**UNIVERSITY OF COLOMBO, SRI LANKA**

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY ( EXTERNAL)**

*Academic Year 2016 – 1st Year Examination – Semester 1*

# *IT1205 – Computer Systems I*

***Multiple Choice Question Paper***

***28th May, 2016***

***(TWO HOUR)***

Important Instructions :

- The duration of the paper is **2 (two) hour**.
- The medium of instruction and questions is English.
- The paper has **50 questions** and **12 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All 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 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- 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 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.**

1) Which of the following statements is/are true?

(a) Charles Babbage is considered the "father of the computer", He conceptualized and invented the first mechanical computer in the early 19th century.
(b) The principle of the modern computer was proposed by Alan Turing, who proposed a simple device that he called "Universal Computing machine" that was later known as a Universal Turing machine.
(c) The Pascaline developed by Blaise Pascal read data from punch cards.
(d) John Vincent Atanasoff and Clifford E. Berry developed and tested the Atanasoff–Berry Computer (ABC), the first "automatic electronic digital computer".
(e) The Differential Engine was developed by Charles Babbage.

2) Which of the following device(s) was the first electronic programmable computer?

| | | |
|---|---|---|
| (a) Analytical Engine | (b) Punch Card Reader | (c) ENIAC |
| (d) Differential Engine | (e) EDVAC | |

3) Which of the following falls into the category of both an input and output device?

| | | |
|---|---|---|
| (a) Modem | (b) Plotter | (c) Scanner |
| (d) Network Card | (e) Digitizer | |

4) What is the text code originally used mainly on IBM mainframe and IBM midrange computer operating systems?

| | | |
|---|---|---|
| (a) Binary | (b) EBCDIC | (c) Unicode |
| (d) ASCII | (e) Extended ASCII | |

5) What is the hexadecimal number equivalent of the decimal number -1075?

| | | |
|---|---|---|
| (a) CBCD | (b) CBAE | (c) FBCD |
| (d) CCAB | (e) BE9D | |

6) The 16-bit number 1111111111111111 in the form of Two's Compliment is equivalent to the decimal number

| | | |
|---|---|---|
| (a) **-1** | (b) +1 | (c) -32768 |
| (d) +32767 | (e) +65535 | |

7) How many decimal digits can be obtained for precision from the IEEE standard 64-bit double precision representation?

| | |
|---|---|
| (a) 4 | (b) 6 |
| (c) 8 | (d) 12 |
| (e) 16 | |

8) Which of the following statements about floating point representation is/are true?

(a) Floating-point representation is an approximate representation of real numbers.
(b) Floating point errors (Overflow/Underflow) cannot cause programs to crash.
(c) Using a greater number of bits in the representation can reduce errors but can never eliminate them.
(d) Floating point errors can lead to erroneous results which are easy to detect.
(e) To add two floating-point numbers, it is necessary to express the numbers with the same exponent.

9) Which of the following is the correct 16-bit floating point representation with a sign bit, 5-bit exponent and 10-bit mantissa of the decimal number +85.625?

| | | |
|---|---|---|
| (a) 0 10101 0101011110 | (b) 0 10101 0101011100 | (c) 0 10101 0101011010 |
| (d) 0 10101 0101010101 | (e) 0 10101 0101010011 | |

10) What is the loss of accuracy (round-off-error) when converting the decimal value +1000.875 to 16-bit floating point representation with a sign bit, 5-bit exponent and a 10-bit mantissa?

| | | |
|---|---|---|
| (a) 0.125 | (b) 0.25 | (c) 0.375 |
| (d) 0.625 | (e) 0.75 | |

11) Which of the following is (a) are correct statement(s) related to negative numbers in Two's Complement binary numbers?

(a) Start from the signed binary representation of its positive value, copy the bit pattern from right to left until a 1 has been copied and Complement the remaining bits: all the 1's with 0's.
(b) Start from the signed binary representation of its positive value and Complement all the bits: all the 1's with 0's.
(c) Start from the signed binary representation of its positive value, Complement all the bits: all the 1's with 0's and add +1.
(d) Start from the signed binary representation of its positive value, Complement all the bits: all the 1's with 0's and add number with all 1's.
(e) Start from the signed binary representation of its positive value, apply XOR operation with number with all 1's and add +1.

