Mobile Communication & Wireless connection.

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* ASSIGNMENT - 2 *

(1) Explain working of DSSS technology.

→ Direct Sequence Spread Spectrum (DSSS) is often compared to a party, where many pairs are conversing, each in diff language.

→ Each pair understand only one lang & therefore concentrates on his or her own conversing, ignoring the rest.

→ The analogy may not be exact, because a roomful of people all talking at once soon becomes very loud.

→ In general, it is distinguished in 3 key elem:
1. Signal occupy bandwidth much larger than what is necessary to send info.
2. Bandwidth is independent of the data.
3. Receiver sync to code to recover data.

→ In order to protect ~~data~~ signal, code used is pseudo-random, which makes it appear ~~data~~ random while being actually deterministic. which enable receiver to reconstruct code for syn detection.

→ DSSS is comonly called CDMA.

→ Eg:-

Station A
Data: 00 (2bit)
Spreading code 0101

Data 0000 0000
⊕ Code 0101 0101
0101 0101

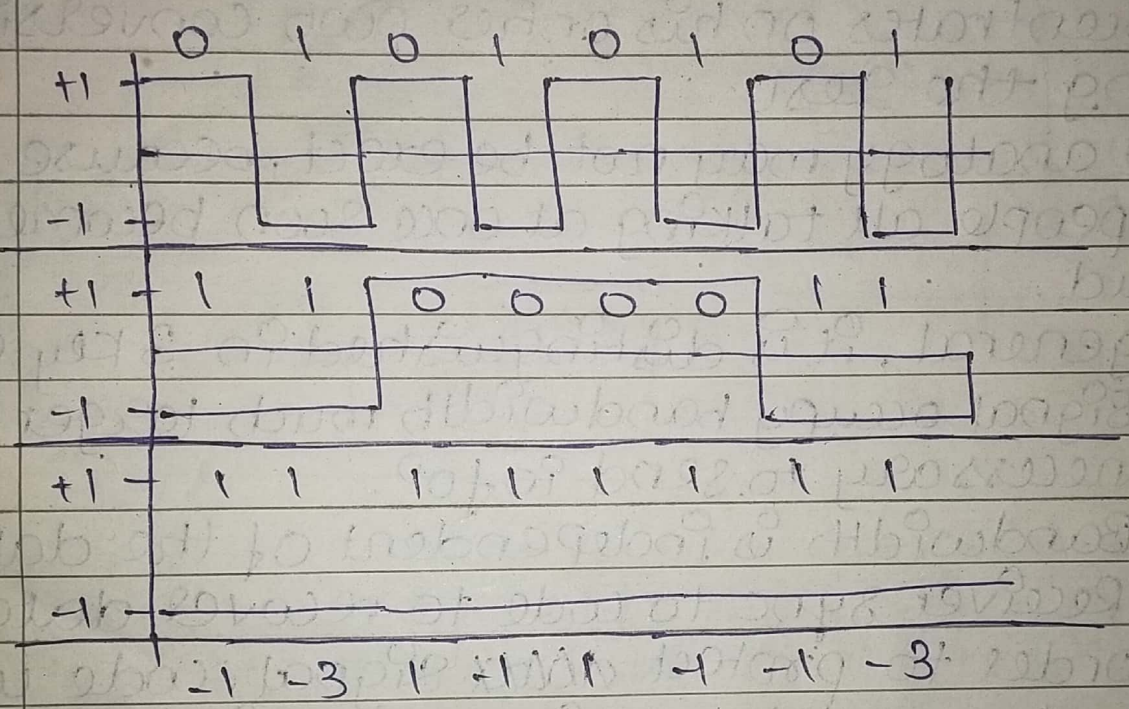
Station B
Data: 10 (2bit)
Spreading code

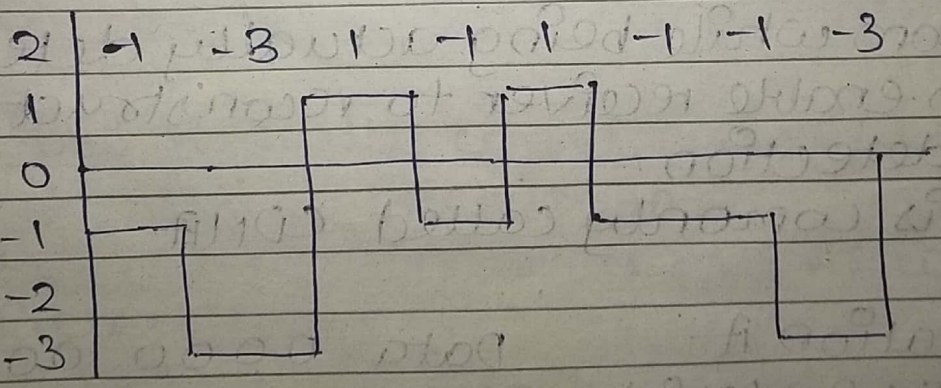
Data 1111 0000
⊕ Code 0011 0011
1100 0011

