

DipIETE – ET (NEW SCHEME) - Code: DE61**Subject: ANALOG COMMUNICATIONS**

Time: 3 Hours

Max. Marks: 100

DECEMBER 2011**NOTE: There are 9 Questions in all.**

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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. 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

b. In PCM system, the output S/N increases

- (A) linearly with bandwidth
- (B) exponentially with bandwidth
- (C) inversely with bandwidth
- (D) none of these

c. The requirements of SSB and ISB receiver are

- (A) High Reliability
- (B) Ability to demodulate SSB
- (C) Excellent suppression of adjacent signals
- (D) All the above

d. An Antenna is Synonymous to a

- (A) generator
- (B) transformer
- (C) regulator
- (D) reflector

e. The radiation resistance can be expressed as below where I_a =Antenna current at feed point and P= Power radiated by Antenna

- (A) $R_{rad} = P \times I_a^2$
- (B) $R_{rad} = I_a^2 / P$
- (C) $R_{rad} = P / I_a$
- (D) $R_{rad} = P / I_a^2$

- f. Frequencies in UHF range propagate by means of
- (A) space wave (B) surface wave
(C) sky wave (D) ground wave
- g. Scatter transmission is used at frequencies
- (A) VLF only (B) UHF only
(C) UHF & VHF (D) VHF only
- h. The noise figure of a receiver connected to an antenna of resistance $50\ \Omega$ and having an equivalent noise resistance of $30\ \Omega$ is
- (A) 0.6 (B) 1.6
(C) 0.667 (D) 1.667
- 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) TE_{20} (B) TE_{10}
(C) TE_{11} (D) TM_{10}

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

- Q.2** a. Explain the need of modulation in communication system (6)
- b. What is meant by the transit time noise in transistor? (5)
- c. What is the noise power at room Temp 25°C , when the bandwidth is 1 kHz? (5)
- Q.3** a. Describe the Filter method of generating DSB-SC. What are the drawbacks of this method? (8)
- b. Explain the Working Principle of Balanced Modulator. (5)
- c. An unmodulated carrier of 10 W is measured as 12W when modulated. Calculate the modulation index (m)? (3)
- Q.4** a. List and discuss the factors which influence the choice of IF in radio receiver. (8)

- b. For an AM broadcast Superhetrodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the intermediate frequency (IF) is 455 kHz, find Image frequency and image rejection α at 1000 kHz and 600 kHz. (8)
- Q.5** a. Compare FM/PM versus AM and list the advantages and draw backs of each. (8)
- b. Explain the prime characteristics of the Foster-Seeley and ratio detectors. What is the main difference between them? (8)
- Q.6** a. Explain the radiation pattern and bandwidth of long wire antenna. (8)
- b. Explain
 (i) Radiation resistance (ii) Directive gain
 (iii) Helical Antenna (iv) Folded Dipole (8)
- Q.7** a. Explain the various ways in which fading occurs when sky waves are being received. (7)
- b. A rectangular waveguide measure 3×4.5 cm internally and has a 9 GHz signal propagated in it. Calculate
 (i) cut off wavelength
 (ii) guide wavelength
 (iii) group and phase velocities for $T_{E1,0}$ mode. (9)
- Q.8** a. Explain how PWM can be generated and detected. (7)
- b. What are regenerative repeaters? Describe in brief. (5)
- c. Construct an even parity seven bit Hamming code to transmit the data 0100. (4)
- Q.9** Write Short note on any **TWO** of the following:
 (i) Microwave links
 (ii) Channel Translating Equipment
 (iii) INMARSAT satellite. (2×8)