12) The equivalent in decimal number to the IEEE standard 32-bit floating point representation of the 1 10000001 11110000000000000000 is

| | | |
|---|---|---|
| (a) -1.9375 | (b) -3.875 | (c) -7.75 |
| (d) -15.5 | (e) -31 | |

13) Consider the following Boolean function

$$F(x, y) = (\overline{x} + \overline{y}).(\overline{x} + y)$$

Which of the following Boolean functions provide(s) a simplified form of F?

| | | |
|---|---|---|
| **(a)** $\overline{x}$ | (b) $\overline{y}$ | (c) $x$ |
| (d) $y$ | (e) $\overline{x}.\overline{y}$ | |

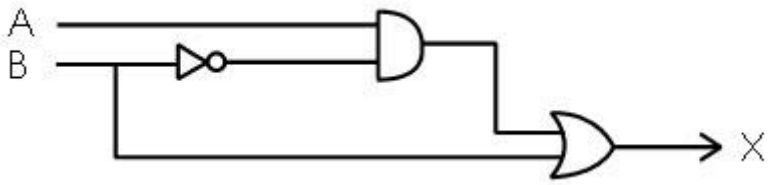
14) Consider the following Boolean function

$$F(x, y) = (\overline{x}.\overline{y}).(\overline{x} + y).(y + \overline{y})$$

Which of the following Boolean functions provide(s) a simplified form of F?

| | | |
|---|---|---|
| (a) $\overline{x}$ | (b) $\overline{y}$ | (c) $x$ |
| (d) $y$ | **(e)** $\overline{x}.\overline{y}$ | |

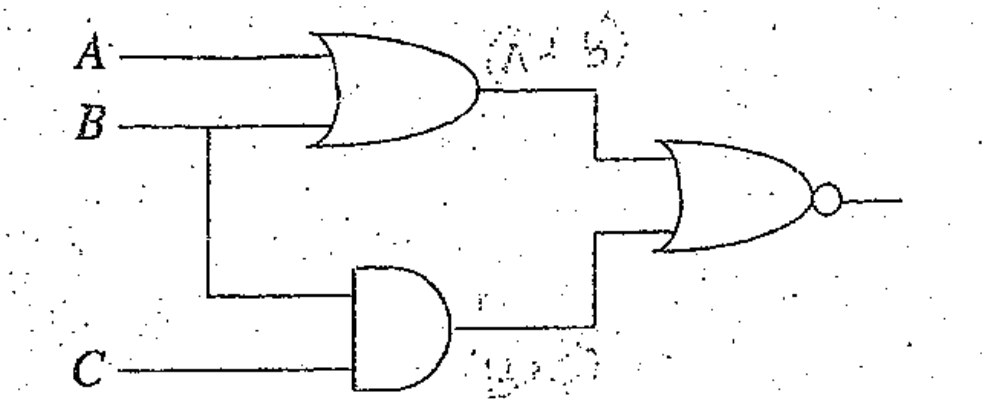
15) Consider the following logic circuit.




What is the output X of the above circuit?

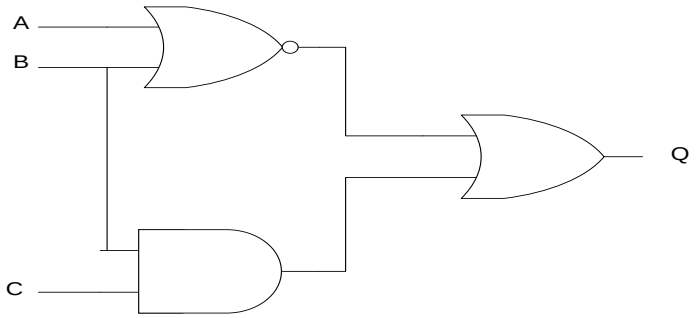
| | | |
|---|---|---|
| (a) $A.B + B$ | (b) $A.B + \overline{B}$ | (c) $A.\overline{B} + B$ |
| (d) $\overline{A}.B + B$ | (e) $A.\overline{B} + A$ | |

