

(CLO – 3: Compute the performance of CPU)

QUESTION NO.03:

- i. While defining CPU performance which parameters are required to consider? Differentiate between CPU performance and execution time. Discuss factors affecting execution time. [05 Marks]
- ii. You are on the design team for a new processor. The clock of the processor runs at 200 MHz. The following table gives instruction frequencies for a given program, as well as how many cycles the instructions take, for the different classes of instructions. [05 Marks]

Instruction Type	Frequency	Cycles
Loads and Stores	30%	6
Arithmetic instructions	50%	4
All others	20%	3

- (a) Calculate the average CPI.
- (b) If a given program gets executed in 11 seconds, calculate the number of instructions in a program.
- (c) What clock rate would make the machine to execute the same program in 10 sec?

[10 Marks: 5+5]

(CLO – 4: Demonstrate assembly language programming capabilities)

QUESTION NO.04:

i. Using a loop and indexed addressing, write a procedure that rotates the members of a 32-bit integer array forward one position. The value at the end of the array must wrap around to the first position. For example, the array.

[10,20,30,40] would be transformed into [40,10,20,30].

[05 Marks]

ii. Write a non-recursive version of the Factorial procedure that uses a loop. Write a short program that interactively tests your Factorial procedure. Let the user enter the value of n. If overflow occurs in your loop when calculating each factorial value, your program should display an error message. If no overflow occurs, display the calculated factorial.

[10 Marks: 5+5]

QUESTION NO.05:

i. Write an assembly code to convert a binary string, declared in data segment, into an unsigned value and store it in EAX register. For example, if the given string is '1110' the EAX register must have 14 in it. If the binary string is greater than 32 digits length, a value zero must be placed in EAX. (Hint: SHL and OR).

[05 Marks]

ii. Write an assembly language procedure which will count the number of times vowel characters occur within a NULL terminated lowercase string. The procedure will be called with EDI having the address of the string to be searched and should return with the count in CX. For example, if the procedure is called for the following string, it must return 3 in CX:

str byte "hello world",0

The procedure should return with all registers preserved (except CX, which contains the return value). You are not allowed to refer to str variable inside the procedure.

[05 Marks]

Note: A NULL terminated string is a sequence of ASCII characters with the end of the sequence indicated by a byte containing the value 0.

[10 Marks: 5+5]

*****BEST OF LUCK*****