DRONACHARYA GROUP OF INSTITUTIONS, GREATER NOIDA.

SATELLITE COMMUNICATIONS (EEC 021)

QUESTION BANK

1. Write the advantages and disadvantages of Satellite Communication.
2. Distinguish between active and passive satellites.
3. Write the advantages of Geo Stationary orbit.
4. Compare LEO, MEO, GEO.
5. State Kepler's laws of planetary motion.
6. Define orbital Parameters.
7. What are Look angles?
8. What are the parameters which may affect the orbital position of the satellite?
9. What do you understand by station Keeping? What are the methods used for that?
10. Define Slant Range.
11. Why is Uplink frequency greater than the downlink frequency?
12. What are the types of Launch Vehicles used for Satellite Launching?
13. What is a Payload of a Communication Satellite?
14. What arc the requirements of an Earth Station antenna?
15. Define apogee and perigee.
16. Write the advantages of Geo Stationary orbit.
17. Define orbital Parameters.
18. What is meant by polar orbiting? Explain in detail.
19. Write brief notes on the advantages and disadvantages of using satellites in LEOs, MEOs and GEOs for satellite communications.
20. State Kepler’s three laws of planetary motion. Illustrate in each case their relevance to artificial

satellites orbiting the Earth?

21. Explain in detail the geocentric-equatorial coordinate system which is based on the earth's equatorial plane.

22. What is the fundamental unit of universal coordinated time? Express thefollowing times in (a) days and (b) degrees: 0 h, 5 min, 24 s; 6 h, 35 min, 20 s;your present time.

23. Discuss the mechanics of launching a satellite.

24. Describe the main effects of the earth's equatorial bulge on satellite orbit.

25. Write notes on SSP, Effects of Atmospheric drag on satellite orbit.

26. Derive the expression for antenna look angles.

27. What are orbital elements? Derive the six orbital elements of satellite from Newton's law of motion.

28. Define argument of perigee with neat sketch.

29. What are the types of Launch Vehicles used for Satellite Launching?

30. What are the methods used for attitude control?

31. What are the functions carried out in Telemetry, Tracking & Command (TT&C) Subsystem ?

32. What are the types of redundancy connections used in Spacecraft?

33. What are the types of antennas used in Spacecraft?

34. How the Capacity of a Satellite Communication System can be increased?

35. What are the methods used to improve the reliability of Satellite System?

36. What is an noise power spectral density?

37. Write the equations of losses for clear sky conditions.

38. What is an Intermodulation noise?

39. A satellite downlink at 12GHZ operates with a transmit power of 6w & an antenna gain of 48.2db.Calculate the EIRP in Dbw.

40. Write the equation of system noise factor.

41. Calculate the gain of a 3m parabolidal antenna operating at a frequency of 12GHZ.Assume an aperture efficiency of 0.5.

42. Define noise factor and system noise temperature.

43. The range between a ground station & a satellite is 42000km. Calculate the free space loss a frequency of 6GHZ.

44. An antenna has a noise temperature of 35k & its matched into a receiver which has a noise temp of 100k. Calculate the noise power density & the noise power for a BW of 36MHZ.
45. Why link budget is calculated for satellite communication system?
46. Derive and express the link equation for received power at the earth station.
47. Which factors does effects the system noise temperature?
48. Define antenna beam width and antenna gain.
49. Explain the EIRP& Transmission losses.
50. Draw the block diagram & Explain the System noise temperature.
51. Explain the carrier to noise ratio of uplink & downlink frequency.
52. Give the expression for G/T ratio and its use.
53. . Write notes on atmospheric absorption and scintillation at troposphere and ionosphere.
54. Derive the expression for C/N for uplink.
55. Derive the expression for C/N for downlink.
56. Describe the effects of rain and intermodulation noise on C/N ratio.
57. Write notes on frequency of operation.
58. Derive the expression for combined uplink/downlink C/N ratio.
59. What is the difference between active and passive attitude control?
60. Name the antenna system that can be used for global coverage.
61. Explain spacecraft power subsystem.
62. Discuss the attitude, orbit and control (AOCS) subsystem of spacecraft.
63. How could I demonstrate the effect of space weather on power systems?
64. Explain the carrier to noise ratio of uplink & downlink frequency.
65. What are the Propagation effects and their impact on satellite-earth links?
66. List out different phenomena which leads to signal loss on transmission through the earth's atmosphere.
67. Define depolarization and attenuation effects on the received power.
68. Which is the dominant propagation phenomena on satellite links at frequencies above 10 GHz & explain?
69. Describe Atmospheric absorption, rain, cloud and ice effects.

