1. (a) i) \text{lea msg, a1 } \Rightarrow 43F9 \text{ $0000\ 2000$} \\
$43F9 \text{ Binary: } 0100\ 0011\ 1111\ 1001$ \\
\text{lea} \\
0100\ 0011\ 1111\ 1001 \quad \text{register effective address mode register, } \\
\quad = \text{a1 addressing mode (xxx). W} \\

i) \text{This means the absolute address given in the} \\
\text{longword extension (xxx). W of the instruction, namely} \\
\text{$0000\ 2000$} \\
\text{is loaded into a1. See Sec. 22.17, Absolute Long} \\
\text{addressing mode. We see that $0000\ 2000$ is indeed} \\
\text{the address of the first byte of msg.} \\

ii) \text{This would not be used in the MHS system since} \\
\text{data are always accessed with indirect addressing} \\
\text{relative to a5.} \\

(b) \text{For } jsr, \text{ the SP is decremented by 4 and} \\
\text{the return address is placed on the stack.} \\
\text{Thus } SP = 1000000 - 4 = FFFFFC \\
\text{and the memory contains $1028$ at that} \\
\text{location ($FFFFFC$).} \\

(c) \text{zero = $30$ (ASCII) in do} \\
\text{cmp, b #$30$ do} \\
\text{sets condition codes as if $30$ had been} \\
\text{subtracted from $20$ resulting} \\
\text{in zero. Thus Z = 1, N = 0} \\
\text{(zero, not negative).}