(3 Hours) [Total Marks: 80]

N.B: 1. Question no. 1 is compulsory.

2. Attempt any three questions out of remaining six questions.

Q1. Attempt all (4*5 marks)

a) Compare FM and PM techniques of modulation.

b) Justify why FM is more immune to noise.

c) Generate Huffman code for the five symbols of a source having probabilities: 0.5, 0.25, 0.125, 0.0625, and 0.0625. Also compute the code efficiency.

d) What is Pre- emphasis? Why is it used? Sketch and explain pre- emphasis circuit.

Q2. (a) Explain Convolutional coder with a neat figure. 10M

(b) Explain the operation of Foster Seeley discriminator with the help of circuit diagram and

phasor diagram. 10M

Q.3(a) Discuss Information, Entropy, Mutual Information, Information rate and Channel

Capacity. 10M

(b) With the help of a neat block diagram explain the principle of indirect method of FM generation. 10M

Q.4 (a) An AM transmitter radiates 5 MHZ carrier with 80KW power, carrier is modulated by 600HZ and 2 KHZ signals.

(i) What will be the total modulation index if each signal modulates at 60 % of modulation?
(ii) Determine the transmitted power.
(iii) Draw the frequency spectrum of modulated signal.
(iv) What is % of power saving if one of the sideband and carrier is suppressed? 10M

(b) State and prove sampling theorem for low pass band-limited signal. 10M

Q.5 (a) Derive mathematical expression for FM wave and its modulation index. 10M

(b) Explain the generation of delta modulated signal. State the drawbacks of DM and suggest methods to overcome it. 10M

Q.6 Write in brief about (4*5M)
(a) Advantages of digital communication system.
(b) Optical Fiber Communication.
(c) Shannon- Hartley theorem.
(d) Properties of Fourier Transform.

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