70. What type of configuration is used in VSAT system?
71. What is medium gain directional antenna?
72. Define Radiation pattern and beamwidth.
73. Define side lobes and antenna directivity.
74. What do you understand by polarization and axial ratio?
75. Write the expression to calculate polarization of circular polarized radiated waves?
76. Draw and discuss the various types of wire antennas.
77. Briefly explain the construction of array antennas.
78. Discuss the applications of crossed slot antennas.
79. What do you mean by the attenuation effects on the satellite earth link.
80. Explain the depolarization process for transmitting antenna.
81. Discuss the propagation effects not associated with raindrops.
82. What is rainfall rate and described it by using CDF?
83. Give the difference between KU-band and the C-band receive only systems.
84. Describe briefly about the rains effects.
85. Explain about inter-satellite link.
86. Give the 3 different types of applications with respect to satellite systems.
87. Mention the 3 regions to allocate the frequency for satellite services.
88. Give the types of satellite services.
89. Describe the operation of typical VSAT system. State briefly where VSAT systems and find widest applications.
90. Explain the Satellite switched TDMA & CDMA.
91. Explain why a minimum of four satellites must be visible at an earth location utilizing the GPS system for position determination.
92. Describe briefly about the rains effects.
93. Explain about inter-satellite link.
94. With the aid of a block schematic, briefly describe the functioning of the receive only home TV systems.
95. What is meant by space division multiple access?
96. What is meant by frequency reuse?
97. What is meant by burst position acquisition & burst position synchronization?
98. What are the non geostationary orbits and explain in brief.
99. List out the characteristics, merits and demerits of LEO, MEO and GEO.
100. How many types of orbits can be used for satellites in wheather forecasting?
101. Discuss the direct broadcast satellite (DBS) frequency plan with orbit location.
102. What do you mean by differential GPS? Explain briefly.

103. Discuss the various applications of GPS system.
104. Draw and discuss the block diagram of a DBS system.
105. Explain the various components of GPS receiver?
106. Draw the structure of GPS navigation data and explain each block?
107. Describe and compare the MATV and CATV systems.
108. What is the GPS position location principle? Explain the functioning of each segment?
109. Draw and explain the block diagram of DBS -TV receiver?
110. What are the data communication services involved in the field of computers and telecommunications?
111. State and explain the differential segment of a global positioning satellite system.
112. Explain why a minimum of four satellites must be visible at an earth location utilizing the GPS system for position determination.
113. List the advantages to use the Ku band for direct broadcast satellite service.
114. Which of the satellite system is used for whether forecast application.
115. Which type of modulation is used in direct broadcast satellite.
116. What is the uplink frequency in DBS TV transmission?
117. Describe briefly the most common type of high-power amplifying device used aboard a communication satellite.
118. What is meant by DBS service? How does differ from the home reception of satellite TV signals in the C band?
119. What is meant by master broadcast quality signals?
120. Write the relevant expression and explain in detail about transmission losses.
121. How to classify the system noise temperature and explain in detail about all.
122. Explain about uplink satellite circuit.
123. Explain about downlink satellite circuit.
124. What are the difference between DBS TV and conventional TV?
125. What do you understand by GMSC? Explain anteena configuration used for GMSC.
126. Discuss the evolution of anteena systems for mobile radio communications.
127. What is meant by antenna noise temperature?
128. How many types of mobile satellite antennas (MSA)are there? explain each of them briefly .
129. Briefly explain the important general requirements for mobile anteena solutions used in GMSC system.

130. Classify mobile satellite antenna on the basis of transmission direction.
131. An antenna has a noise temperature of 35k & its matched into a receiver which has a noise temp of 100k. Calculate the noise power density & the noise power for a BW of 36MHZ.
132. Explain what is meant by satellite attitude, and briefly describe two forms of attitude control.
133. How to broadly classify the antenna noise and explain.
134. What is meant by system noise temperature?
135. What is meant by noise factor?
136. What do you understand by Quad Helix Antenna (QHA)?with the help of diagram discuss its various components?
137. List the major characteristics of SBF, modified SBF and improved SBF.
138. What are the parameters which may affect the orbital position of the satellite?
139. What do you understand by station Keeping? What are the methods used for that?
140. Discuss the major electrical, mechanical and structural requirements of mobile antennas for MSB.
141. Explain the Radarsat & MSAT. Mention the applications.
142. Explain in detail about satellite mobile services.
143. Briefly discuss about Mobile Satellite Services.
144. What is the need of mobile services using satellite communication?
145. What is meant by amplifier noise temperature?
146. What are the factors on which the fading of mobile signals depend?
147. Explain different types of satellite based mobile system.
148. Classify mobile satellite antenna (MSA) and explain.
149. Why uplink frequency is higher than downlink frequency?
150. Explain different types of antennas used in satellite communication.