Code: 13A04409 **R13**

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

PRINCIPLES OF COMMUNICATIONS

(Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) List two differences between analog and digital signals.
(b) Define noise and classify sources of noise.
(c) What is the need for modulation?
(d) What are the advantages and disadvantages of angle modulation?
(e) With reference to AM, define modulation index or depth of modulation.
(f) State Carson's rule for determining approximate bandwidth of FM signal.
(g) What is aliasing effect?
(h) What is granular noise? How it is reduced?
(i) Define entropy.
(j) Define rate of information.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) With a neat block diagram, explain an electrical communication system.
(b) What are the different types of communications? Explain.

OR

3 Explain about: (i) Multiple noise sources. (ii) Noise in reactive circuits.

UNIT – II

4 (a) Explain DSB-SC generation using balanced modulator circuit.
(b) Verify that the modulation efficiency in AM, under sinusoidal tone modulation is 33%.

OR

5 A modulation signal $5\cos 2\pi\ 15 \times 10^3$ t, angle modulates a carrier $A\cos\omega_c t$.
(a) Find the modulation index and the bandwidth for (i) the FM system. (ii) the PM system.
(b) Determine the change in the bandwidth and the modulation index for both FM and PM, if fm is reduced to 5 KHz. Assume $K_p = K_f = 15$ kHz/v.

UNIT – III

6 (a) Distinguish between natural sampling and flat-top sampling.
(b) Explain the generation and detection of PWM signal with neat diagrams.

OR

7 (a) Explain the concept of TDM with an example.
(b) Explain briefly about asynchronous multiplexing.

UNIT – IV

8 (a) Explain the working of elements of PCM system with neat block diagram.
(b) Explain the limitations of delta modulation with neat diagrams.

OR

9 Explain DPSK modulator and DPSK demodulator with block diagram.

UNIT – V

10 Apply the Shannon-Fano coding procedure for the following message ensemble:

$$[X] = [\ x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7\ ]$$
$$[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04\ ]$$

Take M = 2.

OR

11 (a) What is systematic linear block code? How it is generated?
(b) The generated polynomial for a (7, 4) cyclic code is $g(x) = 1 + x + x^3$. Find all 16 code words of this code.

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