



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2013/2014 – 1st Year Examination – Semester 1

IT1205 – Computer Systems I
Multiple Choice Question Paper

22nd March, 2014
(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 **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 device(s) was/were developed by Herman Hollerith?

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

2) Which of the following device(s) can be used to read the answers marked as shaded circles in a multiple choice question paper?

- (a) Digitizer
- (b) Light Pen
- (c) Magnetic Ink Character Reader
- (d) Scanner
- (e) Plotter

3) Which of the following device(s) is/are not (a) part(s) of a microprocessor?

- (a) Arithmetic Logic Unit
- (b) Control Unit
- (c) Random Access Memory
- (d) Registers
- (e) Level 1 Cache Memory

4) Which component(s) is/ are essential part(s) of a Von Neumann computer system?

- (a) A mechanism for transferring data to and from the outside world.
- (b) Pattern driven computing model to extract unique patterns.
- (c) A memory to store both data and instructions.
- (d) A processor to interpret and execute instructions.
- (e) Personal Information Manager (PIM) software.

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

- (a) 1100 1011 1100 1101
- (b) 1100 1011 1010 1101
- (c) 1100 1011 1010 1110
- (d) 1011 1110 0101 1101
- (e) 1100 1100 1010 1011

6) Which of the following is the range of integers that can be represented using one's complement notation on an n-bit register?

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

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

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

8) 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 +47.625?

- | | | |
|------------------------|------------------------|------------------------|
| (a) 1 10010 0111110100 | (b) 0 01111 1011111010 | (c) 0 01110 0111111101 |
| (d) 0 10100 0111110100 | (e) 0 10100 1011110011 | |

9) What is the loss of accuracy (round-off-error) when converting the decimal value +255.9375 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 is equivalent to the decimal number “**minus 11**” in the form of a 16 bit Two's Complement number is

- | | | |
|----------------------|----------------------|---------------------|
| (a) 0111111111110101 | (b) 1111111111110101 | (c) 100000000001010 |
| (d) 1111111111110100 | (e) 1111111111110010 | |

11) The IEEE standard 32-bit floating point representation of the binary number **32.5** is

- (a) 0 01111111 110000000000000000000000
- (b) 1 10000011 000011000000000000000000
- (c) 0 10000100 000001000000000000000000
- (d) 0 10000011 000001000000000000000000
- (e) 0 11000001 111000000000000000000000

12) The equivalent decimal number to the IEEE standard 32-bit floating point representation of **1 10000011 111111000000000000000000** is

- (a) -16.875
- (b) -63.5
- (c) -127
- (d) -31.5
- (e) -31.75

13) Output of the Boolean function $F(x, y, z) = x \cdot \bar{y} + z \bar{x} + y \bar{z}$ is 0 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

14) Consider the following truth table:

A	B	C	F(A,B,C)
1	1	1	0
1	1	0	0
1	0	1	1
1	0	0	1
0	1	1	0
0	1	0	0
0	0	1	1
0	0	0	1

Which of the following expression(s) is/are represented by the Boolean function F(A,B,C)?

- (a) $\bar{A}\bar{B} + \bar{A}B$
- (b) $AB + \bar{A}\bar{B}$
- (c) \bar{B}
- (d) \bar{A}
- (e) B

15) The Boolean function $F = P + \overline{Q}.R$ is equivalent to

i. $(P + \overline{Q}).(P + R)$

ii. $(\overline{P+Q}).(P + R)$

iii. $P + (\overline{Q+\overline{R}})$

iv. $P \cdot (\overline{Q} + R)$

v. $P + \overline{Q} + R$

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

16) Consider the following Boolean function

$$F(P, Q, R) = (P + \overline{Q} + \overline{R})(P + \overline{Q}R)$$

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

- | | | |
|---|-------------------------------------|------------------------------------|
| (a) $Q + P\overline{R}$ | (b) $P\overline{Q} + Q\overline{R}$ | (c) $P + \overline{Q}\overline{R}$ |
| (d) $P\overline{Q} + P\overline{R} + \overline{Q}R$ | (e) $P + \overline{Q}R$ | |

17) Consider the following Karnaugh map.

