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

DECEMBER 2008

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.**
- **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: (2x10)

a. The bandwidth of speech signal used for AM broadcasting is

(A) 3.1 KHz. **(B)** 5 KHz.
(C) 15 KHz. **(D)** 20 KHz.

b. The use of limiter in FM receiver limits

(A) Bandwidth **(B)** Frequency
(C) Amplitude **(D)** Channel noise

c. VHF extends from

(A) 30-300 MHz. **(B)** 30-300 KHz.
(C) 300 MHz to 3 GHz **(D)** below 30 MHz

d. The colour TV system used in India is

(A) PAL-D **(B)** NTSC
(C) SECAM **(D)** None of above

e. A 100 MHz carrier is frequency modulated by a 1 KHz tone to a modulation index of 20. The bandwidth of the resulting FM signal is

(A) 4 KHz **(B)** 42 KHz
(C) 150 KHz **(D)** 100 KHz

f. The biggest disadvantage of PCM is

(A) its ability to handle analog signals
(B) the high error rate which its quantizing noise introduces
(C) its incompability with TDM
(D) the large bandwidth that are required for it

g. Colour burst is sent during

(A) Horizontal blanking period **(B)** Vertical blanking period.

(C) Both **(A)** and **(B)** **(D)** Once in a frame period

h. The geostationary satellite is at an approproximate height of

(A) 2400 Km **(B)** 6400 Km.
(C) 36000 Km **(D)** 360000 Km.

i. Pre-emphasis is used to improve

(A) noise at higher baseband frequency
(B) noise at lower baseband frequency
(C) noise over the entire baseband frequency
(D) have no effect on noise

j. Quantization noise occurs in

(A) TDM **(B)** FDM
(C) PCM **(D)** PWM

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

Q.2 a. What is bandwidth of information signals? Describe the relationship between bandwidth and information capacity. **(8)**

b. Two resistors of 5 $K\Omega$ and 20 $K\Omega$ are at $27^{\circ}C$. Find the thermal noise power and voltage for a 10 KHz bandwidth
(i) for each resistor.
(ii) for their series combination.
(iii) for their parallel combination. **(8)**

Q.3 a. Describe power and current relations for AM wave. **(8)**

b. The output current of 60% modulated AM generator is 1.5A. Determine
(i) What will this current rise if the generator is modulated additionally by another audio wave with modulation index of 0.7?
(ii) What will be the percentage power saving if the carrier and one of the sidebands are now suppressed? **(8)**

Q.4 a. Describe balanced modulator method for generation of DSB-SC signals. **(8)**

b. (i) Find the permissible range in maximum modulation index for commercial FM that has 30Hz to 15KHz modulating frequencies
(ii) Repeat for a narrow band system which allows a maximum deviation of 10KHz and 100Hz to 3KHz modulating frequency. **(8)**

Q.5 a. State advantages and disadvantages of Angle modulation as compared to Amplitude modulation. **(8)**

b. A transmitter operating at 27 MHz with 4W output is connected via 10 m of cable to an antenna which has an input resistance of 300 Ω. Find
(i) reflection co-efficient (ii) the VSWR (iii) Power absorbed by the antenna. Assume Z_0 of the connecting cable at 50 Ω. **(8)**

Q.6 a. What is radio horizon? Explain in detail. **(8)**

b. What is a rhombic antenna? Describe briefly its functioning. **(8)**

Q.7 a. Describe method of FM demodulation by using a PLL. **(8)**

b. Describe briefly the Frequency Shift Keying mode of transmission/reception. **(8)**

Q.8 a. A seven bit Hamming code is received as 1011001. Locate error position and find the correct code. **(8)**

b. Describe the different losses which take place in optical fibre transmission. **(8)**

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

b. Write a short note on PWM. **(8)**