

## AMIETE – ET (OLD SCHEME)

Code: AE15  
Time: 3 Hours

Subject: COMMUNICATION ENGINEERING  
Max. Marks: 100

**JUNE 2011**

**NOTE:** There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. In a communication systems noise is most likely to affect the signal.
- (A) at the Transmitter (B) at the receiver  
(C) at the Channel (D) at the information source
- b. Which type of noise is of great importance at high frequencies?
- (A) Shot noise (B) Random noise  
(C) Solar noise (D) Transit time noise
- c. The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
- (A) unchanged. (B) halved.  
(C) increased by 50 per cent. (D) doubled.
- d. The output stage of a television transmitter is most likely to be a
- (A) Plate modulated class A amplifier.  
(B) Grid modulated class C amplifier.  
(C) Grid modulated class A amplifier.  
(D) Screen modulated class C amplifier.
- e. The most commonly used filters in SSB generation are
- (A) Mechanical. (B) LC.  
(C) RC. (D) Low-pass.
- f. In the FM system, AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is increased to 7.2 V, what is the new deviation?
- (A) 3 KHz (B) 6.2 KHz  
(C) 14.4 KHz (D) 12.2 KHz

- g. In order to reduce the quantizing noise, one must
- (A) Increase the number of standard amplitudes.
  - (B) Send pulses whose side are more nearly vertical.
  - (C) Use an RF amplifier.
  - (D) Increase the no of sample.
- h. If the peak transmitted power in a radar system is increased by a factor of 16, the maximum range will be increased by a factor of
- (A) 4.
  - (B) 2.
  - (C) 16.
  - (D) 8.
- i. In hamming code, for detecting  $t$  errors, the hamming distance,  $d_{\min}$  should satisfy
- (A)  $t \geq d_{\min}$ .
  - (B)  $d_{\min} \leq t \leq d_{\min} + 2$ .
  - (C)  $t \leq d_{\min}$ .
  - (D)  $2t \leq d_{\min} \leq 2t + 1$ .
- j. The biggest disadvantage of CW Doppler radar is that
- (A) It does not give the target velocity.
  - (B) It does not give the target range.
  - (C) A transponder is required at the target.
  - (D) It does not give target position.

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**Answer any FIVE Questions out of EIGHT Questions.  
Each question carries 16 marks.**

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- Q 2.** a. Explain the need of modulation in Communication System. (4)
- b. List separately, the various sources of random noise external to a receiver. Explain in brief. (8)
- c. Explain the concept of Noise temperature. How it is related to Noise Figure? (4)
- Q 3.** a. What is Amplitude Modulation? Derive the expression for AM Modulated Signal. (10)
- b. The total powers content of an AM wave is 600W. Determine the percent modulation of signal, if each of the side band contains 75W. (6)
- Q 4.** a. Explain the filter method for the generation of SSB-AM generation. (8)
- b. Explain the need of coding. Explain the block codes and their advantages. (8)

- Q5.** a. Explain the Armstrong method for generation of FM Signal.  
b. In an FM system, a 7 KHz modulation (or base band) signal modulates 107.6 MHz. Find.  
(i) Carrier swing in the FM signal and modulating index  $m_f$ .  
(ii) The highest and lowest frequencies attained by the FM signal. (10)
- Q6.** a. State and prove the Sampling theorem for the Low pass signals. (8)  
b. What is quantization Error? Explain the method to reduce quantization error. (4)  
c. Explain the Shannon – Fano Coding with suitable example. (4)
- Q7.** a. Describe the working of Delta – Modulator and derive the condition to avoid the slope overload error for sinusoid of amplitude A and frequency f. (10)  
b. A data of four bits 01 10 is send through the transmitter. Form the Hamming code to be sent with steps. (6)
- Q8.** a. Explain the Various Radar performance factors. (8)  
b. Explain the concept of Horizontal and vertical scanning in TV transmission. (8)
- Q9.** Write short notes on:  
(i) Antenna Tracking in Radar  
(ii) Entropy  
(iii) Adaptive Delta Modulation  
(iv) Pulse code Modulation (4×4)