

[SULIT]

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**UNIVERSITI MALAYSIA PERLIS**

Peperiksaan II Pertengahan Semester Kedua  
Sidang Akademik 2019/2020

**DKT 217 – Computer System  
[ Sistem Komputer ]**

Masa: 1 jam

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Please make sure that this question paper has **THREE (3)** printed pages including this front page before you start the examination.

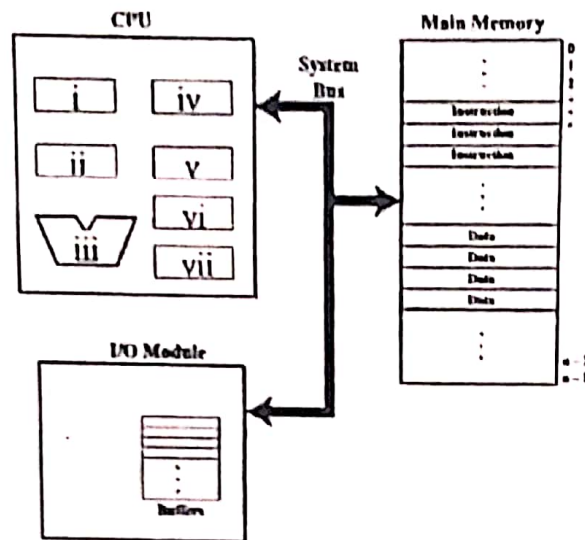
*(Sila pastikan kertas soalan ini mengandungi **TIGA (3)** mukasurat yang bercetak termasuk muka hadapan sebelum anda memulakan peperiksaan ini.)*

This question paper has **THREE (3)** questions. Answer **ALL** questions.

*(Kertas soalan ini mengandungi **TIGA (3)** soalan. Jawab **SEMUA** soalan.)*

## QUESTION 1

a)



The above block diagram shows a general description of a central processing unit (CPU). Explain the structure and function for the following CPU component :

(1) Component i

(2) Component ii

(3) Component iii

*- PC*  
*- SR*  
*Fetch Execute cycle*  
*- Execute Unit*

(6 marks)

b) The most important steps a CPU controller does is the Fetch-Decode-Execute cycle. Using relevant registers inside the CPU, explain in detail the FIVE (5) steps of this cycle and where the appropriate registers are used.

(10 marks)

## QUESTION 2

a) A processor that contains an accumulator, Acc and 2 internal registers, R1 and R2 with stack capability is desired to perform the following mathematical operation :

$$G = (A - B \div F) \times (C \div D + E)$$

where the variables A to G above represent memory address locations. If the basic instructions consists of the following

MOVE, PUSH, POP, ADD, SUB, MUL and DIV

Show the assembly operation of the processor when using the following addressings :

- i. 0-address
- ii. 1-address
- iii. 2-address
- iv. 3-address

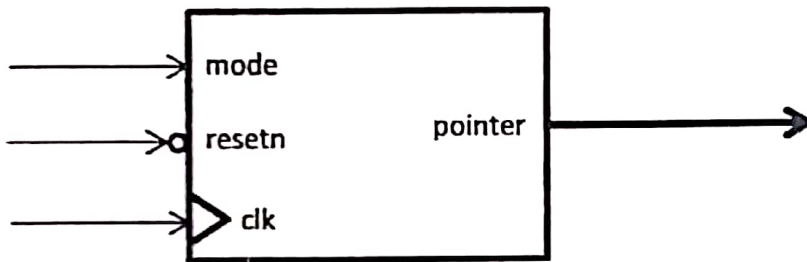
[8 marks]

- b) Suppose a data to be stored into memory is 8FA69CH. Using the Hamming Algorithm approach for data protection, determine the actual data word to be stored into the memory. Show how the word is formed.

[8 marks]

**QUESTION 3**

A program counter (PC) is a counting register that points to the next program memory address location to fetch the instruction data for decoding and execution. Given below is a block diagram for a certain type of program counter :



Write a VHDL program to represent an 8-bit program counter that will count up by 1 when mode is 0 and counts up by 2 when mode is 1 upon every rising clock pulse. The reset will set the pointer to 00H.

*bound if else*

[18 marks]

0000000