Code: DE - 12 **Subject: COMMUNICATION ENGINEERING**

JUNE 2007

Time: 3 Hours **Max. Marks: 100**

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) 5 KHz. **(B)** 20 KHz.
(C) 3.1 KHz. **(D)** None of above.

b. UHF range of frequencies extends from

(A) 3 MHz to 30 MHz. **(B)** 300 MHz to 3 GHz.
(C) 3 GHz to 30 GHz. **(D)** None.

c. The wavelength for a signal of frequency 100 KHz is

(A) 300 Km. **(B)** 3 Km.
(C) 30 m. **(D)** None.

d. The temperature of resistor creating thermal noise is doubled. The noise power generated is

(A) Halved. **(B)** Doubled.
(C) Quadrupled. **(D)** Unchanged.

e. If amplitude of the carrier wave is 100V and is modulated to 50%, the amplitude of the sidebands will be

(A) 50 V. **(B)** 12.5 V.
(C) 25 V. **(D)** 0.5 V.

f. Antenna commonly used for microwave links are

(A) Loop antenna. **(B)** Parabolic antenna.
(C) Yagi-Uda antenna. **(D)** Rhombic antenna.

g. The geo-stationary satellite is located above earth at about

(A) 36000 Km. **(B)** 9600 Km.
(C) 6400 Km. **(D)** None.

h. Which colour TV system is used in India

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

i. The magnitude of reflection co-efficient on a transmission line lies in the range

(A) 0 to 1. **(B)** 0 to 100.
(C) 1 to ∞. **(D)** 0 to ∞.

j. Which scanning is used in TV

(A) Progressive. **(B)** Interlaced.
(C) A & B. **(D)** None.

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

Q.2 a. What is noise? Explain various sources of noise. **(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. **(8)**

Q.3 a. What is amplitude modulation? Derive an expression for amplitude modulated wave. **(8)**

b. An AM transmitter with an unmodulated carrier power $P_C = 100W$ is modulated simultaneously by three modulating signals with $m_1 = 0.2, m_2 = 0.4, m_3 = 0.5$, find
(i) Effective modulation index.
(ii) Upper and lower sideband power.
(iii) Total transmitted power. **(8)**

Q.4 a. State advantages & disadvantages of SSB transmission. **(8)**

b. Explain working of ratio detector using a circuit diagram. **(8)**

Q.5 a. What is pulse width modulation? Explain briefly. **(8)**

b. Draw and explain block diagram of PLL. **(8)**

Q.6 a. What is a forward error correcting code? How do such codes function? Explain with an

example. **(8)**

b. Explain waveguide excitation. **(8)**

Q.7 a. Explain how ionosphere is formed? Discuss different layers and their importance. **(8)**

b. Explain following terms for antenna
(i) Directive gain. (ii) Resistance.
(iii) Bandwidth. (iv) Beam width. **(8)**

Q.8 a. What are the different types of linkages used in satellite communication? **(8)**

b. Explain propagation of light through optical fibre. **(8)**

Q.9 a. Write short note on FDM. **(8)**

b. Describe the operation of Horn antenna. **(8)**