

DiplETE – ET (Current & New Scheme)

Time: 3 Hours

JUNE 2017

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 is not an External noise?
 (A) atmospheric noise (B) cosmic noise
 (C) solar noise (D) shot noise
- b. Noise figure is _____.
 (A) $F = \frac{\text{input N/S}}{\text{output N/S}}$ (B) $F = \frac{\text{input S/N}}{\text{output S/N}}$
 (C) $F = \frac{\text{output N/S}}{\text{input N/S}}$ (D) $F = \frac{\text{output S/N}}{\text{input S/N}}$
- c. 200 watt carrier is modulated to a depth of 75%, what is the total power?
 (A) 256.25 (B) 156.25
 (C) 356.25 (D) 456.25
- d. What is the maximum power in AM when modulation index equals to one?
 (A) $P_t = 2.5P_c$ (B) $P_t = 1.5P_c$
 (C) $P_t = 3.5P_c$ (D) $P_t = 0.5P_c$
- e. One of the following cannot be used to move the unwanted sideband in SSB. This is the _____.
 (A) Filter System (B) Phase Shift Method
 (C) third method (D) balanced modulator
- f. 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
- g. In Super heterodyne receiver
 (A) The IF stage has better selectivity than RF stage
 (B) The RF stage has better selectivity than IF stage
 (C) Both have same selectivity
 (D) None of the above

Code: DE61/DE112

Subject: ANALOG COMMUNICATIONS

- h. Most popular IF for receivers tuning to 540 to 1650 kHz is _____.
- (A) 433 kHz (B) 455 kHz
(C) 545 kHz (D) 555 kHz
- i. What is the functioning role of an antenna in receiving mode?
- (A) Radiator (B) Converter
(C) Sensor (D) inverter
- j. When an electromagnetic wave travels from transmitter to receiver, which factors affects the propagation level?
- (A) Curvature of earth (B) Roughness of earth
(C) Magnetic field of earth (D) All of these

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

- Q.2** a. Explain basic block diagram of communication system. (8)
- b. State the need for modulation. (3)
- c. Explain thermal agitation noise. (5)
- Q.3** a. Derive the expression for total power calculation in the AM wave. (8)
- b. Explain generation of SSB using Phase Shift Method. (8)
- Q.4** a. What is frequency modulation? Explain one method of FM generation. (8)
- b. Explain pre-emphasis and de-emphasis. (5)
- c. Compare wide band FM and Narrow band FM. (3)
- Q.5** a. Draw and explain the block diagram of TRF receiver. (6)
- b. List the reasons for using an RF amplifier in AM receivers. (4)
- c. Explain product demodulator in SSB. (6)
- Q.6** a. Explain types of wave propagation. (8)
- b. A waveguide has an internal width of 3 cm and carries the dominant mode of a signal of unknown frequency. If the characteristic wave impedance is 500Ω , what is the frequency? (8)
- Q.7** a. Distinguish between resonant and non-resonant antennas. (6)
- b. Determine the length of an antenna operating at a frequency of 500 kHz. (4)
- c. Explain ungrounded and grounded antennas. (6)
- Q.8** a. Classify pulse modulation schemes with neat sketch. (6)
- b. Explain generation and demodulation of PWM. (10)
- Q.9** Explain ANY TWO: (8+8)
- (i) Frequency Division Multiplexing (ii) Satellite Communications
(iii) Telephone Exchanges (Switches) and Routing