University of Colombo, Sri Lanka

University of Colombo School of Computing

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2022 — 1st Year Examination — Semester 1

IT1206 — Computer Systems

Multiple Choice Question Paper

(Two hours)

Important Instructions

- The duration of the paper is **Two (2) hours**.
- The medium of instructions and questions is English.
- This paper has **40 questions** on **10 pages**. Answer **all** questions.
- All questions are of the **MCQ** (Multiple Choice Questions) type.
- Each question will have **5 (five)** choices with **one or more** correct answers.
- All the questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from -1 (All the incorrect choices are marked & no correct choices are marked) to +1 (All the correct choices are marked & no incorrect choices are marked). However, **the minimum mark per question would be zero**.
- Answers should be marked on the **special answer sheet** provided.
- Note that questions appear on both sides of the paper. If a page is not printed, please inform the supervisor/invigilator immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
- Calculators are **not** allowed.
-

1) Which of the following is/are (a) fourth generation of computer(s)?

(a) ICL-2900	(b) IBM-1401	(c) Apple II
(d) EDVAC	(e) CDC-1604	

2) Which of the following device(s) function(s) only as an input device?

(a) Optical Pen	(b) Touch Screen	(c) Hard Disk drive
(d) Scanner	(e) Pen drive	

3) Which of the following is/are considered as a page printer?

(a) Inject Printer	(b) Plotter	(c) Thermal-Wax Printer
(d) Chain Printer	(e) Laser Printer	

4) Which of the following is/are **NOT** suitable medium/media for backing up your data?

(a) Expansion Card	(b) Optical Devices	(c) Cloud Storage
(d) Magnetic Tape	(e) Removable Drives	

5) In communication, interface is an electronic circuit that allows sending and receiving data according to a well-defined standard.
Which of the following is/are type of communication interfaces?

(a) IDE	(b) SATA	(c) Fire-wire
(d) ISA	(e) USB	

6) What is the range of 8-bit two's complement integers?

(a) -64 to +63	(b) -128 to +127	(c) -112 to +113
(d) -256 to +255	(e) -224 to +225	

7) What is/are the equivalent binary representation(s) for decimal number $\mathbf{13\frac{3}{8}}$?

(a) `1101.101`	(b) `111.101`	(c) `1101.011`
(d) `111.011`	(e) `1011.111`	

8) Which of the following is/are **NOT** (a) characteristic(s) of a *Star network topology*?

(a) High fault tolerance
(b) Limited number of devices can be connected
(c) All devices are connected to a central hub
(d) Each device has its own cable connection to the central hub of a Star network
(e) All devices are connected through a common cable in a star network

9) Which of the following characteristic(s) differentiate(s) Bluetooth and Wi-Fi technologies?

(a) Wi-Fi is a long-range, high-power, and high-throughput communication technology compared to Bluetooth.
(b) Bluetooth is primarily used for voice communications, while Wi-Fi is used for data communications.
(c) Bluetooth uses the 2.4GHz frequency band, while Wi-Fi uses the 5GHz frequency band.
(d) Bluetooth uses a pairing process for secure communication, while Wi-Fi uses various security protocols such as WPA and WPA2.
(e) Bluetooth devices generally use more power than Wi-Fi devices.

10) What is the clock cycle time of a CPU clock that operates in a 500MHz frequency?

(a) 2 *ns*	(b) 5 *ns*	(c) 0.2 *ns*
(d) 0.5 *ns*	(e) 2.5 *ns*	

11) Which of the following is/are **TRUE** regarding the Microprocessor in modern computers?

(a) Also known as the Central Processing Unit (CPU).
(b) Microprocessor is a non-programmable, single purpose device.
(c) Initially the microprocessors store instructions in a concurrent manner in memory.
(d) It is the unit which performs all the calculations in a computer system.
(e) Instructions in a microprocessor, are fetched from the Arithmetic and Logic Unit (ALU).

12) With the development of technology, the vacuum tubes were replaced by transistors. Which of the following is/are **TRUE** regarding the resulting changes in computers?