16) How many NAND gates are required for the following logic circuit, if it is to be implemented only using NAND gates?




| | | |
|---|---|---|
| (a) 3 | (b) 4 | (c) 5 |
| (d) 6 | (e) 9 | |

17) Consider the following logic circuit




Which of the following Boolean functions provide(s) a simplified form of above logic circuit?

| | | |
|---|---|---|
| (a) $(A+B)+(B.C)$ | (b) $\overline{(A+B)+(B.C)}$ | **(c)** $\overline{(A+B)}+(B.C)$ |
| (d) $(A+B)+\overline{(B.C)}$ | (e) $\overline{(A+B)}+\overline{(B.C)}$ | |

18) Output of the Boolean function $F(x,y,z)=(x+\bar{y}).(z+\bar{x}).(y+\bar{z})$ is 1 when

| | | |
|---|---|---|
| (a) x=1, y=1, z=0 | (b) x=1, y=0, z=1 | (c) x=1, y=1, z=1 |
| (d) x=0, y=1, z=1 | (e) x=0, y=1, z=0 | |

19) If any word of size 64 bit in a memory space can be addressed by using 30-bit memory address and each location holds one word, what should be the size of the memory space?

| | | |
|---|---|---|
| (a) 2GB | (b) 4GB | (c) 8GB |
| (d) 16GB | (e) 32GB | |

20) Suppose, a particular memory space can be addressed by using a 16-bit memory address and each location can hold a word of size 32 bits. If an 8-byte variable is stored starting at location 1110 0011 0010 0010, what is the address of next available storage location?

| | | |
|---|---|---|
| (a) 1110 0011 0010 0011 | (b) 1110 0011 0010 0100 | (c) 1110 0011 0010 1010 |
| (d) 1110 0011 0010 0110 | (e) 1110 0011 0010 1110 | |

21) A stack-based architecture processor executes the following set of machine instructions sequentially.

```
PUSH 100
PUSH  200
MUL
PUSH 300
PUSH 400
MUL
MUL
POP    500
```

*Assume that*

- *Memory locations 100, 200, 300 and 400 contain the values 04, 05, 0C and 01 respectively in hexadecimals.*
- *The stack is byte organized, the stack pointer is at 00FD and*
- *A PUSH and POP instructions have a memory operand.*

*Which of the following could the final result be?*

(a) Memory location 500 contains the value 0F
(b) Memory location 500 contains the value FF
(c) Memory location 500 contains the value F0
(d) Memory location 500 contains the value 14
(e) Memory location 500 contains the value 0C

22) In a register/memory type CPU, the instruction lengths are typically variable. This presents a problem when the program incremented during the Fetch-Decode-Execute cycle. Which of the following statements is/are true with regard to Program Counter (PC) incrementing?

(a) PC is incremented by the largest possible fixed value, irrespective of the variability of the instruction.
(b) Increment value is known when the current instruction length is known.
(c) The binary loader overcomes the problem by positioning instructions at word boundaries so that PC can be increment.
(d) Increment value is known when the current instruction is decoded with the Instruction Register (IR).
(e) PC incrementing method is architecture dependent.

23) Which of the following reasons will not be triggered within the processor as an exception?

(a) Arithmetic errors
(b) Overflow or Underflow
(c) Invalid Instructions
(d) User-defined break points
(e) Input/output requests

24) **Questions 24 and 25 based on the following:**

The word-addressable memory unit of a computer has 256K words of 32 bits each. The computer has an instruction format with 3 fields, namely

- opcode
- register address – to specify one of 100 registers
- memory address

How large must the **memory address** field be?

| | | |
|---|---|---|
| (a) 12 bits | (b) 15 bits | (c) 16 bits |
| (d) 18 bits | (e) 22 bits | |

25) How large must the **opcode** field be?

| | | |
|---|---|---|
| (a) 4 bits | (b) 5 bits | (c) 7 bits |
| (d) 12 bits | (e) 14 bits | |

26) Which of the following can be categorized as (a) solid-state memory device(s)?

| | | |
|---|---|---|
| (a) Domain-wall memory | (b) Hard Disk | (c) Racetrack Memory |
| (d) CD-RW | (e) Insulated Gate Field Effect Transistor | |

