KINGS

COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

SUB.CODE	**: EC1015**	**SUB.NAME**	**: SATELLITE COMMUNICATION**
BRANCH	**: ECE**	**STAFF NAME**	**: MRS.V.FILOMIN JOSEENA**
YEAR	**: IV**	**SEMESTER**	**: VIII**

UNIT-I

OVERVIEW OF SATELLITE SYSTEMS, ORBITS AND LAUNCHING METHODS

PART-A

1. Classify major regions of frequency planning.
2. How many broadcasting services provided in satellite?
3. What is meant by distance insensitive?
4. List out the coverage area for INTELSAT.
5. Classify the Domsats in terms of power.
6. State Kepler's first law.
7. State Kepler's second law.
8. State Kepler's third law.
9. Define apogee and perigee.
10. Define prograde orbit and retrograde orbit.
11. Define ascending node and descending node.
12. Explain right ascension of ascending node.
13. Define true anomaly and mean anomaly.
14. List out the Keplerian elements.
15. What are the quantities involved for determination of look angles?
16. Define sidereal time.

PART-B

1. (a) Explain about frequency allocations for satellite services. (10)
   (b) Explain about U.S Domsats. (6)
2. Discuss briefly the development of INTELSAT starting from the 1960s through the present. (16)

3. What is meant by polar orbiting? Explain in detail. (16)
4. State Kepler's three laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth. (16)
5. Explain in detail the geocentric-equatorial coordinate system which is based on the earth's equatorial plane. (16)
6. Explain in detail about topocentric-horizon coordinate system which is based on the observer's horizon plane. (16)
7. Explain in detail about various measure of time. (16)

UNIT-II

GEOSTATINARY ORBIT AND SPACE SEGMENT

PART-A

1. What are the three conditions required for an orbit to be geostationary? Find height of geostationary orbit based on a_E and a_{GSO}.
2. What is meant by look angles? Classify.
3. Define elevation angle and azimuth angle.
4. What are the three pieces of information needed to determine the look angles for the geostationary orbit?
5. What is meant by polar mount antenna?
6. Define geosynchronous and sunsynchronous.
7. What is meant by geostationary orbit? How do the geostationary orbit and a geosynchronous orbit differ?
8. Why satellites carry batteries in addition to solar-cell arrays?
9. What is meant by satellite attitude?
10. Define the terms roll, pitch and yaw.
11. Describe the east-west and north-south station keeping maneuvers required in satellite station keeping.
12. What is meant by thermal control and why it is necessary in a satellite?
13. What are the functions carried out in TT&C?
14. What is meant by transponder?
15. What is meant by frequency reuse?
16. What is meant by redundant receiver?
17. Define attenuators and explain its classification.
18. Why TWTAs widely used?
19. What is meant by slow wave structure?
20. Define saturation and compression point.

21. What is meant by intermodulation distortion?
22. Define input back off.
23. Define diplexer and orthocoupler.

PART-B

1. Explain in detail about antenna look angles and the polar mount antenna. (16)
2. Explain about Earth eclipse of satellite and sun transit outage. (16)
3. Explain about launching orbits. (16)
4. Explain what is meant by satellite attitude and briefly describe two forms of attitude control. (16)
5. Draw the block diagram of TT&C and explain its blocks. (16)
6. Describe briefly the most common type of high-power amplifying device used aboard a communication satellite. (16)
7. Explain about wideband receiver and advanced Tiros-N spacecraft. (16)
8. Describe briefly the antenna subsystem and Anik-E. (16)
9. Explain in detail about thermal control and Morelos. (16)

UNIT-III

EARTH SEGMENT AND SPACE LINK

PART-A

1. What is meant by DBS service? How does it differ from the home reception of satellite TV signals in the C band?
2. What is meant by polarization interleaving?
3. What is meant by master broadcast quality signal?
4. Why the LNA in a satellite receiving system is placed at the antenna end of the feeder cable?
5. What is meant by single carrier per channel?
6. In most satellite TV receivers the first IF band is converted to a second, fixed IF. Why is this second frequency conversion required?
7. What is meant by the term redundant earth station?
8. List out the comparison between MATV and CATV.
9. Define EIRP.
10. Define receiver feeder losses.
11. What is meant by antenna pointing loss?
12. Write the equation for clear-sky losses and explain each term.
13. What is meant by noise power spectral density?
14. Classify the antenna noise and explain.

15. Define antenna noise temperature and amplifier noise temperature.
16. Write the equation for system noise temperature and apparent absorber temperature.
17. Define saturation flux density.
18. Define quantum efficiency and responsivity.
19. What is meant by noise factor and excess noise factor?

