UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2009/2010 – 1st Year Examination – Semester 1

IT1204 - Computer Systems I

06th March 2010

(TWO HOURS)

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 **11** 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 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) What is/are the specific technology/ies used in First Generation computers?

(a) Vacuum Tubes	(b) Transistors	(c) Microprocessors
(d) ICs	(e) VLICs	

2) Which of the following devices was/were developed by Joseph-Marie Jacquard?

(a) ADA	(b) Punch Card Reader	(c) ENIAC
(d) Differential Engine	(e) Analytical Engine	

3) What is/are the specific computing technology/ies still in Research and Development in Fifth Generation?

(a) Artificial Intelligence	(b) Quantum Computing	(c) Nanotechnology
(d) Natural Languages	(e) High Level Languages	

4) Which of the following is the range of integers which can be represented using two's complement notation on a 16-bit register?

(a) -32768 to +32768	(b) -65536 to +65536	(c) -65536 to +65536
(d) -32767 to +32767	(e) -32768 to +32767	

5) What is the binary equivalent of the hexadecimal number ABCD?

(a) 1010 1011 0101 0101	(b) 1010 1011 1100 1101	(c) 0011 1011 0101 1111
(d) 1011 1011 0101 0101	(e) 1011 1011 1100 0101	

6) The number 0111111111111111 in the form of Two's Complement is be equivalent to decimal number

(a) -65535	(b) +32768	(c) +65535
(d) +32767	(e) -65536	

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

(a) Floating-point representations only approximate real numbers.
(b) Using a greater number of bits in a representation can reduce errors but can never eliminate them.
(c) Floating point errors (Overflow/Underflow) can cause programs to crash.
(d) Floating point errors can lead to erroneous results which are hard to detect.
(e) To add two floating-point numbers, there is no need to express the numbers with the same exponent.

8) The IEEE standard 32-bit floating point representation of the binary number -1.11 is

(a) 1 00000000000000000000001 11000000
(b) 0 01111111111111111111111 11000000
(c) 1 00000001 11000000000000000000000
(d) 1 01111111 11000000000000000000000
(e) 0 01111111 11000000000000000000000

9) The equivalent in decimal number to the IEEE standard 32-bit floating point representation of **0 10000100 01011100000000000000000** is

(a) +48.5	(b) -48.5	(c) +43.5
(d) -41.5	(e) -37.25	

10) Consider the following three statements about R-S Flipflops and J-K Flipflops.

(i) J-K Flipflops do not have the uncertainty associated with R-S Flipflops for the R = S = 1 state, in its J = K = 1 state.

(ii) If J ≠ K, the next output state of the J-K Flipflop will be the same as the current state.

(iii) When R = 1 and S = 0, the next output state of the R-S Flipflop will be made 0 irrespective of the current output state.

What statement(s) is/are correct about R-S Flipflops and J-K Flipflops?

(a) Only (i)	(b) Only (ii)	(c) Only (iii)
(d) Only (i) and (iii)	(e) All	

11) Consider the following Boolean expressions.

(i) $A.\overline{B} + \overline{A}.B$

(ii) $\overline{A}.\overline{B} + A.B$

(iii) $(A+B).A.B$

(iv) $(\overline{A+B}) + A.B$

(v) $\overline{A}.\overline{B}.A.B$

Which of the above Boolean expressions is equivalent to $\overline{A \oplus B}$,

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

12) Consider the following Karnaugh map?

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

Also consider the following compact Boolean forms.

(i) $\overline{B}.\overline{C} + B.\overline{D}$

(ii) $\overline{C}.\overline{D} + \overline{C}.D.\overline{B} + B.C.\overline{D}$

(iii) $\overline{C}.\overline{D} + \overline{C}.B + \overline{D}.B$

(iv) $A.B.C + B.\overline{D}$

(v) $\overline{B}.\overline{C} + \overline{B}.\overline{D}$

Which of the above is the most compact form of a Boolean expression which represents the given Karnaugh map?

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

13) Consider the following logic function

$$F = A.B.C + A.B.\overline{C} + A.\overline{B}.C + \overline{A}.\overline{B}.\overline{C} + \overline{A}.B.\overline{C}$$

Also consider the following compact Boolean forms.

(i) $A.B + A.C + \overline{A}.B$

(ii) $A.B + A.\overline{C} + \overline{A}.\overline{C}$

(iii) $A.B + A.C + \overline{A}.\overline{C}$

(iv) $A.C + \overline{B}.\overline{C} + \overline{A}.\overline{C}$

(v) $A.C + B.\overline{C} + \overline{A}.\overline{C}$

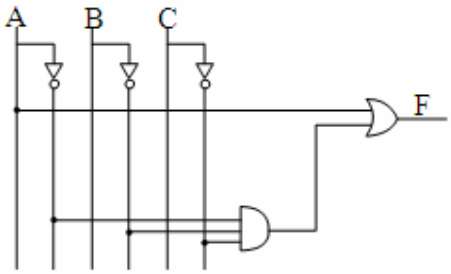
Which of the above would the results be if the given logic function were to be simplified using Karnaugh map?

