



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2014/2015 – 1st Year Examination – Semester 1

IT1205–Computer Systems I
Multiple Choice Question Paper

14th March, 2015
(TWO HOUR)

Important Instructions :

- The duration of the paper is **2 (two) hours**.
- The medium of instruction and questions is English.
- The paper has **50 questions** and **15 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 is/are the key functionality(ies) of a computer?

- (a) Read data
- (b) Process data
- (c) Store and retrieve data
- (d) Develop new ideas
- (e) Output information

2) Complete the following incomplete sentence.

In 1980s Joseph Jacquard automated his weaving factory using a series of that recorded data using a combination of holes.

- (a) Gear wheels
- (b) Punch Cards
- (c) Sound Cards
- (d) Differential Engines
- (e) Analytical Engines

3) Which of the following makeup a computer system?

- (a) Software
- (b) Users
- (c) Hardware
- (d) Software developers
- (e) Electricity

4) Which of the following processors is/are manufactured by Intel Corporation?

- (a) Celeron
- (b) Xeon
- (c) Athlon
- (d) Pentium
- (e) Duron

5) What is the 16- bit two's compliment binary number equivalent of the decimal number -1075?

- (a) 1100101111001101
- (b) 1111101111001101
- (c) 1100101110101110
- (d) 1011111001011101
- (e) 1100110010101011

6) Which of the following is the range of integers that can be represented using two's Complement notation on a 16-bit register?

- | | | |
|----------------------------------|--|--------------------------------------|
| (a) 0 to $+2^{(16-1)}$ | (b) $-2^{(16-1)}$ to $+(2^{(16-1)} - 1)$ | (c) $-2^{(16-1)}$ to $+(2^{16} - 1)$ |
| (d) $-2^{(16-1)}$ to $+2^{16-1}$ | (e) 0 to $+2^{16} - 1$ | |

7) What is the 16-bit one's complement binary number equivalent of the decimal number 32767?

- | | | |
|----------------------|----------------------|----------------------|
| (a) 0111111111111110 | (b) 1000000000000000 | (c) 0111111111111111 |
| (d) 1000000000000001 | (e) 1111111111111111 | |

8) What is the decimal number equivalent of the 16-bit floating point number 0 10101 0101010101? Assume that 16-bit floating point representation is with a sign bit, 5-bit exponent and 10-bit mantissa.

- | | | |
|--------------|--------------|-------------|
| (a) +85.875 | (b) +85.75 | (c) +85.625 |
| (d) +85.3125 | (e) +85.1775 | |

9) What is the loss of accuracy (round-off-error) when converting the decimal value +511.875 to 16-bit floating point representation with a sign bit, 5-bit exponent and a 10-bit mantissa?

- | | | |
|------------|-----------|------------|
| (a) 0.0625 | (b) 0.125 | (c) 0.1875 |
| (d) 0.25 | (e) 0.5 | |

10) Which of the following binary number is equivalent to the hexadecimal number 7FF5?

- | | | |
|----------------------|----------------------|----------------------|
| (a) 0111111111110111 | (b) 0111111111110101 | (c) 0111111111111101 |
| (d) 0111111111110100 | (e) 0111111111110100 | |

11) The IEEE standard 32-bit floating point representation of the binary number +42.625 is

- (a) 0 01111111 110000000000000000000000
- (b) 1 10000011 010101010000000000000000
- (c) 0 10000100010101010000000000000000
- (d) 0 10000011 101010100000000000000000
- (e) 0 10000010010111100000000000000000

12) The equivalent decimal number to the IEEE standard 32-bit floating point representation of **1 10000111 101010101000000000000000** is

- (a) -426.875
- (b) -426.75
- (c)) -426.75
- (d) -426.25
- (e) -426.125

13) Consider the following Boolean function

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

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

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

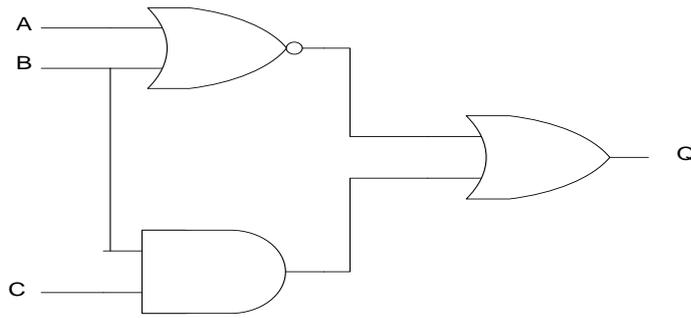
14) Consider the following Boolean function

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

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

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

- 15) 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 | |

- 16) Consider the following Karnaugh map.