27) Which of the following technologies is/are used for Video adapters?

| | | |
|---|---|---|
| (a) SRAM | (b) DDR2 | (c) RIMM |
| (d) DDR SDRAM | (e) GDDR3 | |

28) Which of the following printers uses Ink Cartridges to print in colour?

| | | |
|---|---|---|
| (a) Dot-Matrix Printer | (b) Photo Printers | (c) WaterJet Printer |
| (d) LaserJet | (e) Colour Inkjet Plotter | |

29) In modern PCs, "ROM" (or flash) is used to store the basic bootstrapping firmware for the main processor. Which of the following devices most likely to have various firmware needed to internally control such devices in a BIOS ROM chip?

(a) Graphic Card
(b) Hard Disks
(c) Sound Card
(d) DVD Drives
(e) Thin-film-transistor liquid-crystal display

30) Which of the following is a/are key element(s) of a PC motherboard's form factor?

(a) Number of available USB ports
(b) Power supply
(c) Physical dimensions
(d) Placement of mounting screw holes
(e) Location of the microprocessor slot

31) Which of the following ports could be used to connect a Sound card?

| | | |
|---|---|---|
| (a) IBM PC Parallel Port | (b) USB | (c) MCA |
| (d) PCMCIA | (e) AGP | |

32) Which of the following is a/are functionalities of an Operating System?

(a) Providing resources to copy or move data/contents from one file to another or from one program to another
(b) Manages computer hardware and software resources and provides common services for computer programs
(c) Coordinates how programs work with the computer's hardware and other software
(d) Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources
(e) Can reduce the amount of disk space required to a file or reduce the time it takes to transfer a file over the internet

33) Which of the following wireless technologies cannot be used to connect external devices to a computer?

| | | |
|---|---|---|
| (a) Bluetooth | (b) IrDA | (c) TransferJet |
| (d) DSRC (Dedicated Short Range Communication) | (e) Wi-Fi | |

34) Which of the following statements is/are true about the Fire-Wire?

(a) The FireWire, built from the ground up for speed, uses a "Peer-to-Peer" architecture in which the peripherals are intelligent and can negotiate bus conflicts to determine which device can best control a data transfer.
(b) The FireWire high-speed communication port is also referred to as the IEEE 1395 or the i.Link port.
(c) The Fire Wire contains its own processor and a memory to improve the performance level.
(d) The FireWire was created by a joint effort from Apple, Sony and Panasonic and was standardized in 1995 as IEEE1394.
(e) The FireWire interface is extremely fast and hence popular in connecting audio and video multimedia devices to the PC.

35) Which of the following statements is/are true with respect to the technology of PLASMA monitors?

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(a) Less expensive for the buyer per square inch than LCD, particularly when equivalent performance is considered
(b) A Plasma display uses a flash light like the LCD display
(c) Plasma technologies are mainly used for PCs, Mobile Phones, Laptops and PDAs
(d) Wider viewing angles than those of LCD; images do not suffer from degradation at less than straight ahead angles like LCDs
(e) Capable of producing deeper black allowing for superior contrast ratio

36) What is the commonly used medium to send signals from a remote controller to a roller door?

| | | |
|---|---|---|
| (a) Microwave | (b) Ultra Violet | (c) Laser |
| (d) Infrared | (e) Flash Light | |

37) Which of the following statements is/are true with USB and FireWire interfaces?

(a) The FireWire port is a high-speed serial communication port.
(b) The USB has effectively replaced a variety of earlier interfaces, such as parallel ports, as well as separate power chargers for portable devices.
(c) The USB 3.0 defines a new SuperSpeed transfer mode which provides a data signaling rate of 5.0 Gbit.
(d) The FireWire, built from the ground up for speed, uses a "Peer-to-Peer" architecture in which the peripherals are intelligent and can negotiate bus conflicts to determine which device can best control a data transfer.
(e) The FireWire high-speed communication port is also referred to as the IEEE 1395 or the i.Link port.

38) Which of the following is/are true about Optical Fiber Cables?

