



University of Vavuniya

First Examination in Information Technology - 2020

First Semester April/May 2022

IT1113 Fundamentals of Information Technology (Theory)

Answer Four Questions Only

Time Allowed: Two Hours

1. (a) The unique capabilities and characteristics of a computer have made it very popular among its various users including engineers, managers, accountants, teachers, and students.

Briefly describe five characteristics and capabilities of a modern digital computer.

[10%]

- (b) The history of computer development is often discussed in terms of different generation of computers.

Describe important characteristics of a computer system for each of the five computer generations.

[15%]

- (c) Computers can be classified into three categories based on operating principles.

Briefly describe each of these categories.

[15%]

- (d) Draw a block diagram of a computer system and briefly describe the functions performed by each of the units of the computer system.

[25%]

{ This question is continued on the next page }

(e) Identify suitable devices required to perform each of the following tasks:

- i. Printing large scale engineering drawings
- ii. Showing video or image on a big white screen
- iii. Storing photos and videos on camera
- iv. Teaching Graphics via online
- v. Digitizing hardcopies

[15%]

(f) Briefly describe the roles or usage of computers widely used in real world in each of the following STEM fields:

- i. Science
- ii. Technology
- iii. Engineering
- iv. Mathematics

[20%]

2. Computers are used for processing data for immediate use and storing of large volume of data for future use.

(a) Draw and describe memory hierarchy of a computer to illustrate memory types according to its size, speed and cost. [20%]

(b) Compare and contrast static RAM and dynamic RAM. [10%]

(c) Define each of the following properties of optical storage systems: [15%]

- i. Storage capacity
- ii. Data transfer rate
- iii. Access time

(d) Compare and contrast the significant aspects of impact and non-impact printers. [20%]

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(e) Briefly describe the usage of each of the following input devices:

- i. Magnetic Ink Character Recognizer
- ii. Optical Character Recognizer

[10%]

(f) Assume that a storage disk has the following specifications:

- An average seek time of 9ms
- A 5400 RPM rotational speed
- A 10MB/s average transfer rate
- 2ms of overheads

Determine each of the following to read a random 1,024 bytes sector:

- i. Average rotational delay
- ii. The transfer time
- iii. The response time

[25%]

3. (a) Evaluate each of the following arithmetic operations in binary arithmetic system.

- i. $11100101_2 + 110010101_2$
- ii. $1010111_2 - 11101_2$
- iii. $100101_2 \times 11001_2$
- iv. $1001000_2 \div 110_2$

[20%]

(b) i. Convert the decimal number 3271 to binary, octal and hexadecimal number systems.

ii. Convert the binary number 110101010100 to decimal, octal and hexadecimal number systems.

iii. Convert the decimal number 122.35 into 8421 BCD code.

[20%]

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(c) Describe five basic components of Information Systems. [25%]

(d) i. Draw logic circuits for each of the following expressions with the Boolean variables P , Q , and R :

A. $PQ\bar{R} + P\bar{Q}$

B. $\overline{P + QR} + R$

[20%]

ii. Draw logic diagrams to provide NAND and XNOR functions using basic logic gates. [15%]

4. (a) Draw diagrammatic representation of each of the following guided media and describe advantages and disadvantages of each of them:

i. Twisted pair cable

ii. Coaxial cable

iii. Optical fibre

[30%]

(b) Describe each of the following components of a LAN with the aid of a diagram:

i. Hub

ii. Router

iii. Gateway

iv. Network Operating system

[20%]

(c) Explain the four phases of a CPU cycle with the aid of an example. [20%]

(d) Discuss the similarities and differences between Internet, intranet and extranet on various aspects. [30%]