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**BE (2015)Pattern**

**404190 Broadband Communication Systems**

**UNIT IV: Orbital Mechanics and Launchers**

This set of Avionics Multiple Choice Questions & Answers (MCQs) focuses on “Satellite Orbits”.

1. What happens if a satellite is launched vertically and released at its design altitude? a) Continue to orbit the earth b) Fall back c) Overshoots the altitude and moves at a constant speed d) Stays where it was released View Answer

Answer: b Explanation: If a satellite were launched vertically from the earth and then released, it would fall back to earth because of gravity. For the satellite to go into orbit around the earth, it must have some forward motion. For that reason, when the satellite is launched, it is given both vertical and forward motion.

2. The satellite is accelerating as it orbits the earth. a) True b) False View Answer

Answer: a Explanation: Although the speed of the satellite is constant its direction keeps on changing as the orbit is circular or elliptical. The rate of change of velocity vector is acceleration and hence its direction changes, the satellite is under acceleration.

3. Why does the orbit take the shape of an ellipse or circle? a) Position can be easily determined b) Consume less fuel c) Most efficient geometry d) Better coverage on earth View Answer

Answer: a Explanation: A satellite rotates about the earth in either a circular or an elliptical path. Circles and ellipses are geometric figures that can be accurately described mathematically. Because the orbit is either circular or elliptical, it is possible to calculate the position of a satellite at any given time.

4. The direction of orbit in the same direction of earth rotation is called \_\_\_\_\_\_ a) Retrograde b) Posigrade c) Perigee d) Apogee View Answer

Answer: b Explanation: The direction of satellite rotation may be either in the same direction as the earth’s rotation or against the direction of earth’s rotation. In the former case, the orbit is said to be posigrade, and in the latter case, retrograde. Most orbits are posigrade.

5. When is the speed of the satellite maximum in an elliptical orbit? a) Retrograde b) Posigrade c) Perigee d) Apogee View Answer

Answer: c Explanation: In an elliptical orbit, the speed changes depending upon the height of the satellite above the earth. Naturally, the speed of the satellite is greater when it is close to the earth than when it is far away. The closest point is called the perigee.

6. Satellites closer to the earth travel at lower speeds than satellites that are far away from earth. a) True b) False View Answer

Answer: b Explanation: Satellites that are near earth have to move at higher speeds to sustain their orbit since the gravitational pull is much higher. Since the effect of gravity is less at higher altitudes, satellites that far away require less speeds.

7. The time period taken by the satellite to complete one orbit is called \_\_\_\_\_\_\_\_ a) Lapsed time b) Time period c) Sidereal period d) Unit frequency View Answer

Answer: c Explanation: The period is the time it takes for a satellite to complete one orbit. It is also called the sidereal period. A sidereal orbit uses some external fixed or apparently motionless object such as the sun or star for reference in determining a sidereal period.

8. The period of time that elapses between the successive passes of the satellite over a given meridian of earth longitude is called as \_\_\_\_\_\_\_\_\_\_\_\_\_ a) synodic period b) Lapsed time c) Time period d) Sidereal period View Answer

Answer: a Explanation: Another method of expressing the time for one orbit is the revolution or synodic period. One revolution (1 r) is the period of time that elapses between the successive passes of the satellite over a given meridian of earth longitude. Naturally, the synodic and sidereal periods differ from each other because of the earth’s rotation.

9. What is the angle of inclination for a satellite following an equatorial orbit? a) 0° b) 180° c) 45° d) 90° View Answer

Answer: a Explanation: Another definition of inclination is the angle between the equatorial plane and the satellite orbital plane as the satellite enters the northern hemisphere. When the angle of inclination is 0°, the satellite is directly above the equator. Orbits with 0° inclination are generally called equatorial orbits.

10. The angle between the line from the earth station’s antenna to the satellite and the line between the earth station’s antenna and the earth’s horizon is called as \_\_\_\_\_\_\_\_\_\_\_ a) Angle of inclination b) Angle of elevation c) Apogee angle d) LOS angle View Answer

Answer: b Explanation: The angle of elevation of a satellite is the angle that appears between the line from the earth station’s antenna to the satellite and the line between the earth station’s antenna and the earth’s horizon. If the angle of elevation is too small, the signals between the earth station and the satellite have to pass through much more of the earth’s atmosphere. Because of the very low powers used and the high absorption of the earth’s atmosphere.

11. To use a satellite for communication relay or repeater purposes what type of orbit will be the best? a) Circular orbit b) Elliptical orbit c) Geosynchronous orbit d) Triangular orbit View Answer

Answer: c Explanation: The best solution is to launch a synchronous or geostationary satellite. In a geosynchronous earth orbit. Since the satellite remains apparently fixed, no special earth station

tracking antennas are required. The antenna is simply pointed at the satellite and remains in a fixed position. With this arrangement, continuous communication is possible.

12. What percentage of the earth can communication satellites see? a) 20 b) 50 c) 70 d) 40 View Answer

Answer: d Explanation: Most communication satellites in use today are of the geosynchronous variety. Approximately 40 percent of the earth’s surface can be “seen” or accessed from such a satellite. Users inside that area can use the satellite for communication.

13. What is the point on the surface of the earth that is directly below the satellite called? a) Satellite point b) Subsatellite point c) Supersatellite point d) Overhead point View Answer

Answer:b Explanation: The satellite location is specified by a point on the surface of the earth directly below the satellite. This point is known as the subsatellite point (SSP). The subsatellite point is then located by using conventional latitude and longitude designations.

Communication Systems”.

1. The satellite that is used as a relay to extend communication distance is called as \_\_\_\_\_\_\_\_\_\_ a) Relay satellites b) Communication satellites c) Repeater satellites d) Geosynchronous satellites View Answer

Answer: b Explanation: Communication satellites are not originators of information to be transmitted. If a transmitting station cannot communicate directly with one or more receiving stations because of line-of-sight restrictions, a satellite can be used. The transmitting station sends the information to the satellite, which in turn re-transmits it to the receiving stations.

2. The transmitter-receiver combination in the satellite is known as a \_\_\_\_\_\_\_ a) Relay b) Repeater c) Transponder

d) Duplexer View Answer

Answer: c Explanation: The transmitter-receiver combination in the satellite is known as a transponder. The basic functions of a transponder are amplification and frequency translation. The reason for frequency translation is that the transponder cannot transmit and receive on the same frequency.

3. The downlink frequency is lower than the uplink frequency. a) True b) False View Answer

Answer: a Explanation: The original signal being transmitted from the earth station to the satellite is called the uplink, and the re-transmitted signal from the satellite to the receiving stations is called the downlink. Usually, the downlink frequency is lower than the uplink frequency. A typical uplink frequency is 6 GHz, and a common downlink frequency is 4 GHz.

