27. a.i.	A satellite link operating at 15 GHz has a receiver feeder loss of 12 dB with free space loss of 206 dB and having atmospheric absorption loss of 0.6 dB, antenna pointing loss of 2.5 dB and finally depolarization loss of 0.5 dB, calculate the total link loss of clear sky condition.	4	4	2	3
ii.	Derive the link power budget equation.	6	3	2	3
	(OR)				
b.	Derive the expression of carrier to noise density ratio for satellite uplink and downlink and explain each term in detail.	10	4	2	4
28. a.	With a neat block diagram, briefly describe the functioning of a indoor/outdoor unit of a satellite system indended for home reception.	10	3	3	3
	(OR)				
b.	Explain in detail the functional block diagram of wideband receiver and its function.	10	3	3	3
29. a.	With a neat diagram of a basic CDMA system, explain the direct sequence spread spectrum technique and also describe the pseudo noise sequence generator.	10	3	4	3
	(OR)				
b.i.	Define FDMA.	2	3	4	3
ii.	Explain in detail the pre-assigned and demand assigned FDMA.	8	3	4	3
30. a.	Describe the operation of VSAT system. State briefly where VSAT systems find wider applications.	10	3	5	7
	(OR)				
b.	Explain in detail about GPS system.	10	3	5	7

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Reg. No.														

B.Tech. DEGREE EXAMINATION, MAY 2022
Sixth Semester

18ECE223T – SATELLITE COMMUNICATION AND BROADCASTING
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

	Marks	BL	CO	PO

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

1. Based on the analysis of a non-spherical earth effect, the shape of the earth described as — 1 2 1 1
   (A) Flattering at the pole (B) Equatorial bulge
   (C) Oblate spheroid (D) Spherical

2. Universal time in the normal form of hrs, mins and seconds, it is converted to fractional days as — 1 2 1 1
   (A) UT days=$\frac{1}{24}$ (hours + minutes / 60 + seconds / 3600) (B) UT days=$\frac{1}{24}$ (hours × minutes / 60 + seconds / 3600)
   (C) UT days=$\frac{1}{24}$ (hours × minutes / 60 × seconds / 3600) (D) UT days=$\frac{1}{24}$ (hours + minutes / 60 × seconds / 3600)

3. Calculate the angle between the radius to the earth station and the radius to the north pole for an earth-station antenna located at 35°N. — 1 2 1 7
   (A) 45° (B) 55°
   (C) 130° (D) 65°

4. The line joining the perigee and apogee through the center of the earth is known as _____ — 1 2 1 1
   (A) Descending node (B) Ascending node
   (C) Lien of apsides (D) Line of nodes

5. How many triangles are used in determining the look angles for a geostationary satellite? — 1 2 1 7
   (A) Three (B) Two
   (C) One (D) Four

6. The link from earth-station to satellite segment is called _____ — 1 1 2 3
   (A) Down link (B) Uplink
   (C) Both downlink and uplink (D) Line of sight

7. The factors related to satellite system design are _____ 1 1 2 3
   (A) Multiple access technique (B) Transmission losses
   (C) Radiated paver (D) Noise

8. The losses occur due to connecting waveguides, filters and couplers are due to _____ 1 1 2 3
   (A) Antenna misalignment losses (B) Free space losses
   (C) Feeder losses (D) Ionospheric losses

9. The advantage of forward error correction is _____ 1 1 2 4
   (A) Complexity (B) Fixed size
   (C) Soft decision algorithms (D) Retransmission of data

10. Identify, the band which undergoes signal fading due to rainfall? 1 1 2 4
   (A) X-band (B) S-band
   (C) C-band (D) VHF band

11. The equipment used to provide the service for which the satellite has been launched refers as _____ 1 1 3 1
   (A) Ground segment (B) Payload
   (C) Space segment (D) Thermal control

12. The spin rate is typically in the range of _____during the launch phase. 1 2 3 3
   (A) 100 to 50 rev/min (B) 50 to 100 rev/min
   (C) 150 to 10 rev/min (D) 10 to 150 rev/min

13. Which subsystem transmits information about the satellite to the earth station? 1 1 3 1
   (A) Tracking (B) Telemetry
   (C) Command (D) Acquisition

14. In satellite subsystems, high power can be achieved with solar panels arranged in the form of _____solar sails. 1 1 3 1
   (A) Spherical (B) Circular
   (C) Rectangular (D) Elliptical

15. How many attitude control for the purpose of controlling satellite attitude? 1 2 3 3
   (A) Two (B) Three
   (C) One (D) Four

16. CDMA technique is a _____ 1 1 4 3
   (A) Demand assigned system (B) Pre-assigned system
   (C) Random access system (D) Single access system

17. In TDMA system, which frame section provides a carrier and bit timing recovery channel? 1 1 4 4
   (A) Postamble (B) Preamble
   (C) Burst code word (D) Guard time

18. Which timing control, the earth station receives its own transmission? 1 1 4 4
   (A) Open-loop timing control (B) Loop back timing control
   (C) Feedback timing control (D) Feedback closed loop timing control

19. In preassigned TDMA, the common signaling channel(CSC) can accommodate upto _____earthstations. 1 2 4 4
   (A) 94 (B) 48
   (C) 49 (D) 50

20. How many pseudonoise sequence (PN) can be generated by using 3-stage shift register? 1 2 4 4
   (A) 6 (B) 5
   (C) 7 (D) 4

21. The service provided by Direct Broadcast satellite (DBS) 1 1 5 3
   (A) Internet service (B) Remote service
   (C) Military service (D) Sensing service

22. How many transponders typically a satellite can carry? 1 2 5 3
   (A) 10 (B) 12
   (C) 32 (D) 22

23. The power rating of satellite is decided by _____ 1 2 5 3
   (A) Effective isotropic radiated power (B) Noise power
   (C) Noise bandwidth (D) Transmit power

24. Which digital modulation technique used by satellite digital television? 1 2 5 7
   (A) BPSK (B) QPSK
   (C) QAM (D) FSK

25. MPEG-1 standard used for _____ 1 2 5 3
   (A) Video compression (B) Audio compression
   (C) Image compression (D) Text compression

PART – B (5 × 10 = 50 Marks) Marks BL CO PO
Answer **ALL** Questions

26. a.i. Discuss the effect of atmospheric drag on satellite communication. 6 3 1 1

   ii. Determine the apogee and perigee heights for the orbital parameters given as $e = 0.00115$, $a = 7192.3$ km and the radius of earth is 6371 km. 4 4 1 7

(OR)

   b.i. State and explain in detail the Kepler's law. 5 3 1 7

   ii. The orbital period of a satellite is 630 min. Determine the semi-major axis of the elliptical orbit. 5 4 1 7