1/7/12 Code: A-20

Diplete - ET (OLD SCHEME)

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

DECEMBER 2009

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 the best alternative in the following:	(2×10)
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- a. In the C-band transponder, the downlink frequency is about
 - **(A)** 6 GHz

(B) 4 GHz

(C) 14 GHz

- **(D)** 11 GHz
- b. The multiple access technique that is particularly suitable for communication satellites with military applications is
 - (A) TDMA

(B) FDMA

(C) CDMA

- (D) Random Access
- c. With reference to satellite orbit, perigee is the
 - (A) Point in an intermediate orbit
 - **(B)** Highest point in the orbit
 - **(C)** Lowest point in the orbit
 - (D) Middle point of the orbit
- d. The purpose of satellite receiver is
 - (A) To repeat the satellite signals many times
 - **(B)** To translate signal to new frequency band
 - (C) To receive signal from the satellite
 - (D) To receive signal from the earth
- e. 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 these
- f. INMARSAT consists of
 - (A) Single satellite

(B) Two satellite

(C) Three satellite

(D) Four satellite

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g. Which of the following is India's first operational satellite?

		(A) SITE (C) APPLE	(B) INSAT(D) Aryabhatta				
	h. Digital DBS-TV transmission takes place in						
		(A) L-band(C) Ka-Band	(B) S-band (D) Ku-band				
	i.	Weather satellites employ					
		(A) Polar orbit satellites(C) Both of these	(B) Geo-stationary satellites(D) Either of these				
	j. A communication channel has a bandwidth of 5 kHz and if signal-to-noise ratio is 5, the corresponding character will be						
		(A) 18000 bits/sec (C) 1500 bits/sec	(B) 4000 bits/sec (D) 1000 bits/sec				
		•	VE Questions out of EIGHT Questi h question carries 16 marks.	ons.			
Q.2	a.	Derive general link equations. Find the	e expressions for C/N and G/T ratios.	(8)			
	b.	Explain DBS method of transmission.	(8)				
Q.3	a.	Explain the followin Time Division Mu	ltiplexing (TDM) and also T1-24 chann	el system.	(8)		
	b.	Explain the following:					
		(i) Direct Sequence Spread Spectrum	Techniques (ii) Characteristics of PN	sequence.	(8)		
Q.4	a.	Explain the antenna systems used in (i) Earth stations	(ii) Satellite stations	(10)			
	b.	A satellite located at 40,000 km from the receiving antenna has a gain	earth operates at a frequency of of 50.5 dB, find the received pow		nas a EIRP of 21 dBW. 1		
Q.5	a.	Explain the block diagrams of Transm	itter and Receiver sections of an Earth S	Station.	(9)		
	b.	Explain Cable transmission network a	nd give cable TV frequencies.	(7)			
Q.6		a. Explain the applications satelli	tes with respect to Earth Observatio (10)	n and Weather	Forecasting.		
	b.	Explain the function of Telemetry, Tra	cking and Command subsystem.	(6)			

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Q.7 a. Explain digital communication system and its use in satellite communication. (10)
b. In a certain satellite communication link, the uplink carrier-to-noise (C/N)u is 25 dB whereas the downlink carrier-to-noise ratio (C/N)d is 20 dB. Find the Link carrier-to-noise ratio (C/N). (6)
Q.8 a. Explain Very Small Aperture Terminal (VSAT). (8)
b. Explain the block diagram of conventional satellite repeater (8)
Q.9 Explain the following: (2 × 8=16)

- (i) Satellite TV.
- (ii) INSAT-II