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

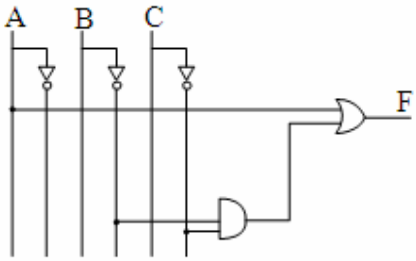
14) Consider the following logic function

$$F = A.B.C + \overline{A}.\overline{B}.\overline{C} + A.\overline{B}.\overline{C} + A.B.\overline{C} + A.\overline{B}.C$$

Also consider the following logic circuit diagrams.



(i)



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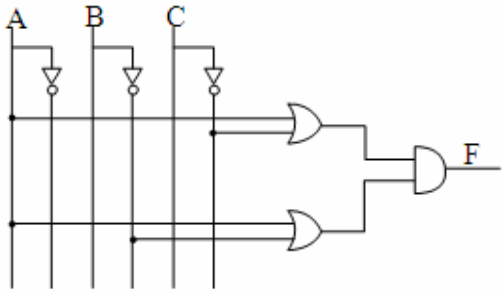
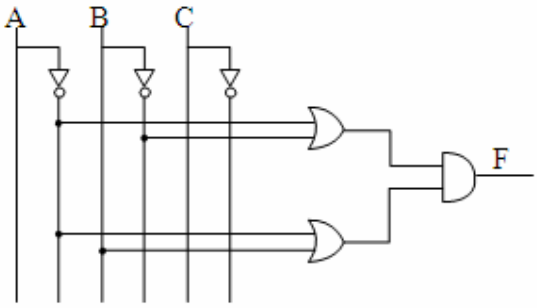
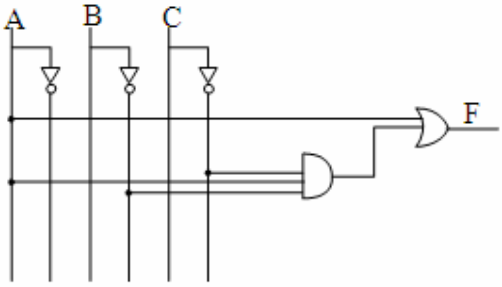


(iii)



(iv)

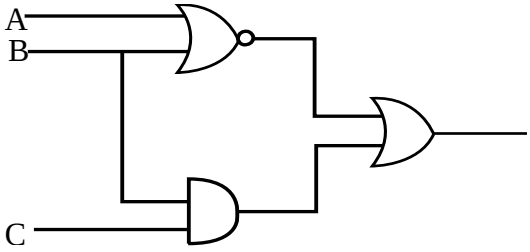


(v)

Which of the above logic circuit diagrams provide a similar output to the above logic function F?

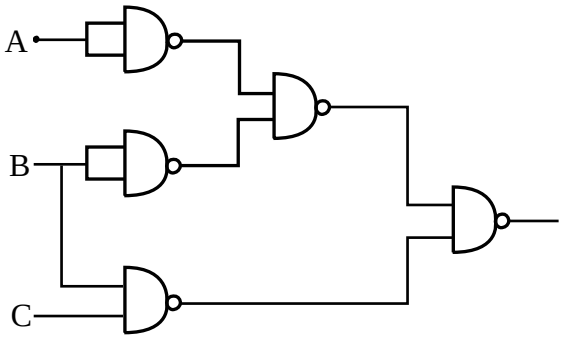
(a) Only (i) and (ii)	(b) Only (i), (ii) and (iii)	(c) Only (iii)
(d) Only (iv) and (v)	(e) All	

15) The following figure represents a logic circuit.

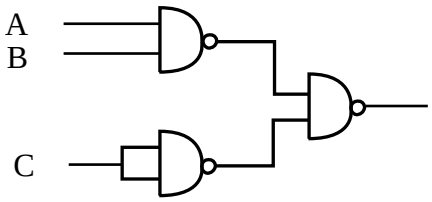


Also consider the following logic circuit diagrams.

