4E4164

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B. Tech. IV Sem. (Main) Exam., April-May 2017

Computer Science & Engineering

4CS5A Fundamental of Communication

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates :-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used / calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Explain the amplitude modulation. **6**

(b) An amplitude modulated signal is given by

$$P_{AM}(t) = 10\cos\left(2\pi\cdot 10^6 t\right) + 5\cos\left(2\pi\cdot 10^6 t\right)\cos\left(2\pi\cdot 10^3 t\right) +$$

$$2\cos\left(2\pi\cdot 10^6 t\right)\cos\left(4\pi\cdot 10^3 t\right) \text{ Volts}$$

Find the various frequency components present and the corresponding modulation index. Draw the Line Spectrum and find bandwidth. **6**

(c) Explain the difference between narrow band FM and wide band FM. **4**

OR

1 (a) Define the following terms for FM waves :

(i) Carrier swing

(ii) Frequency deviation

(iii) Percent modulation. **6**

(b) Explain Frequency Division Multiplexing (FDM). **6**

(c) Explain any generation method of frequency modulation. **4**

UNIT - II

2 (a) State and prove sampling theorem in time domain. What is aliasing effect and how it is reduced ? **8**

(b) Draw the circuit diagram of generation of PPM signal. Write the advantage of PPM. **8**

OR

2 (a) Find Nyquist rate and the Nyquist interval for the signal.

$$x|t| = \frac{1}{2\pi} \cos\left(4000\,\pi\, t\right) \cos\left(1000\,\pi t\right).$$

8

(b) Explain the Time division multiplexing with block diagram. **8**

UNIT - III

3 (a) Describe the working of a Delta Modulation System. Compare the uniform and non-uniform quantization method.

8

(b) Explain the quantization error and derive an expression for minimum signal to noise ratio in PCM system that uses linear quantization.

8

OR

3 (a) Explain Adaptive Delta Modulation in detail with suitable diagram. Also, explain the advantage of adaptive delta modulation over delta modulation.

8

(b) Explain the slope overload distortion and granular noise in delta modulation and how it is removed in ADM.

8

UNIT - IV

4 (a) Represent the data 10110100 using the following digital data formats with the help of neat figures :

(i) RZ

(ii) NRZ.

6

(b) What is the Nyquist Criterion of zero $|S|$? Explain.

4

(c) Explain the generation method of PSK.

6

OR

4 (a) Explain the difference between different modulation techniques.

8

(b) Draw the block diagram of QPSK system and explain its working.

8

UNIT - V

5 (a) Draw a block diagram to generate a PN signal. **8**

(b) What are the modulation techniques used in FHSS systems ? **8**

OR

5 (a) What are the important applications of Spread Spectrum (SS) system ? **6**

(b) What is meant by spreading a signal ? **4**

(c) What are the modulation techniques used in DSSS systems ? **6**
