Code: DE12 **Subject: COMMUNICATION ENGINEERING**
Time: 3 Hours **Max. Marks: 100**

DECEMBER 2010

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 half an hour 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 best alternative in the following: (2×10)

a. To transmit a signal of 1 kHz, the length of the antenna required without modulation is _____

(A) 1 meter **(B)** 3 km
(C) 300 km **(D)** 3 meters

b. Noise is a signal that _____

(A) carries meaningful information
(B) distorts meaningful information signal
(C) has a particular frequency
(D) has fixed phase

c. A base band signal is given by $V_m = \sin 2\pi 300t$ and the carrier signal is given by $V_c = 2\sin 2\pi 10^6 t$. The bandwidth of the AM modulated signal is then given by _____

(A) 10^6 Hz. **(B)** 600 Hz.
(C) 300 Hz. **(D)** 10^{12} Hz.

d. In a Balanced Modulator circuit, there _____

(A) are 2 AM circuits with the baseband fed to one of them after 180° phase shift.
(B) is one AM circuit and a demodulator circuit.
(C) is one demodulator circuit only.
(D) is no circuit.

e. In frequency modulation the baseband signal affects _____

(A) the amplitude of the signal only.
(B) the frequency & the phase of the signal.
(C) the frequency only.
(D) frequency, phase & amplitude of the carrier signal.

f. The minimum rate of sampling required for conversion of an analog signal to digital is _____

(A) $f_s > 2f_m$ **(B)** $f_s = f_m$
(C) $f_s < 2f_m$ **(D)** $f_s < f_m$

g. The error rate in quantization method is _____

(A) $S^3/12$ **(B)** $S^4/12$
(C) $S/12$ **(D)** $S^2/12$.

h. In Delta Modulation _____

(A) the baseband signal is encoded into 1 bit.
(B) the difference signal is encoded into 1 bit.
(C) the difference signal is encoded into 2^n bits.
(D) the baseband signal is encoded into 2^n bits.

i. In Pulse Code Modulation _____

(A) the sampled signals are binary coded.
(B) the quantized signals are binary coded.
(C) the baseband signal is directly binary coded.
(D) All of the above.

j. Optical Fiber communication uses _____

(A) total internal reflection of light waves.
(B) reflection of EM signals.
(C) refraction of EM signals.
(D) None of the above.

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

Q.2 a. Explain the working of a monochrome TV receiver with a neat-block diagram. What type of modulation schemes are used for audio & video TV transmission? **(10)**

b. Explain with suitable diagram, why quantization error occurs. **(6)**

Q.3 a. Explain with suitable diagram, how pre-emphasis & de-emphasis helps in reducing noise in FM systems. **(8)**

b. Explain the working of a PLL in demodulating FM. **(8)**

Q.4 a. Explain with suitable diagram how DSB-SC signals are generated. **(8)**

b. Explain the Armstrong method of FM generation. **(8)**

Q.5 a. Explain how transmission of light takes place in an optical fiber. **(8)**

b. What is Photo detector? Describe PIN photo diode with the help of diagram. **(8)**

Q.6 a. What is a waveguide? How does transmission of electromagnetic waves take place in a waveguide. **(8)**

b. Explain how PCM is generated for an analog signal. **(8)**

Q.7 a. What is a dipole antenna? Explain its working with radiation pattern. **(8)**

b. Explain the difference between sky wave propagation and ground wave propagation. **(8)**

Q.8 Write Short notes on any **TWO** **(2×8)**

(i) Generation of AM using balanced modulator.
(ii) Comparison of TDM and FDM
(iii) Error correction techniques in Digital modulation.
(iv) Block diagram of TV transmitter.

Q.9 a. (i) Explain the terms Orbit, Apogee and Perigee.
(ii) What is geostationary satellite and explain why is it needed? **(8)**

b. Give the fundamentals and applications of cavity resonators. **(8)**