THE OPEN UNIVERSITY OF SRI LANKA
B. Sc. DEGREE PROGRAMME – LEVEL 03
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
FINAL EXAMINATION 2014/2015
CPU1140: FUNDAMENTALS OF COMPUTERS

DURATION: **TWO HOURS ONLY (2 HOURS)**

Date: 14.05.2015 Time: 9.30am-11.30am

Answer FOUR (04) questions ONLY

Q1.

A computer is an electronic device capable of executing a sequence of instructions developed based on algorithms stored in its memory to manipulate data fed into it. It produces the required results faster than human beings.

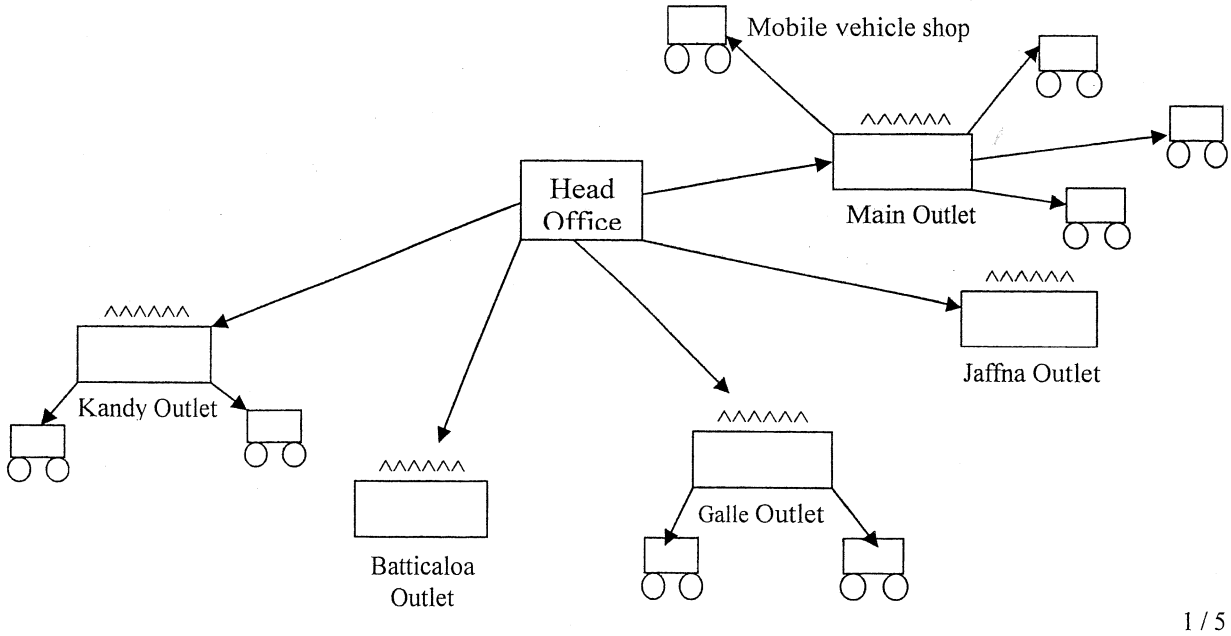
i. List five (05) characteristics of the Computer and describe them.

ii. Briefly write about the evolution of the computer related to the five (05) generations of it.

iii. Draw a diagram to describe the data flow and the control flow of the computer.

iv. Write the function of the following components.
   a) Control unit
   b) ALU
   c) Processor register
   d) Internal bus

v. Read carefully;
A Supermarket chain named "Super Shop" is planning to expand their services. They plan to open outlets at three (03) distance cities from Colombo where the main outlet and the head office are based in Colombo. Also they plan to have mobile shops in vehicles to cover up the Colombo city area, Kandy and Galle. Following is a rough sketch of the supermarket network.



a) Identify the type of computers needed for the following units and justify your answer.

- Head office.
- Main outlet.
- Regional Outlets.
- Mobile shop vehicles.

Q2.

Computer hardware is the physical parts of a Computer.

i. Describe how the hard disk completes a Read/Write command. Use a named diagram to define necessary key words.

ii. A pointing device is an input interface that allows a user to input spatial data to a computer.

a) What are the classes of pointing input devices?
b) Give two (02) examples for each class.

iii. Briefly describe five (05) problems in VDUs.

iv. Describe two (02) alternate input methods that can be used to eliminate or limit the use of computer keyboards.

v. Draw rough diagrams of the following ports and write the use of each port.

a) Serial Port.
b) Parallel Port.
c) Registered Jack.
d) VGA Port.
e) Super Video Connector.
f) Molex Connecter.
g) IEC Connecter.