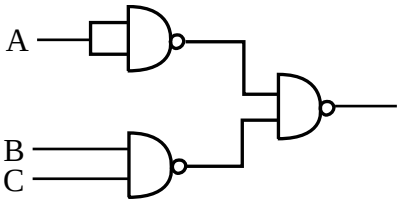
(i)



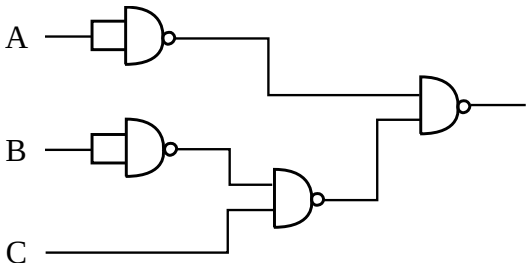
(ii)



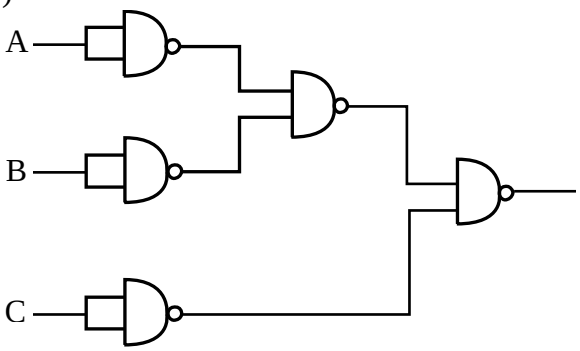
(iii)



(iv)



(v)



Which of the above logic circuit provide a similar output to the above circuit by implementing solely with NAND gates?

(a) Only (i)	(b) Only (ii)	(c) Only (iii)
(d) Only (iv)	(e) Only (v)	

16) An interrupt can be triggered for a variety of reasons. Identify the correct reason(s) for them.

(a) Arithmetic underflow or overflow
(b) User-defined break points (when debugging a program)
(c) Arithmetic errors (division by zero)
(d) Complex Logic Operations
(e) Hardware malfunction

Questions 17 and 18 are based on the following:

The word-addressable memory unit of a computer has 1024K words of length 32 bits each. The computer has an instruction format with the following 3 fields.

- opcode
- register address – to specify one of 64 registers
- memory address

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

(a) 12 bits (b) 15 bits (c) 16 bits
(d) 19 bits (e) 20 bits

18) How large must the **register** field be?

(a) 4 bits (b) 5 bits (c) 6 bits
(d) 7 bits (e) 8 bits

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

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

Assuming that

(i) memory location 100 contains the value 53 (Hex) and memory location 200 contains the value 4C (Hex),
(ii) the stack is byte organised and the stack pointer is at 00FF, and that
(iii) 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 9F
(b) Memory location 00FD contains the value 9F
(c) Memory location 00FF contains a value 100
(d) Memory location 00FE contains a value 200
(e) Memory location 00FD contains a value 300

20) In a register/memory type CPU, the instruction lengths are typically variable. This presents a problem when the program is incremented during the Fetch-Decode-Execute cycle. What statements(s) 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 is decoded with the Instruction Register (IR).
(c) Increment value is known when the current instruction has completed execution.
(d) The binary loader overcomes the problem by positioning instructions at word boundaries so that Program Counter (PC) can be amount.
(e) PC incrementing method is implementation dependent.

21) Which of the following statements is/are always true with respect to Ergonomic Keyboards?

(a) Ergonomic keyboards are designed to optimize human well-being, overall system performance and human comfort.
(b) Ergonomic keyboards enable you to launch your web browser and use its navigation.
(c) Ergonomic keyboards always have an Apple key.
(d) Ergonomic keyboards have illuminated keys.
(e) Ergonomic keyboards weigh less than standard keyboards.

22) Which of the following is a/are pointer device(s)?

(a) Mouse	(b) Track ball	(c) Touch Pad
(d) Scanner	(e) OCR Devices	

23) Which of the following devices is a/are biometric device(s)?

(a) Barcode Readers	(b) Fingerprint Readers	(c) DVD Camcorder
(d) IRIS Scanners	(e) Webcam	

24) Which of the following printers use Ink Cartridges to print in colour?

(a) Dot-Matrix printer	(b) InkJet	(c) LaserJet
(d) Photo printer	(e) Dye-Sublimation printer	

25) Which of the following fall into the category of (a) Modifier key(s) on standard key board?

(a) Alt	(b) Ctrl	(c) Home
(d) Shift	(e) Caps Lock	

26) What is/are the device(s) which is/are most likely to have a BIOS-ROM Chip?

(a) Hard Disk	(b) SCSI Adapter	(c) Sound Card
(d) VGA Card	(e) Internal Modem	

27) Which of the following is/are allowed to be configured in the Setup program of the BIOS?

(a) Date and time settings	(b) Hard Disk Configuration	(c) Floppy Drive A and B
(d) Processor	(e) Video Type	

28) What are the differences between a PROM and an EPROM?

(a) EPROM is larger in size than PROM.
(b) Unlike PROM, an EPROM can be erased electronically.
(c) Like PROM, an EPROM can be erased using Ultra Violet (UV) light.
(d) Unlike PROM, an EPROM can be erased using UV light and re-written only once.
(e) Unlike PROM, an EPROM can be erased using UV light and re-written multiple times.

