Code: AE15   **Subject: COMMUNICATION ENGINEERING**

AMIETE – ET (OLD SCHEME)

Time: 3 Hours   **OCTOBER 2012**   Max. Marks:

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) $\dfrac{f_{dev}}{f_{AF}}$ (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%

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

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 50Ω has an equivalent noise resistance of 30Ω. 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)**

b. Describe vestigial sideband transmission.

Q6. 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)**

Q7. 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)**

Q8. a. Explain average information and information rate.   **(8)**

b. Give any two examples of Algebraic codes.   **(8)**

Q9. 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)**