(a) Optical fiber cable is a cable containing one or more optical fibers that are used to carry light
(b) The optical fiber elements are typically individually coated with plastic layers and contained in a protective tube suitable for the environment where the cable will be deployed
(c) Immune to electrical interface preventing cross talks
(d) Different types of cable are used for different applications, for example long distance telecommunication, or providing a high-speed data connection between different parts of a building
(e) Electro-magnetic signals in the space between inner and outer conductors

39) Which of the following is an/are audiovisual device(s)?

| | | |
|---|---|---|
| (a) Webcam | (b) Gamepad | (c) Microphone |
| (d) OCR Devices | (e) DVD Camcorder | |

40) What is the type of network that allows you to connect your mobile phone to your personal computer?

| | | |
|---|---|---|
| (a) LAN | (b) WAN | (c) PAN |
| (d) Internet | (e) Ethernet | |

41) Which of the following is/are (a) device(s) that can be used to link an ATM network with the Internet?

(a) Gateway
(b) Router
(c) Hub
(d) Bridge
(e) Network Interface Card

42) Which of the following statements is/are true about Cache Memory?

(a) Most CPUs have different independent caches, including instruction and data caches, where the data cache is usually organized as a hierarchy of more cache levels (L1, L2, etc.).

(b) Most modern desktop and server CPUs have at least three independent caches: an instruction cache to speed up executable instruction fetch, a data cache to speed up data fetch and store, and a translation lookaside buffer (TLB) used to speed up virtual-to-physical address translation for both executable instructions and data.

(e) We define a cache hit to be a reference to an item that is not resident in L1 cache but resident in L2 cache.

(c) A TLB cache is part of the memory management unit (MMU) and not directly related to the CPU caches.

(f) We define a cache miss to be a reference to an item that is not resident in the main memory.

43) Which of the following environments is/are conducive to static electricity buildup?

| | | |
|---|---|---|
| (a) Low Humidity | (b) High Humidity | (c) Cold and Wet |
| (d) Hot and Wet | (e) Hot and High Humidity | |

44) Which of the following software is/are designed not be able to modify the source code of the programs?

| | | |
|---|---|---|
| (a) Compilers | (b) Open Source | (c) Freeware |
| (d) Interpreters | (e) Assemblers | |

45) Which of the following statements is/are always true about bus system available in a computer system?

(a) The PCI bus supports the functions found on a processor bus but in a standardized format that is independent of any particular processor's native bus.

(b) The fastest bus in the computer system is processor bus and is used to transfer data between the processor and cache or main memory.

(c) ISA is a bus designed to connect peripheral cards to the motherboard and it allows for bus mastering although only the first 16 MB of main memory are available for direct access.

(d) AGP slots are not designed particularly to be used with video cards and have very low performance connectivity.

(e) The SCSI protocol defines communication from host to host, host to a peripheral device and peripheral device to a peripheral device.

46) Which of the following software is/are designed to be able to translate a high-level language into an intermediate code which will be immediately executed?

(a) Decompiler

(b) Freeware

(c) Compiler

(d) Disassembler

(e) Interpreter

47) Which of the following well known parser development tools is/are designed to be able to analyze a string of symbols, either in natural language or in computer languages, conforming to the rules of a formal grammar?

| | |
|---|---|
| (a) Lex | (b) Yacc |
| (c) JavaCC | (d) Ragel |
| (e) XML | |

48) Which of the following Operating Systems is/are used in embedded systems?

| | | |
|---|---|---|
| (a) SYSGO | (b) Uclibc | (c) Symbian |
| (d) Xinu | (e) Windows NT | |

49) Which of the following can be caused damage to the computer electrically?

| | | |
|---|---|---|
| (a) Power-line noise | (b) Static Electricity | (c) Radio Waves |
| (d) Uninterrupted Power Supply | (e) Stabilized Power | |

50) Which of the following can cause through disk fragmentation?

| | |
|---|---|
| (a) Tendency of a file system to lay out the contents of files non-contiguously to allow in-place modification of their contents | (b) Reduces the efficiency of memory usage |
| (c) Clustering file space | (d) Eliminate duplicates |
| (e) Fragmentation increases disk head movement or seek time, which are known to hinder throughput | |

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