



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

OBJECTIVE QUESTIONS

Name of Course Instructor(s) : Mr. V V Rama Krishna Reg : R20
Course Name & Code : Satellite Technology – 20EC80 Unit : 5
Program/Sem/Sec : B.Tech., IT, V-Sem., Section – A, B, and C A.Y : 2023-24
L-T-P Structure : 3-0-0 Credits: 3

S.No	Question Description	Answer
1.	How many satellites make up the full operational constellation of the GPS system to ensure global coverage? a) 12 b) 24 c) 32 d) 48 Answer: b) 24	
2.	What does DTH (Direct-To-Home) primarily refer to? a) Mobile communication service b) Internet broadband service c) Satellite television broadcasting directly to subscribers d) Landline telephone service Answer: c) Satellite television broadcasting directly to subscribers	
3.	Which segment of the GPS architecture is responsible for satellite operation and health monitoring? a) User Segment b) Control Segment c) Space Segment d) Data Segment Answer: b) Control Segment	
4.	Which GPS segment comprises the GPS receivers and the user community? a) Control Segment b) Space Segment c) User Segment d) Data Segment Answer: c) User Segment	
5.	In which orbit do GPS satellites primarily operate? a) Geostationary Orbit (GEO) b) Medium Earth Orbit (MEO) c) Low Earth Orbit (LEO) d) Polar Orbit Answer: b) Medium Earth Orbit (MEO)	
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7.	Which device is essential for receiving DTH signals at the subscriber's end? a) Modem b) Router c) Set-top box d) Landline telephone Answer: c) Set-top box	
8.	Which satellite orbit is commonly used by DTH service providers? a) Low Earth Orbit (LEO) b) Medium Earth Orbit (MEO) c) Polar Orbit d) Geostationary Orbit (GEO) Answer: d) Geostationary Orbit (GEO)	
9.	In terms of dish size, what distinguishes a VSAT? a) Diameter greater than 10 meters b) Diameter between 0.9 to 3.8 meters c) Diameter less than 0.3 meters d) Diameter exactly 5 meters Answer: b) Diameter between 0.9 to 3.8 meters	

10.	Which topology is commonly used by VSAT networks for data transmission? a) Mesh b) Star c) Ring d) Bus Answer: b) Star	
11.	Which frequency band is commonly utilized by VSAT for communication? a) X-band b) S-band c) Ku-band d) V-band Answer: c) Ku-band	
12.	What type of sensor is primarily used by RADARSAT to acquire Earth observation data? a) Optical sensor b) Ultraviolet sensor c) Infrared sensor d) Synthetic-aperture radar (SAR) Answer: d) Synthetic-aperture radar (SAR)	
13.	RADARSAT is especially beneficial for observing areas with: a) Constant daylight conditions b) Frequent cloud cover or darkness c) Tropical climates only d) Desert regions only Answer: b) Frequent cloud cover or darkness	
14.	Which country launched the RADARSAT series of satellites? a) United States b) Russia c) Canada d) Japan Answer: c) Canada	
15.	The RADARSAT program is primarily intended for: a) Telecommunication services b) GPS and navigation c) Earth observation and monitoring d) Space exploration Answer: c) Earth observation and monitoring	
16.	What is the primary objective of the IRNSS constellation? a) Earth observation b) Deep space communication c) Satellite-based navigation d) Scientific research Answer: c) Satellite-based navigation	
17.	How many satellites are planned to be in the IRNSS constellation for providing complete coverage? a) 3 b) 7 c) 12 d) 24 Answer: b) 7	
18.	What is the alternate name for IRNSS? a) NavIC b) Gaganyaan c) Aryabhata d) Mangalyaan Answer: a) NavIC	

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. V V Rama Krishna	Mr. V V Rama Krishna	Dr.M.V.Sudhakar	Dr. Y. Amar Babu