4. What is the reason for carrying multiple transponders in a satellite? a) More number of operating channel b) Better reception c) More gain d) Redundancy View Answer

Answer: a Explanation: To be economically feasible, a satellite must be capable of handling several channels. As a result, most satellites contain multiple transponders, each operating at a different frequency. Each transponder represents an individual communication channel.

5. Why are VHF, UHF, and microwave signals used in satellite communication? a) More bandwidth b) More spectrum space c) Are not diffracted by the ionosphere d) Economically viable View Answer

Answer: c Explanation: VHF, UHF, and microwave signals penetrate the ionosphere with little or no attenuation and are not refracted to earth. Lower frequencies undergo total internal refraction and get reflected back to earth.

6. What is the reason for shifting from c band to ku band in satellite communication? a) Lesser attenuation b) Less power requirements

c) More bandwidth d) Overcrowding View Answer

Answer: d Explanation: Most new communication satellites will operate in the Ku band. This upward shift in frequency is happening because the C band is overcrowded. Many communication satellites are in orbit now, most of them operating in the C band. However, there is some difficulty with interference because of the heavy usage. The only way this interference will be minimized is to shift all future satellite communication to higher frequencies.

7. Which of the following bands cannot be used for satellite communication? a) MF b) Ku c) X d) C View Answer

Answer: a Explanation: MF is a lower frequency band than Ku, C and X bands and does not lie in the microwave spectrum. Microwaves are used for satellite communication since the lower bands get reflected by the ionosphere.

8. What is the maximum theoretical data rate if a transponder is used for binary transmission and has a bandwidth of 36MHz? a) 32Mpbs b) 72Mpbs c) 36Mpbs d) 12Mpbs View Answer

Answer: b Explanation: For binary transmission, the maximum theoretical data rate or channel capacity C for a given bandwidth B is C = 2B = 2(36) =72Mpbs.

9. Why are techniques like frequency reuse and spatial isolation carried out? a) Reduce traffic load b) More gain c) High speed d) Error detection View Answer

Answer: a Explanation: at times there is more traffic than there are transponders to handle it. For that reason, numerous techniques have been developed to effectively increase the bandwidth and

signal-carrying capacity of the satellite. Two of these techniques are known as frequency reuse and spatial isolation.

10. Which technique uses two different antennas to reduce traffic on the same frequency? a) Spatial isolation b) Frequency reuse c) Multiplexing d) Modulation View Answer

Answer: b Explanation: In the frequency reuse technique two systems use the same frequency, although operating on exactly the same frequencies, they are isolated from each other by the use of special antenna techniques. For example, a vertically polarized antenna will not respond to a horizontally polarized signal and vice versa. Or a left-hand circularly polarized (LHCP) antenna will not respond to a right-hand circularly polarized (RHCP) signal and vice versa.

11. Which technique uses spot beam antennas to divide the area covered by the satellite into smaller segments? a) Spatial isolation b) Frequency reuse c) Multiplexing d) Modulation View Answer

Answer: a Explanation: By using narrow beam or spot beam antennas, the area on the earth covered by the satellite can be divided up into smaller segments. Earth stations in each segment may actually use the same frequency, but because of the very narrow beam widths of the antennas, there is no interference between adjacent segments.

12. Spatial-division multiple access (SDMA) depends on satellite location and not frequency. a) True b) False View Answer

Answer: a Explanation: Spatial-division multiple access uses spatial isolation technique. Earth stations in each segment may actually use the same frequency, but because of the very narrow beam widths of the antennas, there is no interference between adjacent segments. This technique is referred to a spatial-division multiple access (SDMA) in that access to the satellite depends on location and not frequency.

This set of Avionics Multiple Choice Questions & Answers (MCQs) focuses on “Satellite

This set of Avionics Multiple Choice Questions & Answers (MCQs) focuses on “Satellite Subsystems”.

1. Which of the following is not a satellite subsystem? a) Ground station b) Power system c) Telemetry tracking d) Communication subsystem View Answer

Answer: a Explanation: The communication subsystem is the most important part of the satellite. It requires varies additional systems like the power system, propulsion system, telemetry system for its proper functioning. The ground system however is not one of the satellite subsystem and is independent of the satellite. It is just a transponder to monitor and command the satellite.

2. Which of the following is not a part of the propulsion subsystem of a satellite? a) Gyroscope b) Jet thruster c) AKM d) Fuel control system View Answer

Answer: a Explanation: The propulsion subsystem consists of the AKM(Apogee kick motor), jet thruster and the fuel control system. Gyroscopes and other attitude systems fall under the attitude control subsystem.

3. Which of the following are common baseband signals transmitted from the earth ground station? a) Navigational data, computer data, video b) Computer data, navigational data, voice c) Voice, video, computer data d) Computer data View Answer

Answer: c Explanation: An earth station takes the signals to be transmitted, known as baseband signals, and modulates a microwave carrier. The three most common baseband signals are voice, video, and computer data.

4. Which of the following components receives, translates the signal frequency and re-transmits the signal in a satellite? a) Repeater b) Relay c) Transponder d) Transducer View Answer

Answer: c Explanation: The uplink signals from earth are amplified, translated in frequency, and re-transmitted on the downlink to one or more earth stations. The component that performs this function is known as a transponder.

5. Why is there a huge spectrum space between the transmitted and received signal in satellite communication? a) Reduce interference b) Maximum efficiency c) Less attenuation d) To reduce space occupied by filters View Answer

Answer: a Explanation: Because of the close proximity of the transmitter and the receiver in the satellite, the high transmitter output power for the downlink is picked up by that satellite receiver. Naturally, the uplink signal is totally obliterated. Furthermore, the transmitter output fed back into the receiver input causes oscillation. To avoid this problem, the receiver and transmitter in the satellite transponder are designed to operate at separate frequencies. In this way, they will not interfere with each other.

6. Which of the following transponders convert the uplink signal to downlink signal using two mixers a) Single conversion transponders b) Dual conversion transponders c) Regenerative transponders d) Dual mixer transponder View Answer

Answer: b Explanation: A dual-conversion transponder makes the frequency translation in two steps with two mixers. No demodulation occurs.

7. In a regenerative transponder, the signal is demodulated and modulated again before transmission. a) True b) False View Answer

Answer: a Explanation: A regenerative repeater demodulates the uplink signal after the frequency is translated to some lower intermediate frequency. The recovered baseband signal is then used to modulate the downlink signal.

8. What is the number of transponders if the satellite uses 12 channels of frequency and frequency reuse is implemented? a) 12 b) 6 c) 24 d) 3 View Answer

Answer: c Explanation: Since in frequency reuse each channel can be used twice the numbers of transponders are also doubled. 12 x 2 = 24 transponders, two for each frequency.