Station C
Data: 11 (2 bit)
Spreading code

Data 1111 1111
⊕ Code 0000 0000
1111 1111

→ Combined all 3 spreading message.
Bit 0 then +1
Bit 1 then -1





(2) Explain IEEE 802.11 architecture & services.

→ The smallest building block of wireless LAN, is a basic service set (BSS), which consists of

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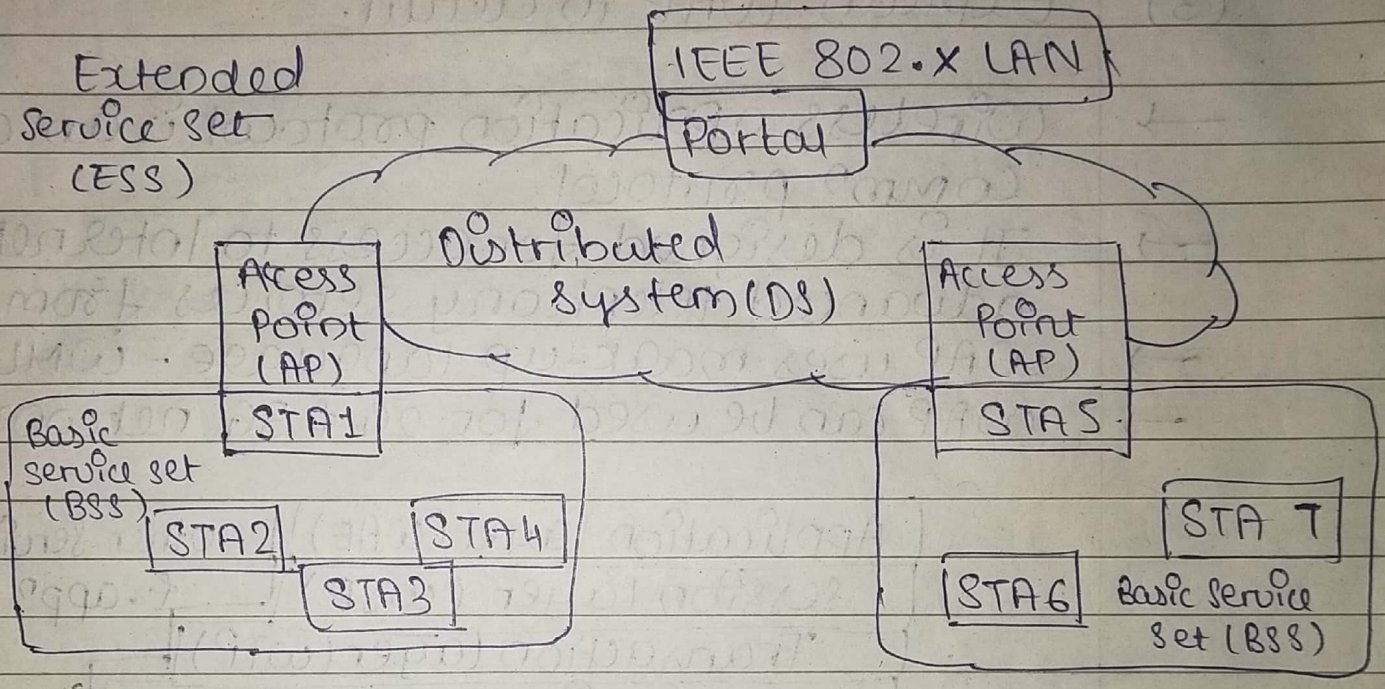
some no of stations executing same MAC protocol & competing for access to same shared wireless medium.



→ A BSS may be isolated or it may connect to a backbone DS through an access point (AP)

→ AP functions as a bridge & relay point. In a BSS, client stations don't comm directly with one another.

→ The BSS generally corresponds to what is referred to as a cell in literature.