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S.No	Question Description	CO	BL
1.	Explain the trilateration method used to obtain the position of a GPS receiver.	CO4	L2
2.	Demonstrate the architecture of GPS in terms of a segment.	CO1	L2
3.	Elucidate the operation of a home receiver outdoor unit using appropriate figures.	CO1	L2
4.	Discuss the factors to be considered in the design of a satellite structure and the types of materials used.	CO4	L2
5.	Summarize the need of thermal control in satellites and explain the types of launch loads during several stages of satellite launching from lift-off to separation	CO4	L2
6.	Discuss the heat transfer mechanism both internal and external to the space craft.	CO4	L2
7.	Mention the salient features of satellite design materials.	CO3	L1
8.	Outline various parts of structure interfacing satellite.	CO4	L1
9.	Illustrate in brief about externally induced thermal environment.	CO4	L2
10.	What are the factors contributing to internal and external induced heat in a satellite?	CO3	L1
11.	Describe the different types of Thermal control systems.	CO2	L2
12.	Illustrate the different types of loads and materials used in Designing of Satellite structures.	CO4	L2
13.	Discuss the salient features of Satellite design materials.	CO2	L4
14.	Interpret the heat transfer mechanism both internal and external to the spacecraft.	CO4	L2

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ICT Tools

Name of Course Instructor(s) : Mr. V V Rama Krishna

Reg : R20

Course Name & Code : Satellite Technology – 20EC80

Unit : 1

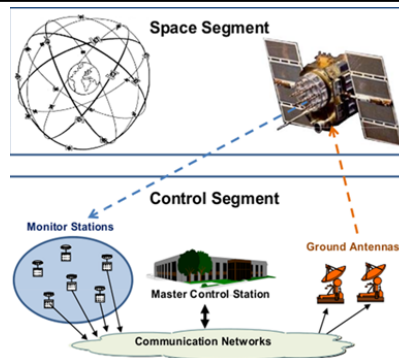
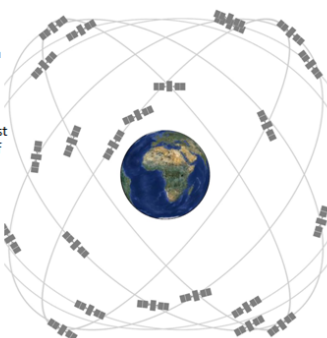
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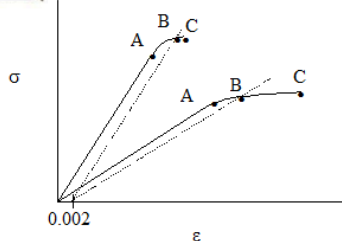
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Space Segment

- The GPS space segment consists of a constellation of satellites transmitting radio signals to users.
- The United States is committed to maintaining the availability of at least 24 operational GPS satellites, 95% of the time.
- To ensure this commitment, the U.S. Space Force has been flying 31 operational GPS satellites for well over a decade.



Strength



- A: Proportional Limit
- B: Yield Point (0.2% residual strain)
- C: Ultimate Failure

Stress:

$$\sigma = \frac{\text{Load}}{\text{Area}} = \frac{P}{A}$$

Strain:

$$\epsilon = \frac{\Delta L}{L}$$

Young's Modulus:

$$E = \frac{\sigma}{\epsilon}$$

Poisson's Ratio: $\nu = \frac{\epsilon_{\text{lateral}}}{\epsilon_{\text{axial}}}$



Structural Design

- Design Stress x Factor Safety < Allowable Stress
- Allowable Stress depends on
 - Type of stress
 - Material used

Option	Design Factors of Safety			
	Critical for Personnel Safety		Not Critical for Personnel Safety	
	Yield	Ultimate	Yield	Ultimate
1) Ultimate test of a dedicated qualification article	1.1	1.4	1.0	1.25
2) Proof test of full flight structures	1.1	1.4	1.1	1.25
3) Proof test of one flight unit of a fleet	1.25	1.4	1.25	1.4
4) No structural test	1.6	2.25	1.6	2.0

(Source: DOD-HDBK-343, MIL-HDBK-340 and MSFC-HDBK-505A offer similar options.)

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