AB CD	00	01	11	10
00	1	1	1	1
01	0	0	0	0
11	0	0	0	0
10	1	1	0	1

Which of the following Boolean function(s) provide(s) a simplified form of above Karnaugh map?

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

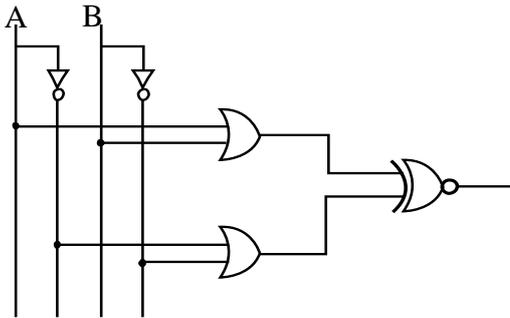
17)

Consider the following logic function

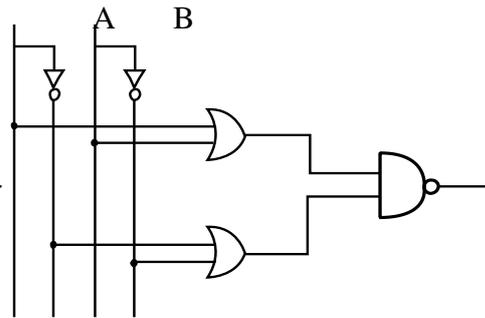
$$F(AB) = \overline{\overline{A}B} + AB$$

Which of the following logic circuit diagrams provide a similar output to the above logic function $F(AB)$?

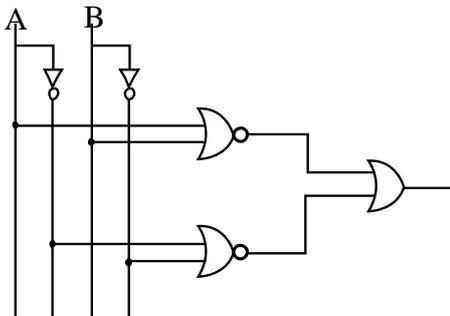
(i)



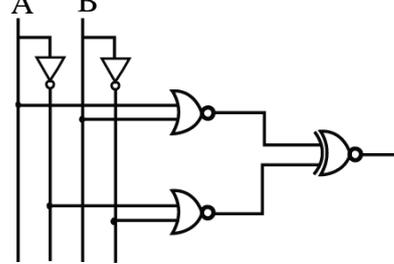
(ii)



(iii)



(iv)



- (a) Only (i) and (ii)
- (b) Only (ii) and (iii)
- (c) Only (i) and (iii)
- (d) Only (i), (ii) and (iii)
- (e) Only (ii), (iii) and (iv)

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

```
PUSH 100
PUSH 200
ADD
PUSH 300
ADD
POP 500
```

Assume that

- *Memory locations 100, 200 and 300 contains the values 25, 55 and 85 respectively in hexadecimal.*
- *The stack is byte organized and the stack pointer is at 00FD, and that*
- *All PUSH and POP instructions have a memory operand.*

Which of the following could the final result be?

- | |
|---|
| (a) Memory location 300 contains the value 4A |
| (b) Memory location 500 contains the value FF |
| (c) Memory location 00FD contains a value 100 |
| (d) Memory location 00FE contains a value 200 |
| (e) Memory location 00FF contains a value 300 |

Questions 21 and 22 based on the following:

Suppose there is a machine with a 32 bits instruction format of the form *opcode A B R* where *A* and *B* are main memory addresses and *R* is a register. There are 25 registers in the machine and the instruction set has 32 opcodes.

21) How large must the memory address field be?

- | | | |
|-------------|-------------|-------------|
| (a) 8 bits | (b) 10 bits | (c) 11 bits |
| (d) 12 bits | (e) 16 bits | |

22) What is the addressable capacity of this machine's memory, if the data size (word) of this computer is 32 bits?

