



1. The `DATE` field of a file directory entry uses bits 0 to 3 for the `DAY`, bits 4 to 7 for the `MONTH`, and bits 8 to 15 for the `YEAR`. Write instructions to copy the `MONTH` to a byte variable `bMONTH`. **[4 Points]**

```
MOV    AX, DATE
MOV    DX, 0
SHRD   DX, AX, 8
SHR    DH, 4
MOV    bDay, DH
```

2. In the following instruction sequence, show the resulting value of **AL** where indicated, in hexadecimal: **[4 Points]**

```
MOV    al, 11h
NOT    al                ; a. EEh

MOV    al, 74h
AND    al, 0Bh           ; b. 00h

MOV    al, 88h
OR     al, 77h           ; c. FFh

MOV    al, 0DCh
XOR    al, 0DCh          ; d. 00h
```

3. Write a valid assembly language *prototype* and an *Invoke* for the following C++ function:

```
void compare(int result, char *ptr1, char ch, int word2, int* ptr) [2 Points]
```

```
compare PROTO, result: DWORD, ptr1:PTR BYTE, ch: BYTE, word2:DWORD, ptr_:PTR DWORD
```

```
INVOKE compare, mem32, ADDR mem8, mem8, mem32, ADDR mem32
```

4. Given that EAX = 01h, EBX=02h, ECX=03h, EDX = 00h, ESP = 0FFFh. Fill in the following table. Provide only the hexadecimal values [8 Points]

<b>main PROC</b> 0001 SAL AL, 2 0002 PUSH EAX 0003 PUSH EBX 0004 CALL f1 0005 DIV CL <b>main ENDP</b>	<b>f1 PROC</b> 000C STC ;CF = 1 000D TEST AX,00h 000E RCL AL,2 000F CALL f2 0010 ret <b>f1 ENDP</b>	<b>f2 PROC</b> 0017 MUL BL 0018 INC EDX 0019 PUSH EDX 001A PUSH EBX 001B POP EDX 001C POP EBX 001D ret <b>f2 ENDP</b>
<b>main PROC</b> 0001 SAL AL, 2 ;EAX=4 0002 PUSH EAX ;ESP:FFB 0003 PUSH EBX ;ESP:FF7 0004 CALL f1 ;ESP:FF3 0005 DIV CL ;AH=2,AL=0Ah <b>main ENDP</b>	<b>f1 PROC</b> 000C STC ;CF=1 000D TEST AX,00h ;EAX=4,CF=0 000E RCL AL,2 ;EAX=16d,10h 000F CALL f2 ;ESP:FEEh 0010 ret ;ESP:FF7 <b>f1 ENDP</b>	<b>f2 PROC</b> 0017 MUL BL ;AX:32 0018 INC EDX ;EDX = 01 0019 PUSH EDX ;ESP:FEBh 001A PUSH EBX ;ESP:FE7h 001B POP EDX ;ESP:FEBh,DX=02 001C POP EBX ;ESP:FEFh,BX=01 001D ret ;ESP:FF3 <b>f2 ENDP</b>

	EIP	ESP	EAX	EDX
After f2 completes execution	0010h	0FF3h	20h	02h
After f1 completes execution	0005h	0FF7h	20h	02h

5. Write some ASM code to replace the contents of Accumulator with its mathematical cube ( $x^3$ ) [2 Points]

```
MOVZX BX, AL
MUL AL
MUL BX
```