

AMIETE – ET (Current Scheme)

Time: 3 Hours

JUNE 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.

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

- a. Which of following is not included in the process of reception?
- (A) decoding (B) encoding
(C) storage (D) interception
- b. Indicate the noise whose sources is different from other.
- (A) solar noise (B) cosmic noise
(C) atmospheric noise (D) galactic noise
- c. The modulation index of an AM wave is changed from 0 to 1. The transmitted power is _____.
- (A) unchanged (B) halved
(C) doubled (D) increased by 50 percent
- d. Which one method of the following is not used to remove unwanted side band in SSB.
- (A) filter system (B) third method
(C) phase-shift method (D) balanced modulator
- e. When the modulating frequency is doubled the modulation index is halved and the modulating voltage remains constant. The modulation system is _____.
- (A) PCM (B) AM
(C) FM (D) PM
- f. A super heterodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz. The image frequency is _____.
- (A) 900 kHz (B) 1650 kHz
(C) 750 kHz (D) 2100 kHz

- g. Impedance inversion may be obtained with_____.
- (A) a short circuited stub (B) a open circuited stub
(C) a quarter- wave line (D) a long circuited stub
- h. The wave length of a wave in a wave guide _____ .
- (A) is greater than in free space
(B) depend only on wave guide dimension and the free space wavelength
(C) inversely proportional to phase velocity
(D) is directly proportional to group velocity
- i. Capacity of a standard 4 kHz telephone with a 32 dB SNR will be _____.
- (A) 32,953 bps (B) 16,426 bps
(C) 65,906 bps (D) can't be decided
- j. Erlang is _____.
- (A) used to measure traffic (B) dimension less quantity
(C) minute per minute calculation (D) all of these

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

- Q.2** a. List the basic functions of a radio transmitter and explain briefly the functions. (4)
- b. Evaluate a single pulse with an amplitude of 8mV and a first zero crossing at 0.5KHz. (4)
- c. Discuss the significance of the following terms with reference to noise: (4 × 2)
- (i) Addition of noise due to several sources
(ii) Signal to Noise ratio
(iii) Noise figure
(iv) Noise temperature
- Q.3** a. Draw and explain the circuit diagram of Grid-modulated class C amplifier used in AM generation. (8)
- b. State the advantages of SSB and calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM Wave modulated to a depth of (i) 100 percent (ii) 50 percent. (8)
- Q.4** a. Compare the following modulation systems:- (8)
- (i) FM and PM
(ii) Wideband FM and Narrow band FM
- b. Discuss varactor diode modulator to generate frequency modulated wave. (8)

- Q.5** a. Discuss the following terms with reference to receivers: (4 × 2)
- (i) sensitivity
 - (ii) selectivity
 - (iii) image frequency
 - (iv) double spotting
- b. Draw the block diagram of Pilot-Carrier single-sideband receiver and explain its operation. (8)
- Q.6** a. Explain briefly the following concepts with reference to transmission lines:-(8)
- (i) types of losses
 - (ii) standing Wave Ratio
 - (iii) normalization of impedance
 - (iv) characteristic impedance
- b. Discuss operation of the following with the help of neat diagrams: - (8)
- (i) Baluns
 - (ii) Slotted lines
- Q.7** a. Describe group velocity and phase velocity in a wave guide. (4)
- b. A wave guide is propagated in a parallel – plane wave guide. (4)
The frequency is 6 GHz and the plane separation is 3 cm. Calculate:
- (i) The corresponding group velocity
 - (ii) The corresponding phase velocity
- c. With the aid of a neat diagram, explain the operation of directional coupler. (8)
- Q.8** a. Compare Pulse Amplitude Modulation & Pulse Position Modulation. (5)
- b. What do you mean by telemetry? What are its applications? Explain the operation of Radiotelemetry transmitter using frequency division multiplex with TDM for subcommutation. (11)
- Q.9** a. Write short note on TDM. (8)
- b. Discuss the following in brief:- (8)
- (i) Co-axial cable
 - (ii) Fibre optic links