- | | | |
|----------|----------|---------|
| (a) 1MB | (b) 4MB | (c) 8MB |
| (d) 16MB | (e) 64MB | |

23) A computer has a two-level cache. Suppose that 80% of the memory references hit on the first level cache, 15% on the second level cache, and 5% miss. The access times are 5 nano seconds (nsec) for the first level cache, 15 nsec for the second level and 60 nsec for the main memory reference respectively. What is the effective access time?

- | | | |
|---------------|----------------|---------------|
| (a) 2.25 nsec | (b) 5.25 nsec | (c) 6.25 nsec |
| (d) 9.25 nsec | (e) 10.75 nsec | |

24) A non-pipelined system A takes on average 60 nano seconds (to process an instruction). A pipelined system B has a 6-stages pipeline, where each stage takes 10 nano seconds. what is the "Speed-Up Ratio" for system B for a 100 instruction program?

- | | | |
|----------|---------|----------|
| (a) 5 | (b) 5.5 | (c) 5.71 |
| (d) 5.85 | (e) 6 | |

25) Given below are some statements about Issues and Conflicts of Instruction Level Pipelining. Identify the correct statement(s) from among them.

- | |
|---|
| (a) The machine's architecture supports fetching both instructions and data in parallel. |
| (b) The amount of control logic decreases with the number of stages. |
| (c) Several instructions can be fetched and decoded before the execution of a preceding branch instruction is finished. |
| (d) The not-yet-available result of one instruction can be the operand of a subsequent instruction. |
| (e) One instruction may store a value to memory while another instruction may fetch data from memory. |

26) Which of the following memory type(s) is/are not having a direct data path to the processor?

- | | | |
|----------------|------------|-----------|
| (a) SRAM | (b) EDORAM | (c) RDRAM |
| (d) DDR2 SDRAM | (e) MPDRAM | |

27) Which of the following is/are not Optical Storage Device(s)?

- | | | |
|--------------|-------------------|------------------|
| (a) Zip Disk | (b) Super Disk | (c) Memory Stick |
| (d) CD-ROM | (e) Magnetic Tape | |

28) Which of the following device(s) is/are not (a) biometric device(s)?

- (a) IRIS Scanners (b) Smart Card Readers (c) Barcode Readers
(d) Credit Card Readers(e)OCR Devices

29) Which of the following is a/are thermal printer(s)?

- (a) Barcode printers(b) Ink Jet printers (c) Dot matrix printers
(d) Printronix printers(e)Thermal transfer printers

30) Which of the following devices is/are used to produce a 3-Dimensional display?

- (a) Autostereoscopy (b) Holographic display (c) Integral Imaging
(d) Electroluminescent (e) Movie projector
display

31) Which of the following statements is/are false when replacing a motherboard of an existing computer?

- (a) The motherboard has to be compatible with the existing speakers connected to the sound card.
(b) The existing processor has to be compatible with the motherboard
(c) The power supply has to have the same form factor as the motherboard.
(d) The motherboard has to be compatible with the existing hard disk.
(e) The motherboard has to be compatible with the existing keyboard.

32) What are the components of a typical system bus of a computer motherboard?

- (a) Data Bus(b) Address Bus (c) Control Bus
(d) ROM Bus (e) Program Bus

33) Which of the following expansion cards support the connection of up to 63 peripherals in a *tree chain topology*?

- (a) Sound card (b) Fire-wire card (c) Network card
(d) Graphics card(e) TV and video capture card

34) Which of the following expansion cards does not contain its own processor and a memory to improve performance level?

- (a) NVM Express (NVMe) (b) Fire-wire card (c) Graphics accelerator card
(d) TV and video capture card(e) Network card

35) Which of the following interfaces cannot be used to connect a hard disk to a motherboard?

- (a) Fiber Channel (b) USB (c) *RJ-45 connector*
(d)SCSI(e) Wi-Fi

36) Which of the following statements is/are true with respect to Wi-Fi?

- (a) The speed of an IEEE 802.11b network is much higher than that of an IEEE 802.11g network.
(b) Wi-Fi refers to the IEEE 802.11b wireless Ethernet standard.
(c) The maximum speed of a Wi-Fi network is 11MBps.
(d) Access points are a must in-order to communicate via Wi-Fi.
(e) Establishing a Wi-Fi network is less expensive compared with establishing a 10/100 Ethernet(wired) network.