(a) Speed decreased, power consumption increased, and size decreased.
(b) Speed decreased, power consumption increased, and size increased.
(c) Speed increased, power consumption increased, and size decreased.
(d) Speed increased, power consumption decreased, and size decreased.
(e) Speed increased, power consumption increased, and size increased.

13) What is/are the number of inputs and outputs of a typical Full-Adder?

(a) 2 inputs and 1 output
(b) 2 inputs and 2 outputs
(c) 2 inputs and 3 outputs
(d) 3 inputs and 2 outputs
(e) 3 inputs and 3 outputs

14) Which of the following is/are considered as Alphanumeric keys on the standard keyboard?

(a) Number keys from 0 to 9
(b) Caps Lock and Backspace keys
(c) Home, End, Page-up, and Page-down keys
(d) Enter and symbol keys
(e) Delete and Insert keys

15) Which of the following statement(s) is/are **TRUE** about Non-volatile storage devices?

(a) Once the power is turned off the data in the memory is lost.
(b) Once the power is turned off the data remains in the memory.
(c) Computer's main memory is a type of Non-volatile storage device.
(d) Non-volatile storage is most commonly used in networking devices, like switches, routers, cable modems.
(e) Hard-disks and Flash drives are examples for Non-volatile storage devices.

16) Which of the following port(s) is/are generally used to connect a mouse to the computer?

(a) USB	(b) Parallel	(c) PS/2
(d) Serial	(e) VGA Port	

17) Which of the following is/are the reason(s) to take backups of a hard disk?

(a) Improve lifetime of the hard disk.
(b) Convert data into information.
(c) Connect a computer to the Internet.
(d) Recover data if the hard disk is damaged.
(e) Keep data safe and secure from data loss.

18) Which of the following is/are considered as (an) **inappropriate** measure(s) to protect the computers in a newly built computer laboratory with the internet connectivity?

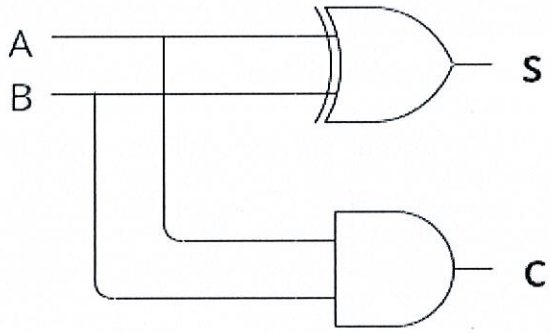
(a) Installing a firewall
(b) Installing and updating anti-virus software
(c) Disable the disk cleanup software
(d) Keeping the malware definition file up to date
(e) Blocking operating system updates

19) Which of the following can be potential source(s) of computer viruses?

A- Pirated software
B- Shared flash drive
C- Scanner

(a) A only
(b) A and B only
(c) A and C only
(d) B and C only
(e) All A, B and C

20) What is/are the corresponding circuit unit(s) for the following circuit diagram?



(a) Decoder	(b) Half Adder	(c) Full Adder
(d) Half Subtractor	(e) Full Subtractor	

21) What is the resulting **decimal value** of *addition operation* over two numbers `00011111` and `11100001` that are represented in **two's complement** representation?

(a) -1	(b) 0	(c) +1
(d) +2	(e) +3	

22) What is the resulting Boolean algebraic expression that can be derived by applying *De Morgan's law* **only once** to the Boolean algebraic expression $((A' + B).(X' + Y'))'$?

(a) $(A.B') + (X.Y)$
(b) $(A' + B).(X' + Y')$
(c) $(A' + B) + (X' + Y')$
(d) $(A' + B)'.(X' + Y')'$
(e) $(A' + B)' + (X' + Y')'$

23) What is/are the correct expression(s) in **postfix notation** for the following expression given in infix notation?

