Code: DE17 **Subject: ELEMENTS OF SATELLITE COMMUNICATION**
Time: 3 Hours **Max. Marks: 100**

JUNE 2011

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 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. The down link frequency in the C band transponder is

(A) 6 GHz **(B)** 4 GHz
(C) 14 GHz **(D)** 11 GHz

b. The carrier to noise ratio for a satellite depends upon

(A) Effective Isotropic Radiated power
(B) Bandwidth.
(C) Free space path losses
(D) All of them

c. The multiple access technique suitable only for digital transmission is

(A) TDMA **(B)** FDMA
(C) Both **(A)** and **(B)** **(D)** Packet Access

d. The function of protocol emulation in VSAT network is to operate seamlessly with

(A) VSAT Antenna **(B)** Terrestrial Network
(C) Space link **(D)** Satellite

e. The most important piece of equipment of weather satellite is

(A) Radiometer **(B)** Bolometer
(C) Altimeter **(D)** Calorimeter

f. The INSAT operates in

(A) S-Band **(B)** C-Band
(C) Q-Band **(D)** K-Band

g. Which of the following digital modulation is widely used in satellite links?

(A) ASK **(B)** PSK
(C) FSK **(D)** QPSK

h. The location of a geostationary satellite is always given in terms of

(A) a certain longitude **(B)** a certain latitude
(C) longitude and latitude **(D)** distance from the earth's surface

i. The number of members states of INMARSAT

(A) 75 **(B)** 95
(C) 85 **(D)** 55

j. FDM is a method of

(A) Combining signals at different frequencies into a single signal
(B) Differentiating frequencies into a single signal
(C) Frequency differentiated modulation
(D) Frame differentiated modulation

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

Q.2 a. Explain the general structure of a satellite communication system. **(8)**

b. Derive the expression for the received power of a satellite receiver. **(8)**

Q.3 a. Explain S/N and C/N ratio in FM. **(8)**

b. Explain Frequency Shift Keying (FSK) and compare it with ASK. **(8)**

Q.4 a. Explain the principle of Time Division Multiple Access (TDMA). **(8)**

b. Explain the principle DS-CDMA technique. **(8)**

Q.5 a. Explain the satellite location with respect to the earth. **(8)**

b. Explain the eclipse effects on the satellite. **(8)**

Q.6 a. Explain, Thermal Control of a satellite. **(8)**

b. Explain Telemetry, Tracking & Command Subsystem of a satellite. **(8)**

Q.7 a. Explain, antenna subsystem of satellite earth station. **(10)**

b. Explain VSAT network architecture . **(6)**

Q.8 a. Explain INMARSAT. **(9)**

b. Explain Cable channel frequencies for VHF range. **(7)**

Q.9 a. Explain earth observation by satellites with respect to monitoring agriculture and forestry & monitoring oil pollution and air pollution. **(10)**

b. Write short note on satellite TV. **(6)**