6-9 For the following four problems, include an arithmetic shift instruction.

6. Give a single shift instruction that multiplies the number (signed) in EAX by 32 and stores the product in EAX.

Instruction: Sal EAX, 5 If EAX had -5, after value in EAX: FFFF FFFF FFFF FFFF FF60 (hex)

7. Give a single shift instruction that divides the number (signed) in EBX by 32 and stores the quotient in EBX.

Instruction: Sar EBX, 5 If EBX had -160, after value in EBX: FFFF FFFF FFFF FFFF FF6B (hex)

6. $2^5 = 32$ -5_{10} sal 5 $= -160_{10}$

$-5_{10} \times 32_{10} = -160_{10}$

7. $2^5 = 32$ -160_{10} sar 5 $= -5_{10}$

$-160 \div 32 = -5_{10}$

8. Write a sequence of instructions to multiply the number (signed) in ECX by 33 using shift and add/sub instructions.

mov EAX, ECX ← copy

Sal ECX, 5 ← multiplies by 32

add ECX, EAX ← add to be (x 33)

$-2 \times 33 = -66_{10}$ / FFFF FFFF FFFF FFBE

9. Write a sequence of instructions to multiply the number (signed) in EDX by 63 using shift and add/sub instructions.

mov EAX, EDX ← copy

Sal EDX, 6 ← multiplies by 64

sub EDX, EAX ← subs to be (x 63)

$-2 \times 63 = -126_{10}$ / FFFF FFFF FFFF FF82

Part II.

1-5. For each problem, give the value in hex after the instructions have been executed.

	Instructions	After	Show work
1	mov di, 0AF75h shl di, 1	DI: 5EEA CF: 1	
2	mov si, 0AF75h shr si, 1	SI: 57BA CF: 1	
3	mov r8w, 0AF75h sar r8w, 4	R8W: FAF7 CF: 0	
4	mov r9w, 0AF75h rol r9w, 1	R9W: 5EEB CF: 1	
5	mov r15w, 0AF75h ror r15w, 1	R12W: D7BA CF: 1	

1. 0AF75h: 1010 1111 0111 0101

shl → 1 0101 1110 1110 1010

5 E E A

2. AF75h: 1010 1111 0111 0101

shr → 0101 0111 1011 1010

5 7 B A

3. AF75h: 1010 1111 0111 0101

sar → 1111 1010 1111 0111 0101

F A F 7 CF

4 AF75h: 1010 1111 0111 0101

rol → 0101 1110 1110 1011 ← CF

5 E E B

5. AF75h: 1010 1111 0111 0101

ror → 1101 0111 1011 1010

CF → D 7 B A