

DiplETE – ET (Current & New Scheme)

Time: 3 Hours

JUNE 2016

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. The main purpose of modulation is to
 - (A) Combine two waves of same frequency.
 - (B) Achieve wave-shaping of the carrier wave.
 - (C) Transmit low frequency information over long distance.
 - (D) Produce Sideband.
- b. In amplitude modulation
 - (A) Carrier frequency is changed
 - (B) Carrier amplitude is changed
 - (C) 3-side bands are produced
 - (D) Fidelity is improved
- c. In the FM the carrier deviation is determined by

(A) Modulating voltage	(B) frequency
(C) Either (A) or (B)	(D) None of these
- d. Which of the following modulating system is digital.

(A) PCM	(B) PPM
(C) PWM	(D) PAM
- e. Pre-Emphasis is used to amplify

(A) Low frequency	(B) High frequency
(C) Both (A) and (B).	(D) None of these
- f. The unit of modulation index is

(A) Hertz	(B) (1/ Hertz)
(C) Ω	(D) Unit less Quantity
- g. Line of Sight transmission is a characteristic of propagation for

(A) MF Band	(B) HF Band
(C) VHF & UHF Band	(D) All of these
- h. The maximum usable frequency & critical frequency are related to each other as

(A) $MUF = F_C \tan\theta$.	(B) $MUF = F_C \sec\theta$.
(C) $MUF = F_C \sin\theta$.	(D) None of these
- i. A yagi antenna is used for

(A) Very large Bandwidth	(B) High forward gain
(C) Omni directional gain	(D) None of these

- j. In FM, when frequency deviation is doubled
 (A) Modulation is doubled (B) Modulation is halved.
 (C) Carrier swing is halved (D) None of these

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

- Q.2** a. Explain communication system with the help of block diagram. (5)
 b. Explain the types of Internal Noise. (5)
 c. A receiver connected to an antenna whose resistance is 50Ω . Its equivalent noise temperature is 174K . Calculate the receiver noise figure & equivalent noise resistance. (6)
- Q.3** a. The antenna current of an AM Transmitter is 10 Ampere, when only the carrier is sent, but it increases to 10.93 Ampere, when the carrier is modulated by a single sine wave. Find the percentage of modulation. Determine the antenna current when the percentage of modulation changes to 0.5. (8)
 b. Calculate the percentage of power saving when the carrier and one of the sidebands are suppressed in AM wave modulation to a depth of (i) 100% and (ii) 50%. (8)
- Q.4** a. With the help of neat block diagram, explain working of indirect method of FM Generation System. (8)
 b. Compare Wideband FM and Narrow Band FM. (2)
 c. What are the advantages and dis-advantage of FM over AM? (6)
- Q.5** a. With the help of neat block diagram, explain working of Tuned Radio- Frequency (TRF) receiver. Also discuss its disadvantages. (8)
 b. Discuss the following terms related to radio receiver:
 (i) Selectivity,
 (ii) Sensitivity,
 (iii) Image Frequency,
 (iv) Double Spotting. (8)
- Q.6** a. Explain following terms in connection with sky wave propagations:
 (i) Virtual Height,
 (ii) Skip Distance. (8)
 b. Write a Short note on:
 (i) T- Junction,
 (ii) Magic Tee. (8)
- Q.7** a. Write a Short note on:
 (i) The Yagi-Uda Antenna,
 (ii) Non Resonant Antenna. (8)
 b. Determine the length of the antenna operating at a frequency of 500 kHz. (8)
- Q.8** a. Write a short note on:
 (i) Pulse Position Modulation;
 (ii) Pulse Code Modulation. (8)
 b. Calculate the capacity of the noisy channel having bandwidth of 4.1 kHz and Signal to Noise ratio of 32dB. (8)
- Q.9** a. What is multiplexing? Explain Frequency Division Multiplexing. (8)
 b. Explain Microwave link-simplified block diagram with working principle. (8)