→ The DS can be switch, wired network or a wireless network

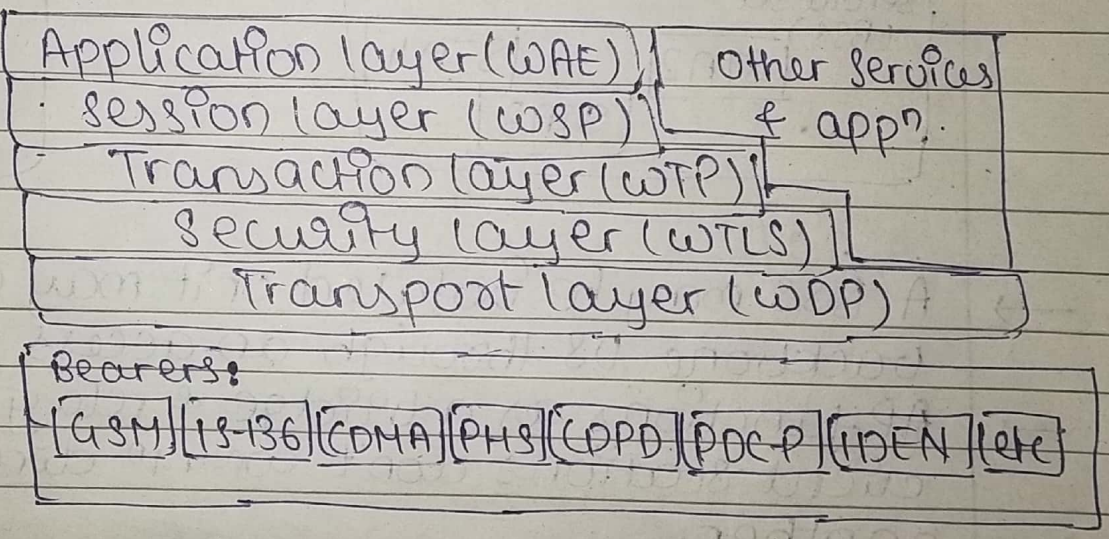
→ An IBSS is typically an adhoc network. In an IBSS, stations comm directly, no AP is involved.

→ It is also possible for 2 BSSs to overlap geogr-aphically, so that single station could par-ticipate in more than one BSS.

→ To integrate the IEEE 802.11 architecture with traditional wired LAN, portal is used.

(3) Explain WAP in detail.

→ Wireless application protocol is an app^n comm^n protocol.
→ It is designed for access to Internet & advanced telephony services from mobile.
→ WAP uses mark-up language - WML.
→ WAP can be used for 2G & 3G network.



⇒ WAE: user agent which is browser or client → WML script which is lightweight client side
⇒ WTP: WAP push architecture which allows for mechanism to allow origin servers to deliver content to terminal without terminal requesting for it.
⇒ WSP: Unlike HTTP, WSP has been designed by WAP forum to provide fast connection suspension & reconnection.