9. Why is it not possible to provide transmit function by wideband amplifier and mixer circuits? a) Heavy attenuation b) High power output over wideband is not possible c) Economically not profitable d) Weight of the system increases five fold View Answer

Answer: b Explanation: it is generally not possible to generate very high output power over such wide bandwidth. The fact is that no components and circuits can do this well. The high-power amplifiers in most transponders are traveling-wave tubes that inherently have limited bandwidth. They operate well over a small range but cannot deal with the entire 500-MHz bandwidth allocated to a satellite.

10. Which of the following is not true? a) Battery is only used as a back up b) When in orbit, solar power is always available c) Battery is used for initial satellite orientation and stabilization d) The batteries are charged using solar power View Answer

Answer: b Explanation: When a satellite goes into an eclipse or when the solar panels are not properly positioned, there is a temporary cut in solar power supply. In situations like this the batteries take over temporarily and keep the satellite operating. The batteries are not large enough to power the satellite for a long time; they are used as a backup system for eclipses, initial satellite orientation and stabilization, or emergency conditions.

11. Telemetry, command, and control (TC&C) subsystem allow a ground station to monitor and control conditions in the satellite. a) True b) False View Answer

Answer: a Explanation: The telemetry system is used to report the status of the onboard subsystems to the ground station. The telemetry system typically consists of various electronic sensors whose data are selected by a multiplexer and then converted to a digital signal, which then modulates an internal transmitter. This transmitter sends the telemetry information back to the earth station, where it is recorded and monitored.

**Q1. Satellite engine uses …………**

**a.** Jet propulsion **b.** Ion propulsion system **c.** Liquid fuel **d.** Solar jet

**Answer : b**

**Q2. The earth area covered by a satellite radio beam is known as ……..**

**a.** Beam width **b.** Band width **c.** Footprint **d.** Zone

**Answer : c**

**Q3. What kind of battery used by older satellites ?**

**a.** Lithium **b.** Leclanche **c.** Hydrogen **d.** Magnesium

**Answer : c**

**Q4. The location of AsiaSat I.**

**a.** 105.5˚ East **b.** 151.5˚ East

**c.** 115.5˚ East **d.** 170.5˚ East

**Answer : a**

**Q5. To make antenna more directional, either its size must be increased or**

**a.** the number of its feed horns must be increased **b.**the frequency of its transmission must be increased **c.** its effective isotropic radiated power (EIRP) must be increased **d.** its footprint must be increased

**Answer : b**

**Q6. India’s first domestic geostationary satellite 1NSAT-IA was launched on 10th April 1982 from**

**a. USSR b.USA c. UK d. UP**

**Answer : b**

**Q7. Satellite launch sites are invariably located on Eastern seaboards to ensure that**

**a.** launch takes place eastward **b.** expenditure of propulsion fuel is reduced during plane changing **c.** the satellite achieves circular orbit quickly **d.** spent rocket motor and other launcher debris falls into the sea

**Answer : d**

**Q8. The owner of a communication satellite is usually required to keep the spacecraft on station at its assigned place in the geosynchronous orbit with an accuracy of \_\_\_\_\_\_\_\_\_\_ degree.**

**a.** 0.1 **b.** 1.0 **c.** 2.0 **d.** 0.5

**Answer : a**

**Q9. The number of days when Earth’s shadow falls on a geosynchronous satellite is**

**a. 88 b. 277 c. 5 d. 10**

**Answer : a**

**Q10. A satellite signal transmitted from a satellite transponder to earth’s station is ……….**

**a.** Uplink **b.** Downlink **c.** Terrestrial **d.** Earthbound

**Answer : b**

**Q11. A helical antenna is used for satellite tracking because of …………..**

**a.** Circular polarization **b.** Maneuverability **c.** Beamwidth **d.** Gain

**Answer : a**

**Q12. What band does VSAT first operate?**

**a.** L-band **b.** X-band **c.** C-band **d.** Ku-band

**Answer : c**

**Q13. VSAT was made available in ……..**

**a. 1979 b. 1981 c. 1983 d. 1977**

**Answer : a**

**Q14. ……………. collects very weak signals from a broadcast satellite**

**a.** Helical antenna **b.** Satellite dish **c.** LNA **d.** TWT

**Answer : b**

**Q15. ………….is a loss of power of a satellite downlink signal due to earth’s atmosphere.**

**a.** Atmospheric loss **b.** Path loss **c.** Radiation loss **d.** RFI

**Answer : b**

**Q16. …………… is considered as the unsolved problem in satellite system.**

**a.** Coverage **b.** Cost **c.** Access **d.** Privacy

**Answer : d**

**Q17. As the height of a satellite orbit gets lower, the speed of the satellite ……………**

**a.** Increases **b.** Decreases **c.** Remains the same **d.** None of the above

**Answer : a**

**Q18. A satellite beam that covers almost 42.4% of the earth’s surface is called ……………**

**a.** Zone beam **b.** Hemispheric beam **c.** Spot beam **d.** Global beam

**Answer : d**

**Q19. A geosynchronous satellite**

**a.** has the same period a that of the Earth **b.** has a circular orbit **c.** rotates in the equatorial plane **d.** has all of the above

**Answer : d**

**Q20. A transponder is a satellite equipment which**

**a.** receives a signal from Earth station and amplifies **b.** changes the frequency of the received signal **c.** retransmits the received signal **d.** does all of the above-mentioned functions

**Answer : d**

**Q21. The INTELSAT-IV satellite launched in 1974 had two earth coverage antenna and two narrower-angle antennas subtending 4.5°. The signal from narrow-angle antenna was stronger than that from earth- coverage antenna by a factor of ……………**

**a.** 17.34/4.5 **b.** 17.34/4.5 **c.** (17.34/4.5)**2 d.** (17.34/4.5)4

**Answer : c**

**Q22. The angle subtended by earth at geostationary communication satellite is ………..**

**a.** 17.34° **b.** 51.4° **c.** 120° **d.** 60°

**Answer : a**

**Q23. The discussing sharing of a communication satellite by many geographically dispersed Earth station, DAMA means**

**a.** Demand-Assigned Multiple Access **b.** Decibel Attenuated Microwave Access **c.** Digital Analog Master Antenna **d.** Dynamically-Assigned Multiple Access

**Answer : a**

**Q24. A 20 m antenna gives a certain uplink gain at frequencies of 4/6 GHz. For getting same gain in the 20/30 GHz band, antenna size required is ……… metre.**

