10883

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3101 Roll No.

B.Tech.

(SEM VI) EVEN SEMESTER THEORY EXAMINATION,
2009-2010

ANALOG AND DIGITAL COMMUNICATION ENGINEERING

Time : 3 Hours *Total Marks : 100*

Note : *(i)* *Attempt **ALL** questions.*

(ii) *All questions **carry equal** marks.*

(iii) *In case of numerical problems assume data wherever not provided.*

1. Attempt **any four** parts of the following : **(4x5=20)**

(a) What does modulation actually do to a message and carrier ? What are the functions performed by the carrier in radio communication ?

(b) The equation of an AM wave is $x(t) = 100\{1 + 0.2 \cos(6280t)\} \cos (2\pi \times 10^6 t)$.

Find all the frequencies present.

(c) Explain the working of balanced modulator for generating AM wave, with circuit diagram.

(d) Define and describe vestigial side band transmission. What is its application ?

(e) Discuss the various factors influencing the choice of I.F. in a radio receiver.

(f) Explain the concept of "Hetrodyning". What is the advantage of Hetrodyning ? Draw the block diagram of super hetrodyne AM receiver.

2. Attempt **any four** parts of the following : **(4x5=20)**

(a) What is the difference between phase modulation and frequency modulation ? Explain.

(b) Compare the performance of FM with respect to AM.

(c) Draw the block diagram of Armstrong frequency modulation system.

(d) What are the differences between wide band FM and narrow band FM in terms of band-width, modulation index and frequency deviation ?

(e) What is need of pre-emphasis and de-emphasis in FM system ? Explain.

(f) Define signal-to-noise ratio and noise figure of a receiver. Derive a relation between noise figure and equivalent noise temperature.

3. Attempt **any two** parts of the following : (2x10=20)

(a) In what way a pulse code modulation is different from other modulation system ? What makes it a digital system ? What are the advantages and applications of PCM ?

(b) What is compounding ? Why it is used ? Why it is preferable to quantizing with tapered steps ? Illustrate your answer with a sketch of typical compounding curves.

(c) Describe delta modulation systems. What are its limitations ? How can they be overcome ? Compare it with differential PCM.

4. Attempt **any two** parts of the following : (2x10=20)

(a) Explain the working of the coherent Amplitude Shift Keying (ASK) receiver and obtain the expression for probability of error.

(b) Why FSK is preferred over ASK ? Give reason. How FSK is generated and obtain the expression for its band-width. Briefly discuss regarding its frequency spectrum.

(c) Explain the working principle of PSK and compare it with ASK and FSK on the basis of power requirement and bandwidth requirements.

TEC—606   3   *[Turn Over*

5. Attempt **any two** parts of the following : (2x10=20)

   (a) What do you mean by Multiplexing ? Why it is required ? Explain the two basic forms of multiplexing.

   (b) With the aid of the Shannon - Hartley theorem, explain why doubling the bandwidth of a channel, while keeping a constant transmitting power, will not automatically double the channel capacity ?

   (c) Define information and entropy. Find an expression for the channel capacity of a continuous channel.

- o O o -