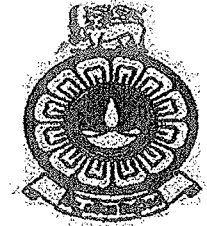THE OPEN UNIVERSITY OF SRI LANKA
B.SC. (IT) DEGREE PROGRAMME – 2023/2024
FINAL EXAMINATION
COU 3300 – COMPUTER ORGANIZATION AND COMMUNICATION
DURATION: TWO HOURS ONLY (2 HOURS)

Date: 20.08.2024   Time: 01.30 p.m. – 03.30 p.m.

Answer FOUR Questions ONLY.

Q1.

a)	What is the major drawback of mechanical calculation machines?	[02 Marks]
b)	State the three (03) main logical functions of ALU.	[03 Marks]
c)	What are the five (05) distinct categories of Microcomputers?	[05 Marks]
d)	State the difference between RAM and ROM	[04 Marks]
e)	Sketch the Simplified view of hierarchical layers.	[05 Marks]
f)	Briefly explain major classes of computer software.	[06 Marks]

Q2.

a)	Provide three (03) examples for high-level programming languages?	[03 Marks]
b)	What are the primary color components used in liquid crystal display?	[03 Marks]
c)	Briefly explain the term "**Network Protocol**".	[03 Marks]
d)	What are the seven (07) layers of the OSI model?	[07 Marks]
e)	Represent how the equation $f(x) = 4x^2 - 16$ proceed in computing machine using diagrams, if the value of x = 2.	[09 Marks]

Q3.

a)	What is known as "**radix**" in number systems?	[02 Marks]
b)	What are the digits used in Hexadecimal number system.	[04 Marks]
c)	Draw the block diagram of "**Exclusive OR**" gate.	[04 Marks]
d)	Perform the following division in binary. $1101010_2 / 10_2$	[07 Marks]
e)	Simplify the following Boolean expression using Boolean laws. $\overline{AC}\,(\bar{A} + C)(\bar{C} + C)$	[08 Marks]

Q4.

    a) What is the primary disadvantage of a SR flip-flop?   [02 Marks]

    b) State the term "**Asynchronous sequential circuit**".   [03 Marks]

    c) What the difference between sequential processing and parallel processing

        [05 Marks]

    d) Draw the Block diagram of SISO shift register.   [05 Marks]

    e) Simplify following Boolean expression using K-map?   [10 Marks]

$$F = \bar{A}B\bar{C}\bar{D} + A\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}\bar{B}CD + A\bar{B}\bar{C}\bar{D} + \bar{A}BC\bar{D}$$

Q5.

    a) State the term "**pipelining**" refers to computer architecture.   [03 Marks]

    b) Explain the two (02) methods of scaling.   [05 Marks]

    c) What are the primary transmission states that may exist on a communication channel, and how do they differ from each other?   [05 Marks]

    d) Differentiate analog signal and digital signal.   [06 Marks]

    e) How do single-threaded and multi-threaded processes differ from each other, briefly explain it with the aid of diagrams.   [06 Marks]

Q6.

    a) Briefly explain the term "**Learning Management system**".   [03 Marks]

    b) What the three (03) options for designing a memory system to support caches.

        [03 Marks]

    c) What are the key reasons for utilizing multiprocessors?   [04 Marks]

    d) Provide two (02) drawbacks of the "Traditional Synchronous Busses".   [04 Marks]

    e) Define the term 'Virtual memory" and what are the historical reasons for the use of virtual memory.   [05 Marks]

    f) Briefly explain UMA and NUMA multiprocessor.   [06 Marks]

** End of the Paper**