Test 03

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Q1: (C) Briefly explain satellite. Define the working principle of GPS.

1. **Introduction**

Satellites are pivotal components of modern technology, orbiting Earth to perform various tasks such as communication, navigation, weather monitoring, and scientific research. They have revolutionized numerous industries by providing vital data and services. One significant application of satellites is the Global Positioning System (GPS), which has become essential for navigation and location-based services worldwide.

2. **What is a Satellite?**

A satellite is an artificial object launched into space to orbit the Earth or another celestial body. Satellites serve diverse purposes and can be classified based on their functions:

Types of Satellite

- Communication Satellites
- Weather Satellites
- Navigation Satellites
- Scientific Satellites

3. **Working Principle of GPS**

The Global Positioning System (GPS) is a satellite-based navigation system developed by the United States Department of Defense. It provides accurate location, velocity, and time information to users worldwide.

1. **Satellite Constellation:**

GPS comprises a constellation of at least 24 satellites in medium Earth orbit, ensuring global coverage.

2. **Ground Control Stations**

Ground stations monitor and control the GPS satellites, ensuring their accurate operation and updating their orbital positions.

3. **GPS Receivers**

A GPS receiver, found in devices like smartphones and vehicles, captures signals from multiple satellites.

4. **Conclusion**

Satellites are indispensable tools for various applications, with GPS being one of the most crucial systems derived from satellite technology.

Q2(C): Differentiate between RAM and ROM.

RAM	ROM
RAM stands for Random Access Memory	ROM stands for Read only Memory.
Volatile Data is lost when power is turned off.	**Non volatile** Data is retained even when power is lost.
Data can be read and write	Data can only be read
It is used to store data temporary	It is used to store data permanently
Example SRAM DRAM	**Examples** EROM EPROM EEPROM

Conclusion

RAM is used for temporary data storage that requires fast access and frequent updates, while ROM stores permanent data that does not change frequently.

Q1(a): Explain the working principle of optical fiber. Enlist the main importance of fiber optics.

1. **Introduction**

Fiber optics is a technology that uses thin strands of glass or plastic fibers to transmit data in the form of light signals. This technology has revolutionized telecommunications and data transmission by offering high-speed, high-capacity, and reliable communication over long distances.

2. **What is Fiber Optics?**

Fiber optics refers to the transmission of information as light pulses through a fiber made of glass or plastic. The technology is based on the principle of total internal reflection, allowing light to travel long distances with minimal loss.

Types of Fiber Optic Cables

- **Single-Mode Fiber (SMF):**

Carries a single light mode, suitable for long-distance communication.

- **Multi-Mode Fiber (MMF):**

Carries multiple light modes, used for shorter distances with higher data capacity.

3. **Working Principle of fiber Optics**

- **Transmission of Light:**

Data is converted into light signals and transmitted through the fiber.

- **Total Internal Reflection:**

Total Internal Reflection.

- **Signal Detection**

At the receiving end, light signals are converted back into electrical signals.

4. **Importance of Fiber Optics**

- **Long-Distance Transmission:**

Minimal signal loss allows for long-distance communication without the need for frequent signal boosters.

- **Immunity to Electromagnetic Interference:**

Unlike copper cables, fiber optics are not affected by electromagnetic interference.

- **Ensure secure transmission:**

Difficult to tap into, ensuring data security.

- **High Bandwidth**

It supports a vast amount of data transmission.

Applications of Fiber Optics

- **Telecommunications:**

It is used for internet, television, and telephone services.

- **Medical:**

It is used in endoscopy and other medical imaging techniques.

- **Industries**

It is employed in sensors and machinery for precise data transmission.