codes
b) Block codes
c) Coding efficiency. [15]

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