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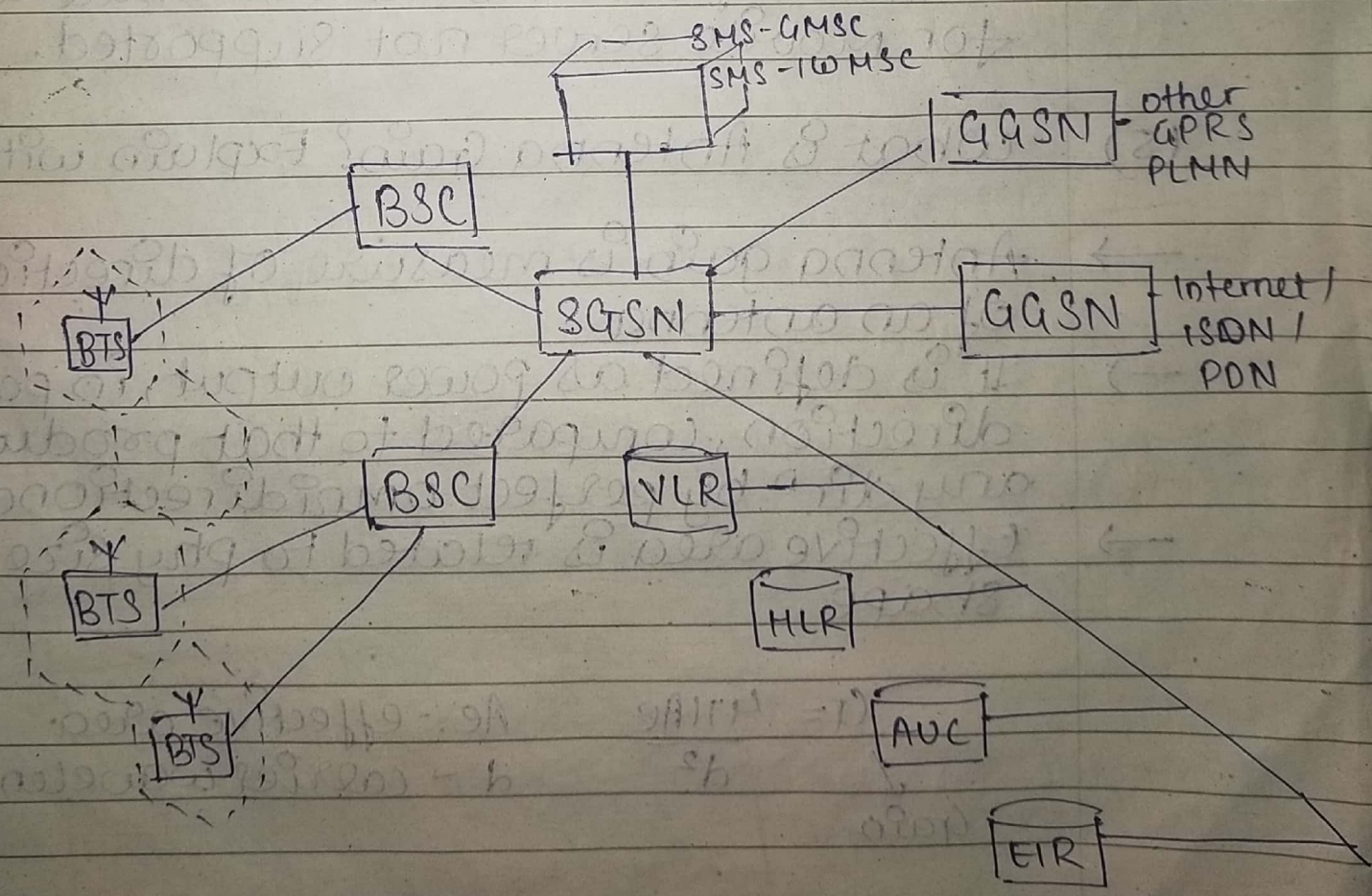
⇒ WTP : It runs on top of datagram service such as UDP and is part of Std suite of TCP/IP protocols used to provide simplified protocol suitable for low bandwidth wireless station.

⇒ WTLS : It incorporates security features that are based upon est transport layer security protocol std.

⇒ WDP : operates above data capable bealer services supported by various network type general transport service.

(4) Draw GPRS architecture with components also discuss app & limitations.

→



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* Application

- Communications
- Value-added services
- E-commerce
- Location-based applications
- Vertical applications
- Advertising

* Limitations

- Limited cell capacity for all users
- Speed lower in reality
- Support of GPRS Mobile Terminate Conn^n for Mobile server not supported.

(5) What is Antenna Gain? Explain with formula.

→ Antenna gain is measure of directionality of an antenna.

→ It is defined as power output, in particular direction, compared to that produced in any dir^n by perfect omnidirectional antenna.

→ Effective area is related to phy size & to its shape.

$G = \frac{4\pi Ae}{d^2}$ ← Gain

Ae.- effective area

d - carrier wavelength

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(6) Compare.

(a)

Circuit Switching	Packet Switching
– Connection oriented	– connectionless
– Designed for voice comm?	– Designed for Data Transmission
– Inflexible	– Flexible.
– Msg received in order sent from source	– out of order receiving
– Space division or Time division.	– Datagram approach & virtual Circuit approach
– Implemented in at physical layer	– Implemented in Network layer.

(b)

Fast fading	Slow fading
– High Doppler spread	– Low Doppler spread.
– Coherence time < Sym period.	– Coherence >> Symbol period.
– Channel response changes rapidly within Sym duration (impulse)	– changes much slower than transmitted signal.
– Occurs if $T_s > T_c$, $B_s < B_o$.	– It occurs if $T_s \ll T_c$,
– It occurs for very low data rates.	$B_s \gg B_o$.

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(c)

Wimax	Wifi
– Defined under IEEE 802.16 Std where y stands for various WiMax versions.	– Defined under 802.11x Stds where x stands for various Wifi versions.
– For MAN applications.	– For LAN applications.
– Gaurantee Quality of Services (QoS)	– does not Gaurantee any QoS.
– Range in 100 mette.	– Range in 50-90 km.
– Connection oriented in Nature	– Connectionless
– Can transmit upto 54 Mbps	– Can transmit upto 70 Mbps.