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Answer to the question no - 2

Given that

$$\eta_b = 0.9$$

$$u = 2$$

$$v_f = 1.0$$

$$B_w = 12.5$$

$$R = 16.2 \text{ Kbps}$$

$$N = 12$$

Now,

$$N_u = \frac{0.9 \times 2}{1.0} \times \frac{12.5 \times 10^6}{16.2 \times 10^3 \times 12}$$
$$= 115.74$$

$$\eta = \frac{115.74 \times 16.2}{12.5 \times 10^6}$$

$$= 1.5 \times 10^{-4} \text{ bits/sec}^2 \text{ Hz}^{-1}$$

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Answer to the question no - 1

Frequency Division Multiple Access is a channel access method used in telecommunications to divide the available frequency spectrum into multiple non-overlapping channels.

Additionally FDMA allocates a fixed amount of bandwidth to each user, regardless of their actual data transmission needs. This means that even if a user is not actively transmitting data, their allocated bandwidth remains unused. This underutilization of bandwidth can be seen as wasteful.

Now, regarding the statement that "TDMA is a complementary access technique to FDMA," I would agree with this statement.

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TDMA is another channel access method that divides the available time slots within a given frequency channel among multiple users. In contrast to FDMA, TDMA allows multiple users to share the same frequency channel by allocating different time slots to each user.

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Answer to the question no-3

Spread Spectrum Multiple Access is a technique used in telecommunications to allow multiple users to share the same frequency band by spreading the signal over a wider bandwidth.

Some of the gains of SSMA, specifically CDMA

1. Increased capacity
2. Improved security
3. Enhanced resistance to interference
4. Flexible resource allocation.

Regarding whether CDMA is a Direct Sequence Spread Spectrum system or not the answer is yes.

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CDMA is a type of DSSS system. In CDMA the data signal is multiplied with a spreading code that has a much higher chip rate than the data rate. This multiplication spreads the signal's bandwidth, resulting in a wider spectrum.

Therefore, CDMA is a form of DSSS that achieves multiple access by spreading the signals over a wider bandwidth using unique codes.