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B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

ANALOG AND DIGITAL COMMUNICATION

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) Define Modulation.

(b) Write two advantages of Digital communication over Analog communication.

(c) What do you mean by figure of merit?

(d) Define the term 'frequency deviation'.

(e) Calculate the power content of an AM signal with carrier power 100kW having 60% modulation.

(f) Why FSK is preferred over ASK?

(g) Define information.

(h) Explain the nyquist criteria for sampling.

(i) Define depth of modulation.

(j) What is entropy?

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) What is delta modulation? Discuss the errors in Delta modulation technique.

(b) Explain the operation of Square law modulator for the generation of AM signal with the help of proper circuit representation.

(c) The antenna current of an AM transmitter is 10 A when only the carrier is sent, but it increase to 10.63 A when the carrier is modulated by a single sine wave. Find the percentage of modulation. Determine the antenna current when the percentage of modulation changes to 0.8.

(d) Briefly explain the generation of Frequency Shift Keying signal. Also, discuss its probability of error.

(e) **Explain the following terms:**

(i) Thermal Noise (iv) Signal to Noise Ratio

(ii) Shot noise (v) Equivalent Noise Temperature

(iii) Noise Figure

(f) Derive the expression for channel capacity of a continuous channel.

(g) Explain the generation of SSB-SC signal with the help of suitable block diagram and expressions.

(h) **Compare the following:** **i)** TDM and FDM ii) FM and PM

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3. Draw and explain the block diagram for indirect method of FM generation. Also, find the frequency deviation and bandwidth of a frequency modulated signal given by $10\cos(2\pi X10^6 t + 5\sin 6\pi X10^3 t)$.

4. Design a binary Huffman code for a discrete source having seven independent symbols having probabilities 0.25, 0.25, 0.125, 0.125, 0.125, 0.0625 and 0.0625 respectively. Also, calculate the efficiency of this code.

5. Describe the various performance parameters of Radio Receivers. Also mention the advantages of superheterodyne receiver over TRF.