**a. 100 b. 4 c. 1 d. 10**

**Answer : b**

**Q25. Of the four INSAT-I satellites planned by India so for, only …………… has proved to be successful.**

**a.** INSAT-IA **b.** INSAT-IB **c.** INSAT-IC **d.** INSAT-ID

**Answer : b**

**Q26. Radio broadcasting is a familiar example of …………….**

**a.** space multiplexing **b.** time multiplexing **c.** frequency multiplexing **d.** none of the above

**Answer : c**

**Q27. As compared to 17.34° antenna, the total increase in the signal relayed by 4.5° antenna of INTELSAT-IV is ……….**

**a.** 14.85 **b.** 220 **c.** 78 **d.** 3.85

**Answer : b**

**Q28. Which one of the following statements regarding DSI is false?**

**a.** It is a digital form of TASI **b.** Though it is more efficient than TASI, it is much slower **c.** A speaker has to wait (it at all) for only a few milliseconds for reallocation of channel

**d.** It has increased the capacity of satellite channels by a factor of 2.2 or more with out degrading speech quality

**Answer : b**

**Q29. Which one of the following statements regarding compandor is FALSE?**

**a.** It compresses the higher-amplitude parts of a signal before modulation and expands them back to normal again after demodulation. **b.** It gives preferential treatment to the weaker parts of the signal **c.** For weaker signals it gives a poor ratio of signal strength to quantizing error **d.** Weaker signals, traverse more quantum steps than they would do otherwise and so quantizing error is reduced.

**Answer : c**

**Q30. The quality of a space-link is measured in terms of the ………. ratio.**

**a.** C/N **b.** S/N **c.** G/T **d.** EIRP

**Answer :a**

**Q31. The useful operational life of INSAT-IB (launched in 1983) is expected to end by**

**a. 1992-93 b. 1991-92 c. 1989-90 d. 1993-94**

**Answer : c**

**Q32. At present, the radio-frequency band mainly used by most satellites is ……….**

**a.** EHF **b.** UHF **c.** VHF **d.** SHF

**Answer : d**

**Q33. Orbital disturbances of a geosynchronous satellite are caused by the**

**a.** moon **b.** sun **c.** earth **d.** all of the above

**Answer : d**

**Q34. Which one of the following statement is correct?**

**a.** Satellite spacing is not affected by the bandwidth of the transmitting earth station **b.** Beamwidth is independent of antenna size and frequency band used **c.** The width of a beam in space is inversely proportional to the width of the transmitting antenna **d.** Use of high-frequency bands permits less number of satellites to share the orbit

**Answer : c**

**Q35. In a stop-and-wait ARQ system, the transmitting terminal**

**a.** waits for positive or negative acknowled-gement from the receiving terminal after sending a block **b.** sends another block if positive acknowledge is received through ACK character **c.** resends the previous block if negative acknowledgement is received through a NAK character **d.** does not wait for acknowledgement after sending a block

**Answer : d**

**Q36. A geostationary satellite is one which**

**a.** hangs motionless in space about 36000 km about Earth **b.** travels around the Earth in 24 hours **c.** remains stationary above the Earth **d.** appears stationary to everybody on Earth

**Answer : d**

**Q37. The geostationary communication satellite APPLE is parked in the equatorial orbit at**

**a.** 102° E longitude over Sumatra **b.** 90° E longitude over Bangladesh **c.** 74° E longitude over India **d.** 67° E longitude over Pakistan

**Answer : a**

**Q38. Power received from Sun per m2 surface area of a geosynchronous satellite in nearly…………. watt.**

**a. 100 b. 500 c. 2000 d. 1000**

**Answer : d**

**Q39. A certain sound has 10000 times more energy than another sound. The number of times it would sound stronger to a listener is**

**a. 40 b. 10000 c. 100 d. 10**

**Answer : a**

**Q40. The bandwidth of C- band satellite frequency band in U.C is ………**

**a.** 500 GHz **b.** 1000 GHz **c.** 1000 MHz **d.** 500 MHz

**Answer : d**

**Q41. Repeaters inside communication satellites are known as ………**

**a.** Trancievers **b.** Transponders **c.** Transducers **d.** TWT

**Answer : b**

**Q42. What kind of battery panels are used in some advance satellites?**

**a.** Germanium based panels **b.** Silicon based panel **c.** Galium Phosphate solar panel array

**d.** Galium Arsenide solar panel array

**Answer : d**

**Q43. What is the local oscillator (mixer) frequency of the satellite with an uplink frequency in GHz band?**

**a.** 3500 MHz **b.** 4500 MHz **c.** 2225 MHz **d.** 2555 MHz

**Answer : c**

**Q44. How many satellite orbital slots are requested by the Philippine Government from ITU ?**

**a. 2 b. 4 c. 6 d. 8**

**Answer : c**

**Q45. The switching from one element to the other element in a typical mobile satellite array.**

**a.** Series **b.** Radial **c.** Matrix **d.** Shunt

**Answer : d**

**Q46. What circuit is responsible in activating and deactivating adjacent antenna elements in a mobile satellite array ?**

**a.** Radial divider **b.** Divider/combiner **c.** Radial combiner **d.** Radial multiplexer

**Answer : a**

**Q47. INTELSAT stands for ………….**

**a.** Intel Satellite **b.** International Telephone Satellite **c.** International Telecommunications Satellite **d.** International Satellite

**Answer : c**

**Q48. …………. is an artificial body that is projected from earth to orbit either earth (or) another body of solar systems.**

**a.** Satellite **b.** moon **c.** sun **d.** none of the above

**Answer : a**

**Q49. ………… is defined as the use of orbiting satellites to receive, amplify and retransmit data to earth stations.**

**a.** Optical communication **b.** Digital communication **c.** Analog communication **d.** Satellite communication

**Answer : d**

**Q50. ………… law states that the path followed by the satellite around the primary will be an ellipse.**

**a.** Newton’s 1st law **b.** kepler’s first law **c.** kepler’s second law **d.** kepler’s third law

**Answer : b**

**Q51. Which law states that for equal time intervals, the satellite will sweep out equal areas in its orbital plane, focused at the barycenter.**

**a.** Newton’s 1st law **b.** kepler’s first law **c.** kepler’s second law **d.** kepler’s third law

**Answer : c**

**Q52. Which law states that the square of the periodic time of orbit is perpendicular to the cube of the mean distance between the two bodies. A3 = 3/n2**

**a.** Newton’s 1st law **b.** kepler’s first law **c.** kepler’s second law **d.** kepler’s third law

**Answer : d**

**Q53. What is meant by GPRS ?**

**a.** General packet receiver service **b.** General packet radio service **c.** Global packet radio service **d.** none of these

**Answer : b**

**Q54. Television transmission is an example of which type of transmission?**

**a.** Simplex **b.** Half Duplex **c.** Full Duplex **d.** None of the above

**Answer : a**

**Q55. What are the limitations of FDMA-satellite access?**

**a.** If the traffic in the downlink is much heavier than that in the uplink, then FDMA is relatively inefficient. **b.** Compared with TDMA, FDMA has less flexibility in reassigning channels. **c.** Carrier frequency assignments are hardware controlled **d.** all of the above