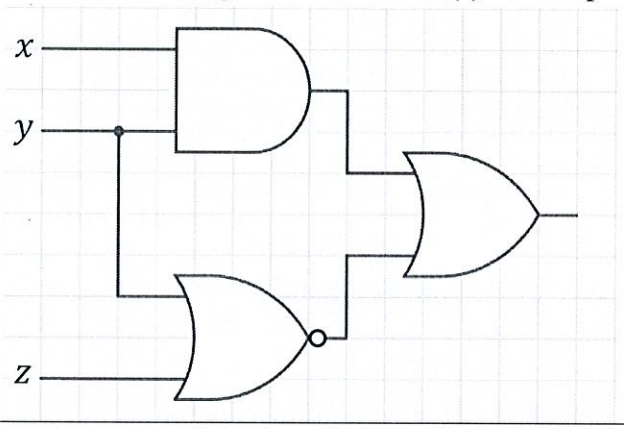
- Z = (X * Y) + (W - U)

(a) Z = X Y * W U - +
(b) Z = X * Y + W - U
(c) Z = X Y + W U - *
(d) Z = W U - X Y * +
(e) Z = X * Y - W + U

24) What is/are the equivalent decimal value(s) of 10101010 which is given in the 8-bit **signed magnitude** representation?

(a) + 170	(b) – 170	(c) 0
(d) + 42	(e) – 42	

25) What is/are the equivalent Boolean algebraic statement(s) that represent the output of the following circuit?



(a) $(x + y) + (y + z)$	(b) $(x.y) + (y' + z')$	(c) $(x.y).(y + z)'$
(d) $(x.y) + (y + z)'$	(e) $(x + y) + (y'.z')$	

26) Which of the following is/are **NOT** considered as (a) key characteristic(s) of a Real Time Operating System?

(a) Non-preemptive: It is designed to run a task until its completion without any interruption and tasks are in the same priority level.
(b) Timeliness: It is designed to respond to events within a specific and predictable time frame.
(c) Predictability: It has a predictable behavior; thus, the execution time of a task can be determined in advance.
(d) High Reliability: It is designed to be highly reliable and able to handle errors and exceptions
(e) Nondeterminism: It is nondeterministic, meaning that it does not guarantees a consistent and repeatable behavior due to quick response time.

27) What is/are **NOT** (a) characteristic(s) of a Network Operating System?

(a) File and printer sharing
(b) Remote access
(c) Network monitoring and management
(d) Availability of directory services
(e) Real-time capabilities

28) Which of the following statements is/are **FALSE** regarding the system software?

(a) It manages and controls the underlying hardware and resources of a computer.
(b) System software may allow edit multimedia such as videos, music or photographs.
(c) Operating systems and device drivers are examples for system software.
(d) System software may help to optimize the performance of the computer.
(e) System software may provide rendering and visualizing effects to the end user.

29) Which of the following best describes the function of the Control Unit (CU) in a CPU?

(a) It performs arithmetic and logical operations.
(b) It controls and manages the flow of data between the main memory and the cache.
(c) It decodes and executes instructions and manages the flow of instructions and data within the CPU.
(d) It stores frequently used data and instructions for faster access.
(e) It performs the instructions within itself and stores the resulting data in the CPU registers.

30) The following machine instruction is expected to load the specified value **V** to the CPU register **R**. Which of the following **addressing modes** is/are involved with the instruction when it is in execution?

- `LOADI R, V`

(a) Immediate addressing and Direct addressing
(b) Relative addressing and Register addressing
(c) Direct addressing and Register addressing
(d) Register addressing and Immediate addressing
(e) Direct addressing only

31) What is/are the correct order of changes in the next state from the present state that you can derive from the following ***SR flip-flop*** truth table?

S	R	Q_{n+1}
0	0	A
0	1	B
1	0	C
1	1	D

(a) A= No change, B= Set, C= Reset, D= Invalid
(b) A= No change, B= Reset, C= Set, D= Invalid
(c) A= Invalid, B= Set, C= Reset, D= No change
(d) A= Invalid, B= Reset, C= Set, D= No change
(e) A= No change, B= Set, C= Reset, D= No change

32) Which of the following is/are **FALSE** statement(s) regarding the input devices?