PART-B

1. With the aid of a block schematic, briefly describe the functioning of the receive only home TV systems. (16)
2. Describe and compare the MATV and CATV systems. (16)
3. With the relevant expression explain in detail about transmission losses. (16)
4. Explain the classifications of system noise temperature. (16)
5. Explain uplink satellite circuit. (16)
6. Explain downlink satellite circuit. (16)
7. Describe briefly about the rains effects. (16)
8. Explain about inter-satellite link. (16)

UNIT-IV

SATELLITE ACCESS

PART-A

1. What is meant by single access?
2. Distinguish between preassigned and demand assigned traffic
3. What is meant by thin route service?
4. Differentiate centrally controlled random access and distributed control random access.
5. Explain the word spade.
6. Define the terms power-limited and bandwidth limited operation.
7. What is meant by demand assignment signaling and switching?
8. What are the advantages of TDMA over FDMA?
9. Define the term burst and frame.
10. Define burst rate and average bit rate.
11. What do you meant by guard time?
12. Define burst code word.
13. Define the term preamble and postamble.
14. What is meant by burst position acquisition and burst position synchronization?
15. What is meant by adaptive open loop timing?

16. Define the term lookback.
17. Define the terms miss probability and probability of false alarm.
18. What is meant by digital speech interpolation and digital noninterpolated?
19. What is meant by telephone load activity factor and digital speech interpolation?
20. What is meant by spread spectrum multiple access?
21. What is meant by direct sequence spread spectrum?
22. Define maximal sequence?
23. List out the advantages of CDMA in terms of VSAT.
24. Define throughput efficiency.

PART-B

1. Explain with an example the type of traffic route where single access is used. (16)
2. Explain in detail about FDMA and show how this differs from FDM. (16)
3. Explain in detail the operation of a preassigned SCPC network. (16)
4. Explain in detail the operation of the spade system of demand assignment. What is the function of the common signaling channel? (16)
5. Describe the general operating principles of a TDMA network. Show how the transmission bit rate is related to the input bit rate. (16)
6. Explain the need for reference burst and preamble and postamble in a TDMA system. (16)
7. Explain in detail about network synchronization with neat sketch. (16)
8. Define and explain the terms carrier recovery, bit-time recovery, traffic data, frame efficiency and channel capacity. (16)
9. Explain in detail about speech interpolation and prediction. (16)
10. Explain in detail about satellite switched TDMA. (16)
11. Describe briefly about on board signal processing for FDMA/TDM operation. (16)
12. Describe in your own words how signal acquisition and tracking are achieved in a DS/SS system. And also derive the expression for maximal sequence. (16)
13. Explain the principle behind spectrum spreading and dispreading and how this is used to minimize interference in a CDMA system. Also determine the throughput efficiency of the system. (16)

UNIT-V

DIRECT BROADCAST SATELLITE SERVICES

PART-A

1. Define DTH.
2. Expand the terms RARC and ISO/IEC.

3. How many MPEG standards are available?
4. What is meant by chroma sub sampling?
5. Draw the diagram of MPEG-2 sub sampling.
6. What is meant by spatial frequency?
7. What is meant by masking in the context of audio compression?
8. Define temporal masking and frequency masking?
9. Expand the terms MPEG, ITU, AVC and CCIR?
10. What is meant by fidelity range extension?
11. Define ideal parabolic surface in terms of rms.
12. What is meant by microsat?
13. List out the modes of operation in Radarsat-2.
14. What is meant by earth-centered, earth-fixed coordinate system?
15. What does the term dilution of precision refer to?
16. What does the term position dilution of precision factor refer to?
17. Define GPS time.
18. Expand the terms GSM, GPS, orbcomm, GCC, NCC, GES, and OSC.

PART-B

1. Describe briefly the video compression process used in MPEG-2. (16)
2. Explain about indoor and outdoor unit of home receiver. (16)
3. Explain about frequencies and polarization, transponder capacity and bit rates for digital television. (16)
4. Explain in detail about satellite mobile services. (16)
5. Describe the operation of typical VSAT system. State briefly where VSAT systems find widest applications. (16)
6. Describe the main features of Radarsat. Explain what is meant by dawn to dusk orbit and why the Radarsat follows such on orbit. (16)
7. Explain why a minimum of four satellites are visible at an earth location utilizing the GPS system for position determination. What does the term dilution of precision refer to? (16)
8. Describe the main features and services offered by the orbcomm satellite system. How do these services offered by geostationary satellites and terrestrial cellular systems? (16)