**Answer : d**

**Q56. What is meant by EIRP?**

**a.** Equivalent Isotropic Radiated Power **b.** Energy Isotropic Radiated Power **c.** Equivalent Isotropic Resonance Power **d.** none of these

**Answer : a**

**Q57. A satellite downlink at 12 GHz operates with a transmit power of 6 W and an antenna gain of 48.2 dB. Calculate the EIRP in dBW.**

**a.** 45 dBW **b.** 50 dBW **c.** 75 dBW **d.** 56 dBW

**Answer : d**

**Q58. The range between a ground station and a satellite is 42000 km. Calculate the free space loss a frequency of 6 GHz.**

**a.** 100 dB **b.** 150 dB **c.** 175dB **d.** 200.4dB

**Answer : d**

**Q59. The flux density required at the receiving antenna to produce saturation of TWTA is known as ……….**

**a.** Electric flux density **b.** Magnetic flux density **c.** Saturation flux density **d.** Photon flux density

**Answer : c**

**Q60. ………….. is necessary to prevent the bursts from overlapping.**

**a.** Preamble **b.** Guard time **c.** Frame efficiency **d.** Decoding quenching

**Answer : b**

**Q61. In some phase detection systems, the phase detector must be allowed for some time to recover from one burst before the next burst is receiving by it. This waiting time is known as …………**

**a.** Preamble **b.** Guard time

**c.** Frame efficiency **d.** Decoding quenching

**Answer : d**

**Q62. …………. is a measure of the fraction of frame time which is used for the transmission of traffic.**

**a. .** Preamble **b.** Guard time **c.** Frame efficiency **d.** Decoding quenching

**Answer : c**

**Q63. What is meant by OMT ?**

**a.** Orthogonal mode tube **b.** Orthogonal modulation tube **c.** Orthogonal mode transducer **d.** none of these

**Answer : c**

**Q64. Which of the following comes under methods of multiple access techniques?**

**a.** FDMA & TDMA **b.** SCPC & CDMA **c.** CDMA & GSM **d.** none of these

**Answer : a**

**Q65. What is meant by SCPC?**

**a.** Single channel per carrier **b.** Single carrier per channel **c.** Single code per channel **d.** none of these

**Answer : a**

**Q66. For satellite communication, standard Earth stations have antenna diameters in the range of ………….. metre.**

**a.** 27.5 to 30 **b.** 10 to 15 **c.** 30 to 50 **d.** 5 to 10

**Answer : a**

**Q67. The most effective anti jamming technique is ………..**

**a.** frequency hopping **b.** spread-spectrum modulation **c.** key leverage **d.** once-only key

**Answer : b**

**Q68. The ending part of the popular teleserial Mahabharat will be beamed to the viewers**

**a.** WESTAT **b.** INSAT-IC **c.** ARABSAT **d.** INSAT-ID

**Answer : c**

**Q69. A communication satellite is a repeater between …………… and …………..**

**a.** a transmitting station and a receiving station **b.** a transmitting station and many receiving station **c.** many transmitting station and many receiving station **d.** none

**Answer : c**

**Q70. While keeping the down-link frequency constant, the diameter of a satellite antenna is reduced by half. To offer the same EIRP over the increased coverage area, the *RF* output power has to be increases by a factor of ………..**

**a. 2 b. 4 c. 8 d. 16**

**Answer : b**

**Q71. The Sun blots out the transmission of a geosynchronous satellite twice a year when satellite passes directly in front of it. This outage lasts for about**

**a.** 10 minutes on 5 consecutive days **b.** 5 minutes on 10 consecutive days **c.** 30 minutes for 5 consecutive days **d.** one hour for 5 consecutive days

**Answer : a**

**Q72. In satellite communication, frequency modulation is used because satellite channel has**

**a.** small bandwidth and negligible noise **b.** large bandwidth and severe noise **c.** maximum bandwidth and minimum noise **d.** high modulation index

**Answer : b**

**Q73. Which of the following factor does NOT contribute to the drift of a geostationary satellite from its stationary position in space?**

**a.** Pressure of solar radiations **b.** Gravitational changes due to Sun and Moon **c.** Oblateness of the Earth **d.** Weight of the satellite

**Answer : d**

**Q74. In communication satellites, the up-link normally operates at a higher frequency than the down-link because it**

**a.** gives a narrow beam shining into space **b.** results in lesser signal attenuation **c.** gives better beam-shaping **d.** is easier to polarize a high frequency beam

**Answer : a**

**Q75. For global communication, the number of satellites needed is**

**a.** 1 **b.** 3 **c.** 10 **d.** 5

**Answer : b**

**Q76. The noise temperature of sky is about \_\_\_\_\_\_\_\_\_\_ °K.**

**a. 100 b. 273 c. 0 d. 30**

**Answer : d**

**Q77. Assuming earth to be a sphere of radius 6400 km and height of a geosynchronous satellite above Earth as 36000 km, the velocity of a geosynchronous satellite is \_\_\_\_\_\_\_\_\_\_ km/hr.**

**a. 28000 b. 15000 c. 36000 d. 11100**

**Answer : d**

**Q78. In the context of error detection in satellite transmission, ARQ stands for ……………**

**a.** Automatic Repeat Request **b.** Automatic Relay Request **c.** Accelerated Recovery Request **d.** Automatic Radiation Quenching

**Answer : a**

**Q79. To cover all inhabited regions of the Earth, the number of geosynchronous communication satellites required**

**a. 5 b. 3 c. 10 d. 2**

**Answer : b**

**Q80. Depending on the technique used, digitized television requires a bit rate between \_\_\_\_\_\_\_\_\_\_ millions.**

**a.** 40 and 92.5 **b.** 25 and 60

**c. 30 and 82.5 d. 2**

**Answer : a**

**Q81. In selecting a satellite system, the First determining factor is its**

**a.** EIRP **b.** antenna size **c.** coverage a sea **d.** antenna gain

**Answer : c**

**Q82. Phase modulation is commonly-used for data transmission mainly because**

**a.** phase can be varied from + 180° to 180° **b.** it is resistant to the effects of noise **c.** demodulation is very easy **d.** it gives highest data rates that can be transmitted over a given channel

**Answer : b**

**Q83. India’s Polar Satellite Launch vehicle (PSLV) to be ready in 1991 is designed to launch 1000 kg spacecraft into \_\_\_\_\_\_\_\_\_\_ orbit.**

**a.** geostationary **b.** equatorial **c.** polar **d.** sun-synchronous polar

**Answer : d**

**Q84. Most of the communication satellites are stationed to the West of their service areas in order to reduce their ………..**

