Exercise of Satellite Communication System (Chapter 1)

1. Describe briefly the main advantages offered by satellite communications.
   Main advantages:
   a. Flexible (if transparent transponders)
   b. Easy to install new circuits
   c. Circuit costs independent of distance
   d. Broadcast possibilities
   e. Temporary applications (restoration)
   f. Niche applications
   g. Mobile applications (especially "fill-in")
   h. Terrestrial network "by-pass"
   i. Provision of service to remote or underdeveloped areas
   j. User has control over own network
   k. 1-for-N multipoint standby possibilities

2. Explain what is meant by a *distance-insensitive communications system.*
   It means a limitations of discovered area that use the communication system, example of mobile and satellite. Mobile communication system have small discover area because it have restricted by the cells, and have small capacity. Meanwhile, the satellite could accommodate the big capacity and have big areas discovered.

3. Comparisons are sometimes made between satellite and optical fiber communications systems. State briefly the areas of application for which you feel each system is best suited.

No	Satellite Communication System	Optical Communication System
1	In rural areas could be discovered	In densely populated with a large number
2	Small bit rate cause of atmosphere and interfenece and unwide bandwidth	Large bit rate cause of light propagation and wide bandwidth
3	Highest cost in initialization until launch, Up front cost is higher	Expensive in fiber types
4	Atmosphere interference and loss data	Light transmission and electrical conversion

4. Describe the development of SKSD Palapa and its evolution to the present day.
   The Palapa Domestical Satellite Communication System (DSCS-P) was built in 1974 till 1976. And in July 9, 1976, the first Indonesia Satellite was launched in United States (USA). The name of Palapa was inspired by Amukti Palapa Oaths, from Majapahit King, Gajah Mada. The ground station was built in Cibinong until now. The Palapa Domestical Satellite Communication System (DSCS-P) have several times launched, start from A1, A2, B1, B2, B2P, B2R, 4, C1 and C2 since 1976 until 1996.
   The Palapa Domestical Satellite Communication System (DSCS-P) have advantages for covering the rural areas and areas that not covered with mobile communication system (make interlocal and international roaming

communication easily). Then, make interareas and intercountry communication as easily, and it become a repeater.

5. Describe briefly the development of INTELSAT starting from the 1960s through to the present. Information can be found at Web site *http://www.intelsat.com/*

No	Date	History	Detail
1	December 20, 1961	Resolution 1721	United Nations General Assembly adopts Resolution 1721, start the global communications for non-discriminatory base
2	August 31, 1962	Communication Satellite Act	John F. Kennedy (US President), signs the act for estabilishing a satellite system in other nations cooperation
3	August 20, 1964	INTELSAT Established	First estabilish: governments and operating entities signed
4	April 6, 1965	Intelsat I Launched	Launch into synchronous orbit for first early bird
5	June 28, 1965	First Transatlantic Communication	
6	January 26, 1967	Pacific Satellite Communication	Commercialing between US and Japan: live television coverage in both countries
7	July 1, 1969	First global Satellite Communication	Completing system by Intelsat 3 that covering Indian Ocean Region
8	July 20, 1969	Moon Landing via Intelsat	
9	August 20, 1974	Intelsat's 10th Anniversary	First 10th anniversary of Intelsat Establishment and launched
10	July 1978	Earliest Internet Demonstration	Demonstrate Internet in Virginia, US, Sweden, London and Norway using IV-A version
11	April 12, 1989	Birth of HD Television	First delivered HD transmission between US and Japan in International
12	May 7, 1992	Intelsat 603 Success	Collaborating NASA and Intelsat for launch Intelsat 603
13	November 30, 1998	Steps to Commercialization	
14	July 12, 2001	Intelsat Privatization	Intelsat begins investing in ground infrastructure and media-oriented satellites
15	February 15, 2003	Ariane space launches Intelsat 907	Launch in French Guiana
16	June 15, 2004	ILS Proton Rocket Launches IS-10-12 Satellite	launched from the Baikonur Cosmodrome in Kazakhstan aboard an ILS Proton rocket
17	June 23, 2005	Intelsat's IS-8 Sea Launch by Zenit-3SL Rocket	
18	July 7, 2007	Live Earth Coverage	Provides communications capacity using its industry-leading network of satellite and terrestrial facilities for the 24-hour, seven-continent, 150-performer environmental awareness campaign to a viewing audience of more than two billion

6. Define the terms: S/N , C/N_o, E_b/N_o, dB, dBm, and dBmO.
    a.   S/N: is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. It is defined as the ratio of signal power to the noise power, often expressed in decibels.
    b. C/N_o: is the signal-to-noise ratio (SNR) of a modulated signal. The term is used to distinguish the CNR of the radio frequency passband signal from the SNR of an analogue baseband message signal after demodulation, for example an audio frequency analogue message signal.

c. E_b/N_o: important parameter in digital communication or data transmission. It is a normalized signal-to-noise ratio (SNR) measure, also known as the "SNR per bit". It is especially useful when comparing the bit error rate (BER) performance of different digital modulation schemes without taking bandwidth into account.

d.   dB: logarithmic unit used to express the ratio of two values of a physical quantity, often power or intensity.

e.   dBm: : logarithmic unit used to express the ratio of two values electrical power unit in decibels (dB), referenced to 1 milliwatt (mW).

f.   dBmO: logarithmic unit used to express the ratio of noise power in dbm at a point of zero relative transmission level.