GSM (Global System for Mobile Communications):

Mobile Services: GSM provides various mobile services such as voice calls, SMS (Short Message Service), MMS (Multimedia Messaging Service), and data services.
System Architecture: GSM architecture consists of several components including Mobile Station (MS), Base Station Subsystem (BSS), Network Switching Subsystem (NSS), and Operation and Support Subsystem (OSS).
Radio Interface: GSM operates in the 900 MHz and 1800 MHz frequency bands. The radio interface includes physical and logical channels for communication between mobile devices and base stations.
Protocols: GSM uses various protocols for signaling, voice and data transmission, and mobility management. Examples include GSM MAP (Mobile Application Part), GSM Um (air interface), and GSM GPRS (General Packet Radio Service).
Localization and Calling: GSM supports localization of mobile devices using techniques such as Cell Global Identity (CGI) and Location Area Identity (LAI). Calling involves procedures for setting up, maintaining, and terminating voice calls.
Handover: Handover is the process of transferring an

ongoing call or data session from one cell to another as a mobile device moves. GSM supports various handover types such as intra-cell handover and inter-cell handover.
Security: GSM provides security features to protect user privacy and prevent unauthorized access. These include authentication, encryption, and key management mechanisms.
Satellite Systems:
History: Satellite communication systems have been in use since the mid-20th century, initially for military and government purposes, and later for commercial telecommunications.
Applications: Satellite systems are used for various applications including telecommunications, broadcasting, navigation (GPS), remote sensing, and scientific research.
Basics of GEO, LEO, and MEO:
GEO (Geostationary Earth Orbit): Satellites orbit at a fixed position relative to the Earth's surface, providing continuous coverage of a specific region.
LEO (Low Earth Orbit): Satellites orbit at lower altitudes, offering lower latency but requiring a larger number of satellites for global coverage.
MEO (Medium Earth Orbit): Satellites orbit at intermediate altitudes, balancing coverage and latency.

Routing: Satellite systems use routing algorithms to determine the optimal path for data transmission between ground stations and satellites, as well as between satellites in satellite constellations.
Localization: Localization in satellite systems involves determining the position of ground stations and mobile terminals using techniques such as GPS (Global Positioning System) or ground-based tracking systems.
Handover: Similar to cellular systems, satellite systems support handover between satellites to maintain connectivity as mobile terminals move between satellite footprints.
Examples: Examples of satellite systems include geostationary communication satellites like Intelsat and Eutelsat, as well as satellite constellations like Iridium and Globalstar.
GPRS (General Packet Radio Service):
GPRS is an enhancement of GSM that enables packet-switched data transmission over mobile networks.
It allows mobile devices to maintain an "always-on" connection to the internet, enabling services such as web browsing, email, and multimedia streaming.
GPRS uses packet-switching techniques to transmit data in small packets, optimizing network resources and

enabling efficient use of bandwidth.
GPRS supports higher data rates compared to traditional GSM circuit-switched data services, providing better performance for data-intensive applications.
It forms the foundation for later mobile data technologies such as EDGE (Enhanced Data rates for GSM Evolution) and 3G (Third Generation) mobile networks.