Solve the following questions.

1. Implement the following pseudo-code in assembly language. Also, give the corresponding data definition directives:

[**04 points**]

```
; All values are 32-bit unsigned integers
do {
     A²
     if (C == B)
          X = Y + 2;
     else
          X = Y + 10;
     }
     while(A < B)
```

SOLUTION:

```
L1:   MOV   EAX, A
      MUL   A
      MOV   A, EAX      ;A = A²

      MOV   EAX, C
      CMP   EAX, B
      JNE   L2
      MOV   EDX, Y
      ADD   EDX, 2
      MOV   X, EDX      ;X= Y + 2
      JMP   L3

L2:   MOV   EDX, Y
      ADD   EDX, 10
      MOV   X, EDX      ;X= Y + 10

L3:   MOV   EAX, A
      CMP   EAX, B
      JB    L1

      RET
```

2. Provide the contents of registers where indicated (in hex-decimal), after execution of the following instructions.

[**2 Points**]

```
mov     al, 1Ah
not     al                      ; a. 0E5h

mov     al, 13h
and     al,74h                  ; b. 10h

mov     al,9Bh
or      al,35h                  ; c. 0BFh

mov     al,7Ah
xor     al,0DCh                 ; d. 0A6h
```

3. Elaborate the difference between SHR and SHRD through some working example.   [**2 Points**]

ANSWER:

SHR Instruction performs a logical right shift on the destination operand, replacing the highest bit with a 0. The lowest bit is copied into the Carry flag. For example:

```
mov  al,0D0h                    ; AL = 11010000b
shr  al,1                       ; AL = 01101000b, CF = 0
```

The **SHRD** (shift right double) instruction shifts a destination operand a given number of bits to the right. The bit positions opened up by the shift are filled by the least significant bits of the source operand. For example:

```
.data
     wval WORD 9BA4h
.code
     mov  ax,0AC36h
     shrd wval,ax,4             ; wval = 4AC3h
```