29) Which of the following technologies is/are used for Processor Cache Memory?

(a) SRAM	(b) DRAM	(c) EEPROM
(d) EEPROM	(e) True-ROM	

30) Which of the following memory is/are referred to as the "Hyper Page Mode" RAM?

(a) SRAM	(b) RDRAM	(c) FPRAM
(d) EDORAM	(e) MPDRAM	

31) Which of the following is a/are non-volatile type of memory?

(a) USB	(b) Multimedia Card	(c) XD-Picture Card
(d) Compact Flash Card	(e) DRAM	

32) Which of the following is a/are Removable drives?

(a) Thumb drives	(b) Zip drives	(c) Super Disks
(d) Jaz Drives	(e) Compact Flash Drives	

33) Which of the following is a/are essential components of motherboard?

(a) Microprocessor slot	(b) RAM memory sockets	(c) Sound Card
(d) Chip Set	(e) BIOS	

34) Which of the following interfaces could be used to connect a VGA card?

(a) AGP	(b) PCI	(c) ISA
(d) Firewire	(e) USB 3.0	

35) Which of the following expansion cards can connect 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	

36) What is the maximum number of devices which can be connected to a single USB hub at one instance?

(a) 7	(b) 15	(c) 31
(d) 63	(e) 127	

37) Which of the following statements is/are true with Fire-Wire?

(a) FireWire is a connector on your computer, which allows you to transfer information from one FireWire device to another very quickly.
(b) Fire Wire contains its own processor and a memory to improve performance level.
(c) FireWire was created by a joint effort from Apple, Sony and Panasonic that was standardized in 1995 as IEEE1394.
(d) Fire-wire interface is extremely fast and hence popular in connecting audio and video multimedia devices to the PC.
(e) Fire Wire is also commonly known as iLink on Sony devices and by the IEEE1394 standard.

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

(a) Coordinates how programs work with the computer's hardware and other software.
(b) Can reduce the amount of disk space required to store a file or reduce the time it takes to transfer a file over the internet.
(c) Manages the way information is stored in the disks and how they are retrieved.
(d) Keeps track of which programs uses which devices, responds to requests for memory and other devices from running programs and coordinates everything that hardware does.
(e) Sending documents to the printer and activating the printer.

39) Which of the following software is/are designed to be able to translate source code of the programs to machine code?

(a) Freeware	(b) Open Source	(c) Shareware
(d) Proprietary	(e) Compilers	

40) What is the most practical method to remove a software application from a PC?

(a) Delete all files of the software application.
(b) Remove the Icon for the application and delete the executable file of the software application.
(c) Uninstall the software application.
(d) Delete the Folder of the software application.
(e) Back-up the software application.

41) Which of the following software is/are focused on supporting communication, collaboration and coordination?

(a) E-business software	(b) Groupware	(c) Lotus Notes
(d) Project Management Software	(e) Enterprise Application Software	

42) Which of the following statements is/are true with operating systems?

(a) Single User/Single Tasking operating systems take up very large space in the memory when they are running programs.
(b) Multi-User/Multitasking operating systems allow changes to be made from the terminal server.
(c) Multi User/Multitasking operating systems support more than one user at a time, performing more than one task at a time.
(d) Single User/Multitasking operating systems allow performing two or more functions at any given time.
(e) Real-Time operating systems accept inputs, process the inputs, and give the appropriate response in milliseconds or microseconds.

43) "A network which covers a large geographical area and uses communication circuits to connect intermediate nodes" can be referred as

(a) Local Area Networks	(b) Wide Area Networks	(c) Personal Area Networks
(d) Metropolitan Area Networks	(e) Campus Area Networks	

44) Which of the following networks would be completely affected when there is a failure of any node?

(a) Star	(b) Ring	(c) Tree
(d) Mesh	(e) Bus	

45) Which of the following is a/are device(s) used to differentiate between voice and data with the ordinary telephone network?

(a) Hub	(b) Router	(c) Splitter
(d) Gateway	(e) Modem	

46) Which of the following topologies is/are used for switched networks?

(a) Star	(b) Ring	(c) Tree
(d) Bus	(e) Mesh	

47) Which of the following transmission media is/are used as unguided data transmission media?

(a) Radio waves	(b) Microwave	(c) Satellite
(d) Optical Fibre	(e) Twisted Pair	

48) Which of the following components might require upgrading, for the computer to support a high-end realistic 3D game?

(a) Keyboard	(b) Operating System	(c) Main Memory
(d) DVD-ROM	(e) VGA Card	

49) Which of the following statements is/are true when replacing a motherboard?

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

50) Which of the following can cause damage to the computer electrically?

(a) Power-line noise	(b) Continuous power supply
(c) Radio waves	(d) Static Electricity
(e) Uninterrupted Power Supply (UPS)	

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