ROLL NO. _____

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) Pc **(B)** 2 Pc
(C) 1.5 Pc **(D)** 2.5 Pc

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)**