5.

a) Reverse a given string and check whether it is a palindrome or not.

```
.model small ; begin of the model (the model small is selected out of large and medium)

.stack ; creates a stack segment and allocates memory to the starting of the stack

.data ; creates a data segment to store the data required by the program

str db "OLIRIL" ;declaration of local variable and initialization

l db $-str

str_r db 20 dup(0) ;allocation of memory to str_r and initialize it to 0

m1 db 10,13, "PALINDROME$" ;initialization to the string m1

.code ;begin of the code segment to store the code of program

m2 db 10,13, "NOT PAL$" ;initialization to the string m2

mov ax,@data ;copies the address of data to ax

mov ds,ax ;copy ax into ds

lea si,str ;loads offset address of str into si

lea di,str_r ;loads offset address of str_r into d

add di,l ;adds contents of reg l into index reg di

dec di ;decrement the value of di reg

mov cl,l ;copy contents of l reg into cl reg

up: mov al,[si] ;copies contents of memory addressed by si into al reg

 mov [di],al ;copies contents of al into memory addressed by di

 inc si ;increments contents of si

 dec di ;decrements contents od di

 loop up ;control is jumped to label up

up1: mov al,[si] ;copies contents of memory addressed by si into al reg
```

```
lea si,str ;loads offset address of str into si

lea di,str_r ;loads offset address of str-r into si

mov cl,l ;copies contents of l into cl

cmp al,[di] ;compares the contents of memory addressed by di with

jne dm2 ;makes the control to jump to label dm2 if contents are not

 inc si

 inc di

 dec cl

jnz up1 ;makes the control to jump to label up1 if contents are

lea dx,m1

mov ah,09h ;displays the message1 on the display screen

int 21h ;interrupt signal

jmp exit

dm2: lea dx,m2

 mov ah,09h ;displays the message 2

 int 21h ;interrupt signal

exit: mov ah,4ch ;terminates the program

 int 21h ;interrupt signal
```

b) Assume any suitable message of 12 characters length and display it in the rolling fashion on a

7-segment display interface for a 30 suitable period of time. Ensure a flashing rate that makes it

easy to read both the messages. (Examiner does not specify these delay values nor is it necessary

for the student to compute these values).

```
.model small

.stack

end
```

```
.data
m1 db 86h,88h,0f9h,8eh,8ch,0c7h,86h,89h
PA equ 9800H
PB equ 9801H
PC equ 9802H
CR equ 9803H
.code
mov ax,@data
mov ds,ax
mov al,80h
mov dx,CR
out dx,al
up3: lea si,m1
 mov cx,08h
up1: mov al,[si]
 call disp
 call delay
 inc si
 loop up1
mov ah,4ch
int 21h
disp proc
mov bl,08h
up5: rol al,01h
 mov dx,PB
 out dx,al
 push ax
```

```
 mov al,0FFH
 mov dx,PC
 out dx,al
 mov al,00h
 out dx,al
 pop ax
 dec bl
 jnz up5
RET
disp ENDP
delay PROC
push cx
mov cx,4FFFH
up7: mov bx,0EFFFH
up6: dec bx
 jnz up6
 loop up7
 pop cx
 RET
 delay ENDP
end
```