

AMIETE – ET (Current & New Scheme)

Time: 3 Hours

DECEMBER 2015

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.**

Q1. Choose the correct or the best alternative in the following: (2 × 10)

- a. The maximum power efficiency of AM modulator is _____

(A) 25 %	(B) 50 %
(C) 75 %	(D) 100 %
- b. A pre-emphasis circuit provides extra noise immunity by

(A) boosting the higher audio frequencies
(B) delaying the higher audio frequencies
(C) pre amplifying the whole audio band
(D) converting the phase modulation to FM
- c. Single Sideband system needs _____

(A) more bandwidth
(B) high power
(C) complex receiver circuit as compared to other type system
(D) none of these
- d. Thermal Noise is independent of _____

(A) Bandwidth	(B) Temperature
(C) Centre Frequency	(D) Boltzman's Constant
- e. The very high frequency (VHF) range extends from _____

(A) 3-30 MHz	(B) 30-300 MHz
(C) 300-3000 MHz	(D) 3000-30000 MHz
- f. Pulse Width Modulation (PWM) needs _____

(A) More power than PPM
(B) More bandwidth than PPM
(C) More samples per second than PPM
(D) None of the above
- g. In order to reduce cross-sectional dimensions, the wave guide to use _____

(A) rectangular	(B) circular
(C) ridged	(D) flexible
- h. The Maximum Usable Frequency (MUF) or secant law is expressed by relation _____ (if Θ = angle of incidence)

(A) $\cos \Theta$ /critical frequency	(B) $\cos \Theta \times$ critical frequency
(C) critical frequency/ $\cos \Theta$	(D) none of these

- i. If carrier is fully modulated, the total power will be
 (A) P_c (B) $2 P_c$
 (C) $1.5 P_c$ (D) $2.5 P_c$
- j. The dominant mode in a rectangular waveguide is
 (A) TE₂₀ (B) TE₁₀
 (C) TE₁₁ (D) TM₁₀

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

- Q. 2** a. Explain the need of modulation in communication system. (8)
 b. What is Shot noise? Describe the variables on which Shot noise depends. (8)
- Q. 3** a. Describe briefly amplitude modulation. Develop a mathematical expression for Amplitude Modulation Index and what happens if this index exceeds 1? (8)
 b. Calculate the percentage saving in power, if only one side band transmission is transmitted for: (8)
 (i) 80% modulation
 (ii) 50% modulation
- Q. 4** a. What are the advantages and disadvantages of frequency modulation in comparison to amplitude modulation? (8)
 b. Describe the concept of pre-emphasis and de-emphasis with the help of circuit diagram. (8)
- Q. 5** a. Draw the Block Diagram of basic super heterodyne receiver and briefly explain it's working. Give its uses. (8)
 b. What factors are to be considered while choosing the value of Intermediate Frequency (IF)? (8)
- Q.6** a. Discuss the standing waves and impedances in a quarter wave and half wave length transmission lines. (8)
 b. Explain how a smith chart can be used for the calculation of the following: (8)
 (i) Admittance
 (ii) Impedance
 (iii) VSWR
- Q. 7** a. What are Waveguides? Briefly describe the working principle of a Waveguide by explaining the propagation of waves in it? Explain how a section of Rectangular Waveguide depends upon the frequency of the signal? (8)
 b. Rectangular Waveguide is having inside dimensions of 5×2 cms. Calculate the cutoff frequency with a dominant mode of TE_{1,0}? (8)
- Q.8** a. Explain with a block diagram, how demodulation of PPM pulses can be achieved. List the advantages and disadvantages of PPM, over other type of systems. (8)
 b. What is Information Theory and Coding of Information? Briefly describe Baudot Code? (8)
- Q.9** a. Describe the elements of Long- Distance telephony? (8)
 b. What is Multiplexing and what were the reasons for developing it? What are its two basic forms of Multiplexing? (8)