Q3.

Computer Software is a collection of Computer Programs, Procedures and documentation that perform some tasks on a Computer System.

i. What are the types of computer Software? Describe them with two (02) examples for each type.

ii.

a) What is an Operating System?
b) What are the basic functions provided by an Operating System?

iii. Briefly describe the following Software.

a) Debugger
b) IDE
c) Interpreter
d) Source code
e) Object Code

iv. Briefly write about the five (05) generations of programming languages. Write examples for each generation.

v. Write two (02) examples for each of the following Software classes.

a) Enterprise Software.
b) Enterprise infrastructure Software.
c) Information worker Software.
d) Content access Software.
e) Educational Software.

Q4.

Binary number system is a numeral system that represents numeric values using combinations of the two digits '0' and '1'.

i. Write three (03) reasons to use the binary number system in digital Computers.

ii. Convert the following decimal numbers to binary numbers.

a) 343_{10}
b) 996_{10}
c) 23.625_{10}
d) 504.02_{10}

iii. Convert the following **Binary** values to **Hexadecimal** and **Octal.**

a) 1101110111_2
b) 111011111001_2
c) 100011110001_2
d) 111110001111001_2

iv. Solve the following Binary Sums.

a) $10111_2 + 1111001_2$
b) $1111001_2 - 111110001_2$
c) $1111_2 * 1001001_2$
d) $10110110_2 / 101_2$

v. Briefly describe the following character representation methods.

a) ASCII

b) BCD

c) UTF-EBCDIC

Q5.

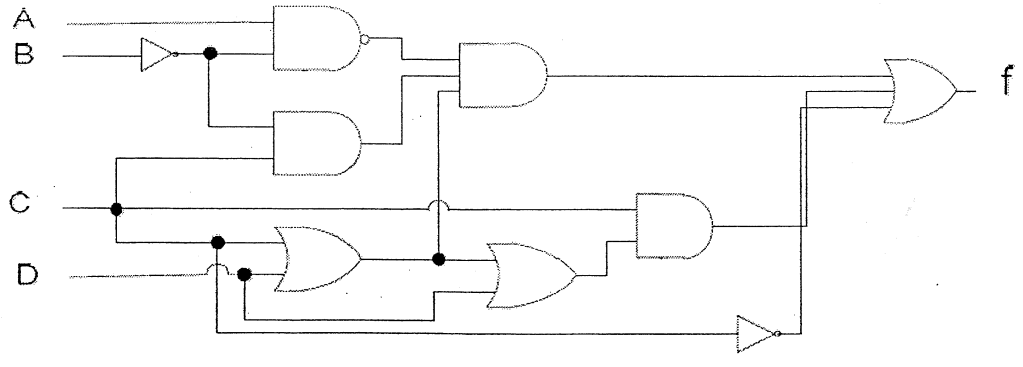
Boolean algebra is the algebra for the manipulation of objects that can take only two (02) values.

i. Derive the Boolean expression for the following description of System X.
System X - "You can go to University today if it is morning, it is not raining, there is no bus strike and it is not a university holiday"
Use appropriate parameters as,
M- for Morning
R- for Raining
B -for Bus available
H- for Holiday
(Careful about Boolean function)

ii. Write the Product form and sum form of the following Boolean algebraic laws. Using parameters A, B and C.

a) Commutative Law
b) Associative law
c) Distributive Law
d) Redundancy law
e) De Morgan's Law

iii. Write the Boolean expression for the following circuit.



iv. Simplify the Boolean expression above in (i) using Boolean algebraic rules.
(Clearly indicate the rule used)

v. Draw the logic circuit for the Simplified Boolean expression above in Q5 part (ii).

Q6.

Computer Networks are used to interconnect computers to be able to communicate with one another and share data.

i. Define the following terms related to computer Networks.
   a) Node
   b) Client
   c) Server

ii. Write brief descriptions about the communication media with diagrams.
   a) UTP
   b) Coaxial cables
   c) Fiber optics
   d) Microwave link
   e) Satellite links

iii. Compare the peer-to-peer networks and client server networks related to their,
   a) Size
   b) Administration
   c) Security
   d) Cost
   e) Implementation

iv. Describe the functionality of the following Network devices in a Computer Network. (Use rough sketches)
   a) Network Gateway.
   b) Network Firewall.
   c) Modem.

v. Inter networking involves connecting two or more distinct Computer Networks or Network Segments via a common routing technology.
   a) Explain how WWW works.
   b) What is the use of two different Static and Dynamic IP addresses?