Supply the appropriate words to fill the blanks in the following sentences about the UMTS system (Note: write your answer in the answer book and NOT on this page):

UMTS system uses W-CDMA as its multiple access technique. _____(1) power control is a very important aspect in UMTS, in particular in the uplink, because of the near-far problem. _____ _____ (2) power control mechanisms make a rough estimate of path loss by means of a downlink beacon signal. In _____ _____(3) power control, the BS performs frequent estimates of the received Signal-toInterference Ratio (SIR) in the _____ (4) and compares it to a target SIR. If the measured SIR is higher than the target SIR, the BS will command the MS to lower the power; if it is too low it will command the MS to increase its power. _____ _____ (5) power control adjusts the target SIR in the BS according to the needs of the individual radio link.

UMTS uses ____W-CDMA_____ (1) as its multiple access technique. Each frequency carrier in UMTS occupies a frequency band of 4.4 to _____ (2) MHz. _____(3) power control is a very important aspect in UMTS, in particular in the uplink, because of the _____(4) problem. _____ (5) power control mechanisms make a rough estimate of path loss by means of a downlink beacon signal. In _____ _____(6) power control, the BS performs frequent estimates of the received Signal-to-Interference Ratio (SIR) in the _____ (7) and compares it to a target SIR. If the measured SIR is higher than the target SIR, the BS will command the MS to _____ (8) the power; if it is too low it will command the MS to _____ (9) its power. _____ _____ (10) power control adjusts the target SIR in the BS according to the needs of the individual radio link.

GSM uses _____(1) as a multiple access technique. The GSM spectrum provides _____(2) different frequency carriers, and a guard band is left between the first and the last carrier. Each frequency carrier in GSM occupies a frequency band of _____(3) accommodating _____(4) logical channels in it. Each logical channel is defined by the repetitive occurrence of _____(5) each one with an approximate duration of 0.577ms. In a GSM full rate traffic channel, the payload data is encrypted in blocks of _____(6) bits. The capacity in kbps of a full rate traffic channel is _____(7), this value takes into consideration that in _____(8) frames occurring in a _____(9) ms multi-frame, _____(10) slots are used for other purposes which are: _____(11) and the _____(12) logical channel.

Security in GSM is implemented to prevent fraud via _____ (1) of the subscriber, not revealing the subscriber number over the air, and by _____ (2) the conversations to avoid eavesdropping. The SIM card has a microprocessor chip that can perform the computations required for security purposes. A _____ (3) key Ki is stored on the SIM card, and it is unique to the card. This key is used in two proprietary algorithms: A3 for _____ (4) and A8 for _____ (5). Ki is used in a _____ (6) response protocol using the A3 algorithm between the BSS/MSC and the MS. Ki is used to generate a privacy key _____ (7) that is used to _____ (8) messages (voice or data) using the A8 algorithm. Finally, the control channel signals are also _____ (9) to avoid eavesdropping by using a third algorithm called _____ (10).

The technologies applied with HSUPA improve the _____ (1) packet data performance by means of fast physical layer (L1) _____(2) and transmission _____ (3), as well as fast Node B _____(4). HSUPA general functionality: The _____ (5) estimates the data rate transmission needs of each active HSUPA user based on the device-specific _____(6); The scheduler in the _____(7) then provides instruction to devices on the _____ (8) link data rate to be used at a fast pace depending on the _____ (9) received before, the scheduling algorithm and the _____ (10) prioritisation scheme.

In traffic engineering, assume a cell receives on average 630 calls per hour, the mean holding time is 120 seconds, and the grade of service is 2%. Therefore, the offered traffic in the cell is _____ (1) and the dimensionless unit is _____(2). If the number of channels needed for this offered traffic is 28 channels, the corresponding trunking efficiency is _____ (3).

In a FDMA/TDMA system, there are two types of frequency interference. The first type is the cochannel interference and the second type is the _____ (1) channel interference. Depending of the value of the cochannel reuse ratio the network will have different number of cells per cluster. For example, if the cochannel reuse ratio is 6, the number of cells per cluster will be _____ (2). In order to avoid the second type of frequency interference, the assigned frequencies for the channels of a cell have maximum possible _____ (3) and sectorization can also help.