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Question Paper Code : 52442

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fourth Semester

Electronics and Communication Engineering

EC 2252 – COMMUNICATION THEORY

(Regulations 2008)

(Common to PTEC2252 – Communication Theory for BE (Part – Time) Third
Semester – ECE – Regulations 2009)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. Determine the bandwidth required for an AM signal obtained by modulating 2 MHz carrier signal by a message signal of 4 kHz bandwidth.

2. Why is vestigial modulation preferred in Television signal transmission ?

3. How is narrow band FM signal distinguish from wide band FM ?

4. Illustrate the relationship between Phase and Frequency modulated signal.

5. List the properties of White noise.

6. Determine the thermal noise voltage induced by a 50 ohm resister when operating at 5kHz bandwidth under room temperature.

7. What is meant by image frequency ? How to overcome it ?

8. State the FM threshold effect.

9. Determine the entropy of the source with alphabet $S = \{S_1, S_2, S_3\}$ with probabilities 0.25, 0.25, 0.5 respectively.

10. What is meant by discrete memoryless source ?

PART – B   (5×16=80 Marks)

11. a) i) Draw the block diagram of frequency division multiplexing system and explain in detail.   (10)

   ii) Compare AM, SSB and VSB in terms of their bandwidth and power requirements.   (6)

(OR)

    b) i) Explain the phase shift method of generation of SSB SC signal with neat block diagram. **(8)**

        ii) Describe the function of synchronous demodulator. **(8)**

12. a) Obtain the expression for wide band frequency modulated signal and show that it requires infinite bandwidth. Draw the spectrum of FM signal. **(16)**

(OR)

    b) With neat diagram explain demodulation of FM signal using balanced frequency discriminator. **(16)**

13. a) i) State and justify the properties of auto correlation function. **(8)**

        ii) State the differences between :

           A) Random variable and Random process **(4)**

           B) Strict sense stationary process and wide sense stationary process. **(4)**

(OR)

    b) i) Let X and Y be defined as $X = 2 \cos \theta$ and $Y = 3 \sin \theta$, where θ is a random variable uniformly distributed over $[0, 2\pi]$. Determine the mean, auto correlation function of X and cross correlation of X and Y. **(8)**

        ii) Define the Noise figure. Derive the expression for the Noise figure of cascaded system. **(8)**

14. a) With neat block diagram, explain the function of each block in a superheterodyne receiver. **(16)**

(OR)

    b) Derive the figure of merit expression for FM receiver and explain the need for pre-emphasis and de-emphasis in FM system. **(16)**

15. a) i) Explain LZ coding scheme with an example. **(12)**

        ii) Briefly discuss about rate distortion theory. **(4)**

(OR)

    b) A discrete memoryless source emits one of the symbols A, B, C, D and E with probabilities 1/3, 1/6, 1/8, 1/8 and 1/4 respectively. Design a Huffman code for the given source. Determine the average code length and coding efficiency. **(16)**