

**AMIETE – ET (OLD SCHEME)**

Time: 3 Hours

**OCTOBER 2012**

Max. Marks: 100

**PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.**

**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. Intermediate Frequency (IF) in AM transmission is
  - (A) 455 KHz
  - (B) 400 KHz
  - (C) 325 KHz
  - (D) 10 KHz
- b. One of the following is an indirect way of generating FM. This is the
  - (A) reactance FET modulator
  - (B) varactor diode modulator
  - (C) Armstrong modulator
  - (D) reactance bipolar transistor modulator
- c. The most commonly used filters in SSB generation are
  - (A) Mechanical
  - (B) LC
  - (C) RC
  - (D) Low pass
- d. Equalizing pulses in TV are sent during
  - (A) horizontal blanking
  - (B) vertical blanking
  - (C) the serrations
  - (D) pulse repetition frequency
- e. One of the following types of noise becomes of great importance at high frequencies. It is the
  - (A) shot noise
  - (B) random noise
  - (C) impulse noise
  - (D) transit-time noise
- f. Companding is used
  - (A) to overcome quantizing noise in PCM
  - (B) in PCM transmitters, to allow amplitude limiting in the receivers
  - (C) to protect small signals in PCM from quantizing distortion
  - (D) in PCM receivers, to overcome impulse noise

- g. The largest 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 the target position
- h. Aperture effect is associated with  
 (A) Instantaneous sampling (B) Natural sampling  
 (C) Flat-topped sampling (D) Ideal sampling
- i. The modulation index  $m_f$  of frequency modulation is defined as  
 (A)  $\frac{f_{dev}}{f_{AF}}$  (B)  $V_m/V_c$   
 (C)  $f_c/f_m$  (D)  $F_m/F_c$
- j. Modulation index of an AM wave with  $E_m = 160V, E_c = 200V$  is  
 (A) 40% (B) 80%  
 (C) 125% (D) 100%

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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. Discuss various types of noise that are found in a receiver. (8)  
 c. A receiver connected to an antenna whose resistance is  $50\Omega$  has an equivalent noise resistance of  $30\Omega$ . Calculate the receiver's noise figure in decibels and its equivalent noise temperature. (4)
- Q 3.** a. Explain the filter method for the generation of 85B-AM signals. (8)  
 b. Compare frequency and amplitude modulation. (8)
- Q 4.** a. Explain the Armstrong method for generation of FM signal. (8)  
 b. What is pre-emphasis? Sketch a typical pre-emphasis circuit & explain why de-emphasis must be used. (8)
- Q5.** a. The antenna current of an AM transmitter is 8 amperes (8 A) when only the carrier is sent, but it increases to 8.93 A, when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8. (8)

**Code: AE15**
**Subject: COMMUNICATION ENGINEERING**

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|            | b. Describe vestigial sideband transmission.  | (8) |
| <b>Q6.</b> | a. What is Pulse Amplitude Modulation (PAM)? Discuss the mathematical analysis.                       | (8) |
|            | b. Explain the difference between Natural Sampling and Flat-top Sampling with illustrative waveforms. | (8) |
| <b>Q7.</b> | a. Derive the expression for the signal to quantization noise ratio in a PCM system.                  | (8) |
|            | b. Describe the block codes coding and decoding.  | (8) |
| <b>Q8.</b> | a. Explain average information and information rate.  | (8) |
|            | b. Give any two examples of Algebraic codes.  | (8) |
| <b>Q9.</b> | a. Draw and explain the block diagram of MTI Radar.   | (8) |
|            | b. Write a note on colour transmission and reception in a TV system.                                  | (8) |