Cour...	...izza Aqeel / Amn...	
Instructor N...		Section: H
Student Roll No:		Timing: 02:45 pm-04:10 pm
Date: 09-01-2021		Max. Marks: 40 points

Time allotted: 85 minutes

Instructions:

- *Return the question paper.*
- *Read each question completely before answering it. There are 3 questions on 2 pages.*
- *Write neat and clean handwritten code on the given answer sheet. No cutting is allowed in the code.*
- *Cheating in any case will lead to F-GRADE directly as per university rules.*
- *In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.*

Question#1

[2*5=10 points]

Write an assembly program in which a student wants to check his FSc grade by calling ***Grade*** Procedure. Following are some steps, the student has to perform for his/her Grade checking.

i. Run in a loop so that 5 subject scores can be entered.
ii. Store a counter of the number of subject scores and get the average.
iii. If user enters 0 in any subject score, stop the loop and exit.
iv. Perform range checking on the student's input: Display an error message box if the subject score is greater than 100.
v. The program should display the appropriate letter grade based on table given below:

Average	Grade
80-100	A
70-79	B
60-69	C
50-59	D
0-49	F

Question#2

[1*15=15 points]

Yousuf usually communicates with Bilal using text message. One day, Yousuf realizes that someone is listening to their communication. He informs Bilal regarding this problem of eavesdropper. So, Bilal gives Yousuf an idea to make a private channel using 2-byte private one-time pad i.e., OTP which will be once generated by you. The Yousuf also added one feature that the encryption of our message through private OTP should be done using only through logical operation and integer arithmetic. So, Yousuf and Bilal want your help to make two procedure i.e., Encryption and Decryption. Procedure Encryption will encrypt Yousuf message using OTP and Procedure Decryption will helps Bilal to decrypt Yousuf encrypted message using that OTP. In Encryption procedure, you have to receive two parameter one is plain text message and another is OTP which will be locally used in this procedure. In Decryption procedure, you have to receive one parameter i.e. cipher text means encrypted text. In last, Bilal adds one more feature that local variable/s cannot be declare using term local. You can assume any 2-byte value for OTP.

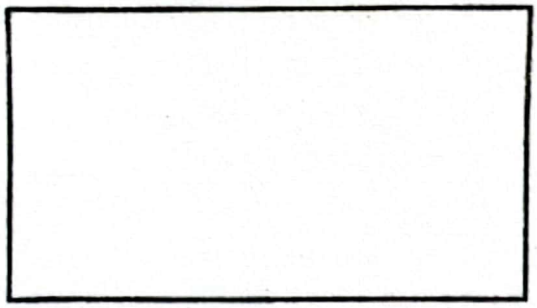
Question#3

[3*5=15 points]

a) Write the output for the following program:

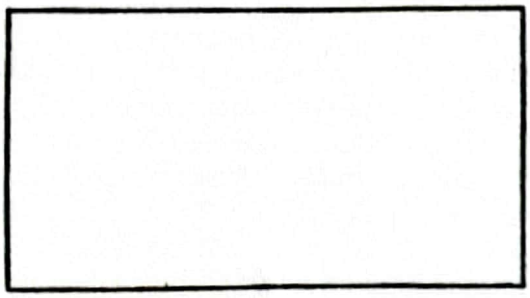
Code#1:

```
.data
Msg byte "output will be: ",0
Var1 byte 11,15,27,64
.code
main proc
mov ebx, offset var1
add ebx, sizeof var1
sub ebx, type var1
mov edx,offset msg
call writestring
mov eax,[ebx]
call writedec
call crlf
exit
```



Code#2:

```
.data
Msg byte "output will be",0
arr byte 11h,15h,27h,64h,10h,3h,6h,10h
.code
main proc
Mov ecx,lengthof arr
Mov esi,offset arr
L1:
Mov eax,[esi]
call writehex
add esi,type arr
call crlf
Loop L1
Exit
```



b) In the following instruction sequence, show the resulting value of AL where indicated, in Hexadecimal and for part (e&f) show the value of flags only:

a. mov al,7Ah
   not al
b. mov al,3Dh
   and al,74h
c. mov al,9Bh
   or al,35h
d. mov al,72h
   xor al,0DCh
e. mov al,00001111b
   test al,00000010b ; CF=? ZF=? SF=?
f. mov al,00000110b
   cmp al,00000101b ; CF=? ZF=? SF=?