(a) A track ball is similar to a mouse device upside down.
(b) Trackpads are commonly found in laptop computers
(c) A mouse is an input device that translates its movements on the desktop into analog form.
(d) A graphics tablet can be used to trace over technical drawings.
(e) A bar code reader can act as both an input device and an output device at the same time.

33) A CD-RW has several layers for recording. Which of the following is/are **NOT** (a) layer(s) in it?

(a) Protective lacquer layer
(b) Reflective Aluminum layer
(c) Dielectric layer
(d) Organic dye layer
(e) Polycarbonate layer

34) Where can the boot option be selected from the commonly required configuration settings in the motherboard BIOS?

(a) PnP/PCI Configuration
(b) Advanced BIOS Features
(c) Advanced Chipset Features
(d) CPU Soft menu
(e) Power management Setup

35) Which of the following is/are **TRUE** regarding the AGP Slot?

(a) AGP stands for Accelerated Graphic Port.
(b) PCI -Express slot was gradually replaced by the AGP slot.
(c) From a single AGP slot it is possible to connect two devices to a computer.
(d) AGP slot is a type of socket that is used to plug expansion cards to the motherboard.
(e) AGP slot is used to connect external devices to the PC.

36) What is the **largest positive number** that can be represented with 8-bit floating point representation with 1 bit for sign, 3 bits for exponent, and 4 bits for mantissa (significand)? Assume the exponent is in **Excess-3** representation.

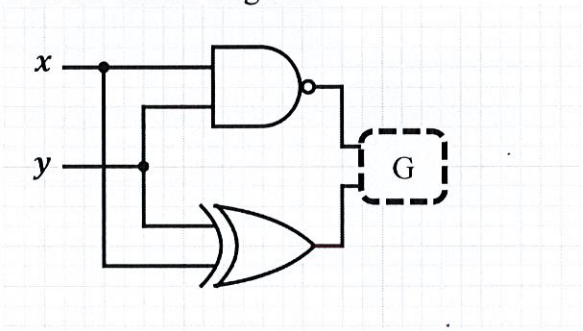
(a) 31	(b) 248	(c) 15.5
(d) 42	(e) 122	

37) What is the simplest Boolean algebraic expression that can be derived from the following Boolean algebraic expression?

$$(A + C)(A.B + A.B') + A.C + C$$

(a) $A + C$
(b) $(A + C) + A$
(c) $(A + C).B + C$
(d) $B + C$
(e) $A.C$

38) Which of the following gates will produce the Boolean algebraic expression $(x.y) + (x'.y')$ after placing it at the unit G in the circuit diagram?



(a) AND Gate	(b) OR Gate	(c) XOR Gate
(d) NAND Gate	(e) NOR Gate	

39) When the following machine instruction code is executed in a computer, what are the corresponding values stored in registers R1 and R2 in a sequence at the time of the final instruction is being executed?

Note: Interpretations of the machine instructions are as given here. All the numbers given in the machine code are in decimal representation.

- `LI R, A` Load the register R with value A.
- `ADD R1, R2` Add the numeric values in R1 and R2 and place the results in R1.
- `DEC R` Decreases the value of register R by one.
- `JMP L, R` Jump to the label L if the bit pattern in R is none zero.
- `LABEL:` Used as a jump target in the instruction which refers to a location in the assembly code.

```
LI   R1, 0
LI   R2, 10
LABEL:
ADD R1, R1, R2
DEC R2
JMP LABEL, R2
LI   R3, 35
```

(a) 10, 0 (b) 35, 55 (c) 65, 0
(d) 55, 0 (e) 35, 0

40) What is/are the **most simplified Sum of Products** representation(s) for the following Karnaugh Map?

		A.B			
		00	**01**	**11**	**10**
C.D	**00**	0	0	1	1
	01	1	0	1	1
	11	1	0	0	1
	10	0	0	1	1

(a) $A.B' + A.C' + A.C.D' + A'.B'.D$
(b) $A.B' + A.C' + B'.D$
(c) $B'.D + A.D' + A.C'$
(d) $B'.D + A.C' + A.C.D'$
(e) $A.B + A.B' + B'.D$

****