SLIATE
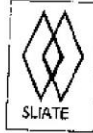
SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
Second Year Second Semester Examination – 2019
HNDIT 2401-Computer Architecture

Instructions

Time: Two(02) hours
Answer Any four Questions
All Question carry equal marks

No. of question	: 05
No of pages	: 04

Q1)

I.   What is the purpose Logic gates?   (02 marks)

II.   Draw the truth table for following Logic gates.   (04 marks)
      a. NAND
      b. XOR

III.   Draw a circuit to represent half adder and draw the truth table.   (04 marks)

IV.   Write Boolean algebra equations for following Boolean Algebra laws?   (04 marks)
      a. Associative Law
      b. Commutative Law

V.   Simplify the following Boolean expression with Algebra law.   (05 marks)

$$Z = \overline{(\bar{A} + C).(B + \bar{D})}$$

VI.   Draw the Karnaugh map and simplify the following equation.   (06 marks)

$$Z = \bar{A}B + B\tilde{C} + BC + A\bar{B}\tilde{C}$$

(Total 25 marks)

Q2)

    I.   What is the purpose of an Instruction set?

                                (02 marks)

    II.   Name four registers in the CPU.

                                (04 marks)

    III.   Briefly explain following CPU operations.
            a. Instruction Fetch   (04 marks)
            b. Instruction Execute

    IV.   Briefly explain CPU clocks.

                                (04 marks)

    V.   Write down the advantages and disadvantages of Instruction pipelining.   (05 marks)

    VI.   Briefly explain Pipeline hazard.

                                (06 marks)

                                (Total 25 marks)

Q3)

    I.   Define the term CISC.

                                (02 marks)

    II.   Compare and contrast DRAM and SRAM.

                                (04 marks)

    III.   What is Non-volatile memory? Give two examples.

                                (04 marks)

    IV.   What are the functions of cache memory?

                                (04 marks)

    V.   Draw the diagram to represent memory hierarchy.

                                (05 marks)

    VI.   Consider the following details of hard disk.
        Average seek time = 9ms   (06 marks)
        Disk rotation speed = 7200 rpm
        Byte per sector = 512
        Sectors per Track = 400
        Tracks per Sector = 20000
        Number of Tracks = 05
            a. Calculate capacity of the hard disk.
            b. Calculate the average disk rotational latency.
            c. Calculate the total time needed to read 00KB data file (Assume file is not fragmented)

                                (Total 25 marks)

Q4)

    I.   What is Input/output module?

    II.   Name four functions of I/O module.   (02 marks)

    III.   Briefly explain the operations of Interrupt driven I/O technique.   (04 marks)

    IV.   Compare and contrast non-preemptive and preemptive CPU scheduling.   (04 marks)

    V.   Define the following terms.   (04marks)
        a. Throughput
        b. Service Time   (05 marks)
        c. Response Time

    VI.   The following table explains execution of four process in the CPU. The Arrival time and Execution time is given in milliseconds. Using the preemptive Round Robin Algorithm, the size of the quantum is 3 milli seconds.

                                                                             (06 marks)

Process	Arrival Time	Execution Time
P0	0	5
P1	1	3
P2	2	8
P3	3	6

    a. Draw the Grant chart.
    b. Calculate the Average waiting time.

                                (Total 25 marks)

Q5)

    I.   What is the purpose of System Busses?

    II.   Name four types of disk interfaces.   (02 marks)

    III.   Briefly explain following terms.   (04 marks)
        a. Ethernet
        b. Serial Interface   (04 marks)

    IV.   What is the concept of Deadlock?

    V.   Briefly explain following terms.   (04 marks)
        a. Resource Allocation Graph
        b. Deadlock Avoidance   (05 marks)

VI.   The following details are related to the computer performance.
      Clock rate= 3GHz   (06 marks)
      Average Cycle per Instruction=4
      Number of Instruction=500
         a.   Calculate the clock cycle time.
         b.   Calculate the CPU execution time of this program.

                                                                    (Total 25 marks)