37) Which of the following statements is/are false with respect to BIOS?

- (a) In modern systems, BIOS chips are also available on interface and adapter cards like the VGA card, SCSI adapter and Network interface card.
(b) Most modern day motherboard BIOS chips are EEPROMs, hence we could easily do a BIOS upgrade (Burn a newer version of the BIOS software).
(c) BIOS are the most prominent CMOS type chip in the computer system.
(d) BIOS settings configuration cannot be written into the BIOS chip since it is a ROM.
(e) The BIOS mainly consists of standard drivers for the primary input and output devices and other components like motherboard, memory and on-board interfaces.

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

- (a) The fastest bus in a computer is the processor bus which is used to transfer data between the processor and cache or main memory.
- (b) AGP slots are designed particularly to be used with video cards.
- (c) A PCI card is in the form of 16-bit slots mounted on the mother board and is in white colour.
- (d) An ISA bus could handle maximum of only 16-bits, and ISA cards cannot be plugged-in to the EISA slots.
- (e) SCSI adapters cannot be plugged-in to the PCI-X slots.

39) Suppose you want to connect offices in a city with tall buildings. What would the obvious drawbacks be to use microwave as the transmission medium?

- (a) A pair of microwave antennas needs a direct line of sight to communicate and buildings could be an obstacle to establish a link.
- (b) Microwave antennas must be placed in at same height from ground level.
- (c) Fixing microwave antennas on buildings is not feasible
- (d) The city could have been congested with already existing microwave links.
- (e) Insufficient room to place antennas.

40) Which of the following technologies is/are suitable to implement a backbone for a wired MAN?

- (a) Bluetooth
- (b) Wi-Fi
- (c) ISDN
- (d) ADSL
- (e) Wi-Max

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

- (a) Bluetooth is a wireless standard.
- (b) Bluetooth describes how devices like computers, cellular phones, PDAs and fax machines can be linked within a short range.
- (c) Wi-Max is a wireless technology which is used to implement wireless MANs.
- (d) Wi-Fi is an Ethernet standard.
- (e) Bluetooth uses microwave signals to transmit data.

42) Which of the following is/are (a) LAN categories based on distribution of processing power?

- (a) Client-server
- (b) Peer-to-peer
- (c) Wireless
- (d) Campus Area Networks (CANs)
- (e) Metropolitan Area Networks (MANs)

43) Which of the following transmission media is/are not used as guided data communication media?

- (a) Microwave
- (b) Satellite
- (c) Optical Fibre
- (d) Coaxial
- (e) Twisted Pair

44) Which of the following is the intermediary between application programs and the operating system?

- (a) User interface
- (b) Hardware
- (c) Utilities
- (d) Command line
- (e) Disk drivers

45) Identify the components found in most graphical user interfaces.

- (a) Mouse or a pointing device
- (b) Type-written commands
- (c) Windows
- (d) Buttons
- (e) Desktop Shortcuts

46) A firewall is

- (a) used to protect a computer room from fire & floods.
- (b) a form of a anti-virus to protect the computer system.
- (c) a screen saver program
- (d) a specialized software that is dedicated to examining and blocking traffic coming from and going to the Internet.
- (e) a network monitoring tool to analyse network performance and functionality.

47) What is/are the function(s) of system software?

- (a) To analyze data
- (b) To execute programs
- (c) To collect data
- (d) To maintain security
- (e) To manage the way information is stored in the disks

48) Which of the following is the most suitable method for indicating a display (VGA) error by the POST method?

- (a) Beep codes
- (b) Chassis indicator LED blinks
- (c) Keyboard LED blinks
- (d) On screen messages
- (e) Checkpoint codes

49) Which of the following statements defines "Active preventive maintenance"?

- (a) Providing a trouble free environment
- (b) Providing a disturbance free environment
- (c) Cleaning the system and its components, as well as performing backups, antivirus and antispyware scans and other software-related procedures
- (d) Providing a good electrical environment
- (e) Providing an environment free of large temperature variations

50) Which of the following is/are (an) advantage(s) of purchasing a system from a large system vendor?

- (a) Special software manufactured by the vendor may be provided free of charge.
- (b) The computer can be easily upgraded in the future.
- (c) The computers components are fully compatible with each other.
- (d) Obsolete components are easily replaceable.
- (e) The computer will be given a full warranty and service.