**a.** eclipse period **b.** loss of power **c.** battery power provision **d.** mass of station-keeping fuel

**Answer : c**

**Q85. The degradation of satellite solar cells with time is mainly due to**

**a.** their bombardment by electrons **b.** collection of meteoric dust **c.** increase in resistivity of silicon **d.** gradual leakage of charge carriers from the semiconductor material

**Answer : a**

**Q86. The echo heard by a telephone user on a satellite channel can be removed by using**

**a.** a vocoder **b.** a multiplexer **c.** echo suppressor **d.** digital techniques

**Answer : c**

**Q87. The 1150 kg geosynchronous satellite INSAT-IA parked 36000 km above India had greatly improved India’s**

**a.** intelligence gathering capacity **b.** domestic communications **c.** meteorological capability **d.** both (b) and (c)

**Answer : d**

**Q88. Presently, the worlds’s largest and most advanced multi-purpose communication satellite is ……………**

**a.** INSAT-2 **b.** Intelsat-V **c.** INSAT-ID **d.** Olympus-I

**Answer : d**

**Q89. A satellite link uses different frequencies for receiving and transmitting in order to ……..**

**a.** avoid interference from terrestrial microwave links **b.** avoid interference between its powerful transmitted signal and weak in coming signal **c.** minimise free-space losses **d.** maximise antenna gain

**Answer : b**

**Q90. Regarding TASI which one of the following statements is wrong?**

**a.** It snatches the channel in his speech and may allocate it to another speaker needing it. **b.** The same speaker is reassigned a channel almost instantly when he speaks again even when the circuit is heavily loaded. **c.** It increases the overall utilization of the transmission channel. **d.** Intercontinental callers sometimes confuse the effects of TASI with the effects of satellite delay

**Answer : b**

**Q91. Master control facility (MCF) for INSAT-2 series satellites is located at …………..**

**a.** Madras **b.** New Delhi **c.** Leh **d.** Hassan

**Answer : d**

**Q92. The communication satellite INSAT-IB had to take up the job of INSAT-IA because the latter collapsed within …………… months of its launch.**

**a. 12 b. 20 c. 5 d. 36**

**Answer : c**

**Q93. The distance of a synchronous satellite from Earth’s surface is ………….. km.**

**a. 300 b. 10000 c.35900 d. 5**

**Answer : c**

**Q94. The traffic-handling capacity of an Earth station on the uplink depends on …………**

**a.** its EIRP **b.** satellite antenna gain **c.** noise associated with the satellite **d.** all of the above

**Answer : d**

**Q95. System satellites orbit the Earth once in …………. hrs.**

**a. 24 b. 12 c. 1 d. 6**

**Answer : a**

**Q96. The lowest frequency used in satellite communications is ……….. GHz.**

**a. 0.8 b. 3 c. 18 d. 30**

**Answer : a**

**Q97. Geosynchronous satellites are always launched in the equatorial plane because it is the only plane which provides**

**a.** 24-hour orbit **b.** stationary satellite **c.** global communication **d.** zero-gravity environs

**Answer : c**

**Q98. A few minutes disturbance in space communications occurs twice a year during Sunblinding when \_\_\_\_\_\_\_\_\_\_ are in line.**

**a.** Sun and satellite **b.** Sun and Earth station **c.** Satellite and Earth station **d.** Sun, satellite and Earth station

**Answer : d**

**Q99. After the death of INSAT-IB, the mainstay of the entire Indian satellite network for some time to come would be**

**a.** INSTELSAT-V **b.** INSAT-ID

**c.** INSAT-2 **d.** ARABSAT

**Answer : d**

**Q100. For satellite transmission, analog signals may be converted into digital form with the help of ……………..**

**a.** modem **b.** transponder **c.** codec **d.** compandor

**Answer : c**

**Q101. The maximum signal propagation time of a geosynchronous satellite transmission is about ……….. millisecond**

**a. 540 b. 270 c. 135 d. 1080**

**Answer : b**

**Q102. The life time of a geosynchronous communication ……..**

**a. 5 b. 10 c. 20 d. 50**

**Answer : b**

**Q103. A typical error rate on satellite circuits is one bit error in**

**a. 107 b. 103 c. 102 d. 1010**

**Answer : a**

**Q104. In satellite communication, highly directional antennas are used to**

**a.** direct the spot beam to a particular region of space on Earth **b.** strengthen the beam to overcome the cosmic noise **c.** make corrections in change of polarisation of the beam **d.** select a particular channel in transmission and reception

**Answer : a**

**Q105. The average noise temperature of Earth, as viewed from space, is ………. °K**

**a. 254 b. 303 c. 100 d. 500**

**Answer : a**

**Q106. Low-orbit satellites are not used for communications because they**

**a.** produce sonic booms **b.** do not provide 24 hour/ day contact to the users on Earth **c.** heat up and melt **d.** none

**Answer : c**

**Short Answers Questions**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BE (2015)Pattern**

**404190 Broadband Communication Systems )**

**Satellite Communication**

ORBIT DYNAMICS

1. What is Satellite?

An artificial body that is projected from earth to orbit either earth (or) another body of solar systems.

Types: Information satellites and Communication Satellites

2. Define Satellite Communication. It is defined as the use of orbiting satellites to receive, amplify and retransmit data to earth stations.

3. State Kepler’s first law.

It states that the path followed by the satellite around the primary will be an ellipse.

An ellipse has two focal points F1 and F2. The center o

f mass of the two body system,

termed the barycenter is always centered on one of the

foci. e = [square root of (a2– b2) ] / a

4. State Kepler’s second law.

It states that for equal time intervals, the satellite will sweep out equal areas in its orbital plane, focused at the barycenter.

5. State Kepler’s third law.

It states that the square of the periodic time of orbit is perpendicular to the cube of the mean distance between the two bodies.

a3= 3 / n22

Where, n = Mean motion of the satellite in rad/sec.

3 = Earth’s geocentric gravitational constant. With the

n in radians per sec. the orbital period in second is given by,

P = 2 / n

6. Define apogee. The point farthest from the earth.

7. Define Perigee. The point closest from the earth.

8. What is line of apsides? The line joining the perigee and apogee through the center of the earth.

9. Define ascending node. The point where the orbit crosses the equatorial plane going from south to north.

10. Define descending node. The point where the orbit crosses the equatorial plane going from north to south.

very small with the result that a region that is only a few hundred km in diameter is illuminated on earth.

14. What is meant by momentum wheel stabilization?

During the spin stabilization, flywheels may be used rather than spinning the satellite. These flywheels are termed as momentum wheels.

15. What is polarization interleaving?

Overlap occurs between channels, but these are alternatively polarized left hand circular and right hand circular to reduce interference to acceptable levels.

