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**Question Paper Code : 51399**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fourth Semester

Electronics and Communication Engineering

EC 2252/EC 42/EC 1252/080290020 — COMMUNICATION THEORY

(Regulation 2008)

(Common to PTEC 2252 Communication Theory for B.E. (Part-Time) Third Semester ECE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the differences between single side band and vestigial side band transmission systems.
2. For an AM system, the instantaneous values of carrier and modulating signal are  $60 \sin \omega_c t$  and  $40 \sin \omega_m t$  respectively. Determine the modulation index.
3. Define white noise.
4. If the maximum phase deviation in a phase modulation system when a modulating signal of 10 V is applied is 0.1 radian, determine the value of phase deviation constant.
5. State the Shannon's theorem.
6. State the need for pre-emphasis and de-emphasis circuits in the field of communication.
7. Derive an equation for the modulated signal of an AM system.
8. Why is frequency modulation preferable for voice transmission?
9. Define noise figure.
10. Define the sensitivity characteristics of a radio receiver.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the need for carrier suppression in an AM system. Draw and explain the functioning of one such system.

Or

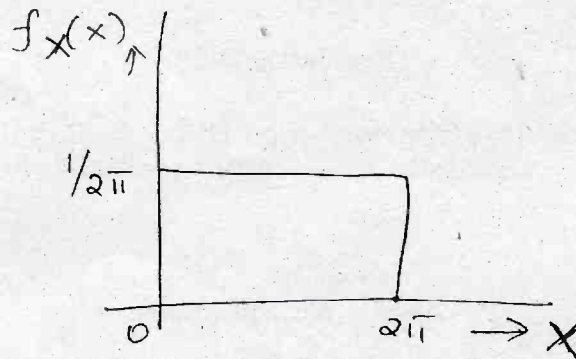
- (b) Explain the working of a AM transmitter and that of a receiver with a suitable block schematic.

12. (a) (i) Explain the Armstrong method of FM generation.  
(ii) Explain the functions of any FM detector circuit.

Or

- (b) (i) Explain how FM is achieved using varactor diodes.  
(ii) Make atleast five comparisons of AM and FM systems.

13. (a)  $X$  is uniformly distributed as given below :



Find  $E(X)$ ,  $E[X^2]$ ,  $E[\cos X]$  and  $E[(X - mx)^2]$ .

Or

- (b) Define and explain the following :  
(i) Gaussian noise and Gaussian distribution  
(ii) Thermal noise  
(iii) Shot noise.  
What type of PDF does the Gaussian noise follow?

14. (a) (i) Explain the advantages in the usage of superheterodyne receivers.  
(ii) Explain envelope detection with a suitable diagram.

Or

- (b) (i) Explain the method of coherent detection.  
(ii) Compare atleast three important characteristics of various FM systems.

15. (a) Explain Huffman coding system with an example.

Or

- (b) (i) Explain the need for source coding and channel coding.  
(ii) Explain how channel capacity could be improved. Explain the S/N trade off in detail.