This is referred to as polarization interleaving.

16. Define S/N ratio.

The S/N introduced in the preceding section is used to refer to the ratio of signal power to noise power at the receiver output. This is known as S/N ratio.

17. What is noise weighting?

The method used to improve the post detection signal to

noise ratio is referred to as noise weighting.

18. What is noise power spectral density?

Noise power per unit Bandwidth is termed as the noise p

ower spectral density.

19. What is an intermodulation noise?

Intermodulation distortion in high power amplifier can result in signal product which appear as noise and it is referred to as intermodulation noise.

20. What is an antenna loss?

It is added to noise received as radiation and the total antenna noise temperature is the sum of the equivalent noise temperature of all these sources.

21. Define sky noise.

It is a term used to describe the microwave radiation w

hich is present throughout universe and which appears to originate from matter in any form, at

finite temperature.

22. Define noise factor.

An alternative way of representing amplifier noise is

by means of its noise factor. Indefining the noise factor of an amplifiers, usually taken as 290 k.

23. What is TWTA?

TWTA means Traveling Wave Tube Amplifier. The TWTA i

s widely used in transponder to provide the final output power required to the transtube and its power supplies.

24. What is an OMT?

The polarization separation takes place in a device kno

wn as an orthocoupler or Orthogonal Mode Transducer.

SATELLITE ACCESS

1. What is a single mode of operation?

A transponder channel abroad a satellite may be fully loaded by a single transmission from an earth station. This is referred to as a single access mode of operation.

2. What are the methods of multiple access techniques?

FDMA – Frequency Division Multiple Access Techniques

TDMA – Time Division Multiple Access Techniques

3. What is an CDMA?

CDMA – Code Division Multiple Access Techniques

In this method, each signal is associated with a particular code that is used to spread the signal in frequency and time.

4. Give the types of CDMA.

• Spread spectrum multiple access

• Pulse address multiple access

5. What is SCPC?

SCPC means Single Channel Per Carrier. In a thin route circuit, a transponder channel (36 MHz) may be occupied by a number of single carriers, each associated with its own

voice circuit.

6. What is a thin route service?

SCPC systems are widely used on lightly loaded routes, this type of service being referred to as a thin route service.

7. What is an important feature of Intelsat SCPC system?

The system is that each channel is voice activated. This me

ans that on a two way telephone conversation only one carriers is operative at any one time.

8. What is an TDMA? What are the advantages?

TDMA – Time Division Multiple Access Techniques Only one carrier uses the transponder at any one time, and therefore Inter modulation products, which results from the non-linear amplification of multiple carriers are absent.

Advantages : The transponder traveling wave tube can be operated at maximum power output.

9. What is preamble?

Certain time slots at the beginning of each burst are used to carry timing and synchronizing information. These time slots collectively are referred to as preamble.

10. Define guard time.

It is necessary to prevent the bursts from overlapping. The guard time will vary from burst to burst depending on the accuracy with which the various bursts can be

positioned within each frame.

11. What is meant by decoding quenching?

In certain phase detection systems, the phase detector must

be allowed for some time to recover from one burst before the next burst is received by it. This is known as decoding quenching.

12. What is meant by direct closed loop feedback?

The timing positions are reckoned from the last bit of the unique word in the preamble.

The loop method is also known as direct closed loop feed

back.

13. What is meant by feedback closed loop control?

The synchronization information is transmitted back to an earth station from a distant, that is termed feedback closed loop control.

14. Define frame efficiency.

It is measure of the fraction of frame time used for the transmission of traffic.

15. What is meant by digital speech interpolation?

The point is that for a significant fraction of the time, the channel is available for other transmission and advantages are taken of this in a form of demand assignment known

as digital speech interpolation.

16. What is meant by telephone load activity factor?

The fraction of time a transmission channel is active is kno

wn as the telephone load activity factor.

17. What are the types of digital speech interpolation?

• Digital time assignment speech interpolation

• Speech predictive encoded communications

18. What is meant by freeze out?

It has assumed that a free satellite channel will be found for any incoming speed spurt, but there is a finite probability that all channels will be occupied and the speech spurt lost. Losing a speech spurt in this manner is referred to as freeze out.

19. What is DSI?

The DSI gain is the ratio of the number of terrestrial space channels to number of satellite channels. It depends on the number of satellite channels provided as well as the design objectives.

20. What are the advantages of SPEC method over DSI

method?

Freeze out does not occur during overload conditions.

21. Define satellite switched TDMA?

Space Division Multiplexing can be realized by switching the antenna interconnections in synchronism with the TDMA frame rate, this being known as satellite switched TDMA.

22. What is SS / TDMA?

A repetitive sequence of satellite switch modes, also referred to as SS / TDMA.

23. What is processing gain?

The jamming or interference signal energy is reduced by

a factor known as the processing gain.

24. What is burst code word?

It is a binary word, a copy of which is stored at each earth station.

25. What is meant by burst position acquisition?

A station just entering, or reentering after a long delay to acquire its correct slot position is known as burst position acquisition.

26. What is an single access?

A transponder channel aboard a satellite may be fully

loaded by a single transmission from earth station.

27. What is an multiple access technique?

A transponder to be loaded by a number of carriers.

These may originate from a number of earth station may transmit one or more of the carriers. This mode of

operation known as multiple access technique.

28. What is meant by frequency reuse?

The satellite as a whole to be accessed by earth station

s widely separated geographically but transmitting on the same frequency that is known as frequency reuse.

29. What is meant by space division multiple access?

The satellite as a whole to be accessed by earth stations widely separated geographically but transmitting on the same frequency that is known as frequency reuse. This method of access known as space division multiple

access.

30. What is an error detecting code?

A code which allows for the detection of errors is terme

d as error detecting code.

31. What are the limitations of FDMA-satellite access?

a. If the traffic in the downlink is much heavier than that in the uplink, then FDMA is relatively inefficient.

b. Compared with TDMA, FDMA has less flexibility in r

eassigning channels.

c. Carrier frequency assignments are hardware controlled.

32. Write about pre-assigned TDMA satellite access.

Example for pre-assigned TDMA is CSC for the SPADE net

work. CSC can accommodate upto 49 earth stations in the network and 1 reference station. All bursts are of equal length. Each burst contains 128 bits. The bit rate is 128 Kb / s.

33. Write about demand assigned TDMA satellite access.

The burst length may be kept constant and the number f bursts per frame used by the given station is varied when the demand is varied.

EARTH SEGMENT

1. Define earth segment.

Earth segment of a satellite communication system consist

s of transmit earth station and receive earth station.

Example : TV Receive Only systems (TVRO systems)

2. Give the difference between KU-band and the C-band receive only systems. Operating frequency of outdoor unit.

3. What is mean by ODU and IDU.

ODU – The Home Receiver Outdoor Unit

IDU – The Home Receiver Indoor Unit

4. Explain about MATV system.

MATV – Master Antenna TV system.

It is used to provide reception of DBS TV channels to the user group.

Example : Apartment users

It consists of one outdoor unit and various indoor units. Each user can independently access all the channels.

5. Write about CATV system.

CATV – Community Antenna TV system.

As in MATV system, it consists of oneoutdoor unit and separ

ate feeds for each sense of polarization.

6. Define S/N ratio.

The S/N introduced in the preceding section is used to

refer to the ratio of signal power to noise power at the receiver output. This is known as S/N ratio.

7. What is noise weighting?

The method used to improve the post detection signal to

noise ratio is referred to as noise weighting.

8. What is an EIRP?

EIRP means Equivalent Isotropic Radiated Power. It is a

measure of radiated or transmitted power of an antenna.

9. What is noise power spectral density?

Noise power per unit Bandwidth is termed as the noise p

ower spectral density.

10. What is an inter modulation noise?

Inter modulation distortion in high power amplifier can result in signal product which appear as noise and it is referred to as inter modulation noise.

11. What is an antenna loss?

It is added to noise received as radiation and the total antenna noise temperature is the sum of the equivalent noise temperature of all these sources.

12. Define noise factor.

An alternative way of representing amplifier noise is

by means of its noise factor. In defining the noise factor of an amplifiers, usually taken as 290 k.

13. A satellite downlink at 12 GHz operates with a tra

nsmit power of 6 W and an antenna gain of 48.2 dB. Calculate the EIRP in dBW.

EIRP = 10 log 6 + 48.2 = 56 dBW

14. The range between a ground station and a satellite is 42000 km. Calculate the free

space loss a frequency of 6 GHz.

[Free space loss] = 32.4 + 20 log 42000 + 20 log 6000

= 200.4 dB

15. An antenna has a noise temperature of 35 K and it is matched into a receiver which has a noise temperature of 100 K. Calculate the noise power density and the noise

power for a BW of 36 MHz.

N0 = ( 35 + 100 ) \* 1.38 \* 10-23= 1.86 \* 1 -21

JP N = 1.86 \* 10-21\* 36 \* 106= 0.067 PW

16. Define Saturation flux density.

The flux density required at the receiving antenna to produce saturation of TWTA is termed the saturation flux density.

SATELLITE APPLICATIONS

1. Give the 3 different types of applications with respect to satellite systems.

• The largest international system (Intelsat)

• The domestic satellite system (Dom sat) in U.S.

• U.S. National oceanographic and atmospheric administra

tions (NOAA)

2. Mention the 3 regions to allocate the frequency for satellite services.

a. Region1: It covers Europe, Africa and Mangolia

b. Region2: It covers North & South Ameriaca and Greenland.

c. Region3: It covers Asia, Australia and South West Pacif

ic.

3. Give the types of satellite services.

a. Fixed satellite service

b. Broadcasting satellite service

c. Mobile satellite service

d. Navigational satellite services

e. Meteorological satellite services

4. What is mean by Dom sat?

Domestic Satellites. These are used for voice, data and v

ideo transmissions within the country.

5. What is mean by INTELSAT?

International Telecommunication Satellite.

6. What is mean by SARSAT?

Search and rescue satellite.

7. What are the applications of Radarsat?

a. Shipping and fisheries.

b. Ocean feature mapping

d. Iceberg detection

e. Crop monitoring

8. What is ECEF?

The geocentric equatorial coordinate system is used with the GPS system.It is called as earth centered, earth fixed coordinate system.

9. What is dilution of precision?

Position calculations involve range differences and where the ranges are nearly equal, any error is greatly magnified in the difference. This effect, brought a result of the satellite geometry is known as dilution of precision.

10. What is PDOP?

With the GPS system, dilution of position is taken into account through a factor known as the position dilution of precision.

11. What is DBS?

Satellites are used to provide the broadcast transmissions. It is used to provide direct transmissions into the home. The service provided is known as Direct Broadcast

Satellite services.

Example : Audio, TV and internet services.

12. Give the frequency range of US DBS systems with hig

h power satellites.

a. Uplink frequency range is 17.3 GHz to 17.8 GHz

b. Downlink frequency range is 12.2 GHz to 12.7 GHz

13. Give the frequency range of US DBS systems with med

ium power satellites.

a. Uplink frequency range is 14 GHz to 14.5 GHz

b. Downlink frequency range is 11.7 GHz to 12.2 GHz

14. What is DTH?

DBS television is also known as Direct To Home ( DTH ).

15. Write about bit rates for digital television.

It depends format of the picture.

Uncompressed Bit rate = (Number of pixels in a frame) \*

(Number of pixels per second) \* (Number of bits used to encode each pixel)

16. Give the satellite mobile services.

a. DBS – Direct Broadcast satellite

b. VSATS – Very Small Aperture Terminals

c. MSATS – Mobile Satellite Service

d. GPS – Global Positioning Systems

e. Micro Sats

f. Orb Comm – Orbital Communications Corporation

g. Iridium

17. What is GCC and GEC?

GCC - Gateway Control Centers

GEC – Gateway Earth Stations

18. What is INMARSAT?

It is the first global mobile satellite communication system operated at Lband and internationally used by 67 countries for communication between ships and coast so that mergency life saving may be provided. Also it provides modern communication services to maritime, land mobile, aeronautical and other users.

19. List out the regions covered by INMARSAT.

• Atlantic ocean region, east (AOR-E)

• Atlantic ocean region, west (AOR-W)

• Indian ocean region (IOR)\

• Pacific ocean region (POR)

20.What is INSAT?

INSAT – Indian National Satellite System.

INSAT is a Indian National Satellite System for telecommunications, broadcasting, meteorology and search and rescue services. It was commissioned in 1983. INSAT

was the largest domestic communication system in the sia-Pacific region.

20. List out the INSAT series.

• INSAT-1

• INSAT-2

• INSAt-2A

• INSAT-2E

• INSAT-3

21.What is GSM?

GSM (Global System for Mobile communications: originally from Groupe Spécial Mobile) is the most popular standard or mobile phones in the world. GSM differs from its predecessors in that both signaling and speech channels are digital, and thus is considered a second generation (2G) mobile phone system. This has also meant that data communication was easy to build into the system.

22.What is GPRS?

General packet radio service (GPRS) is a packet oriented mobile data service available to users of the 2G cellular communication systems global system for mobile communications (GSM), as well as in the 3G systems. In the 2G systems, GPRS provides data rates of 56-114 kbit/s.

23. Define DAB.

DAB - Digital Audio Broadcast