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

What is the most compact Boolean function that represents the above Karnaugh map?

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

- 18) How many NAND gates are required for the logic function F, if it is to be implemented using NAND gates only?

$$F = C\bar{A} + B\bar{C} + A\bar{B}$$

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

- 19) Which of the following statement(s) is/are true with respect to the Central Processing Unit (CPU)?

- | |
|--|
| (a) The Program Counter (PC) holds the memory address of the instruction in execution. |
| (b) Only the Operations-Code is transferred to the Control Unit. |
| (c) An instruction in the Instruction Register (IR) consists of the Operations-Code and one or more Operands. |
| (d) The value of the Program Counter (PC) is incremented by 1 (word size) once its content has been read to the Memory Address Register. |
| (e) The instruction is transferred to the Instruction Register (IR) from the Main Memory before it is transferred to the Memory Buffer Register (MBR). |

- 20) Given below are some statements about cache memory. Identify the correct statement(s) from among them.

- | |
|--|
| (a) Cache memory enhances overall execution performance by providing a faster memory access time. |
| (b) Level 1 cache is always faster than the Level 2 Cache. |
| (c) Level 2 cache is used every time a Level 1 cache miss occurs. |
| (d) In modern computers, the Level 2 cache is referred as the external cache. |
| (e) We define a cache miss to be caused by a reference to an item that is not resident in main memory. |

Questions 21, 22 , 23 and 24 are based on the following:

A two-word instruction is stored in memory at address 300 and 301. The instruction is **LOAD \$R1, 800**. The contents of memory addresses 800, 900, 1000 and 1100 are 900, 1000, 700 and 500 respectively. The content of indexed (base) register is 300.

- 21) What is the value loaded into register \$R1 after the execution of the instruction, if the addressing mode is Immediate?

(a) 500	(b) 700	(c) 800
(d) 900	(e) 1000	

- 22) What is the value loaded into register \$R1 after the execution of the instruction, if the addressing mode is Direct?

(a) 500	(b) 700	(c) 800
(d) 900	(e) 1000	

- 23) What is the value loaded into register \$R1 after the execution of the instruction, if the addressing mode is Indirect?

(a) 500	(b) 700	(c) 800
(d) 900	(e) 1000	

- 24) What is the value loaded into register \$R1 after the execution of the instruction, if the addressing mode is Indexed (Base)?

(a) 500	(b) 700	(c) 800
(d) 900	(e) 1000	

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

(a) Flash Memory Drive	(b) Hard Disk	(c) MP3 Player
(d) CD-RW	(e) Floppy Disk	

26) Which of the following technologies is/are not used as internal cache memory?

- | | | |
|-----------|---------------|------------|
| (a) SRAM | (b) DRAM | (c) EEPROM |
| (d) RDRAM | (e) DDR SDRAM | |

27) Which of the following is/are not considered as magnetic storage device(s)?

- | | | |
|------------------|---------------------|--------------|
| (a) CompactDisks | (b) PunchCard | (c) Zip Disk |
| (d) Floppy Disks | (e) Recording Tapes | |

28) Which of the following memory is/are referred to as "Fast page mode DRAM"?

- | | | |
|--------------------|------------|-----------|
| (a) Page Mode DRAM | (b) RDRAM | (c) FPRAM |
| (d) FPMDRAM | (e) MPDRAM | |

29) Which of the following printer(s) use Ink Cartridges to print in colour?

- | | | |
|---------------------------|--------------------------------------|--------------|
| (a) Colour Inkjet Plotter | (b) Liquid Ink Electrostatic printer | (c) LaserJet |
| (d) Photo printer | (e) Dye-Sublimation printer | |

30) Which of the following device(s) is/are biometric device(s)?

- | | | |
|-------------------------|--------------------|------------------------|
| (a) IRIS Scanners | (b) DVD Camcorders | (c) Smart Card Readers |
| (d) Fingerprint Readers | (e) OCR Devices | |

31) Which of the following device(s) is/are used to produce 3-Dimensional displays?

- | | | |
|------------------------------|-------------------------|-----------------------|
| (a) Overhead Projector | (b) Holographic display | (c) Digital projector |
| (d) Varifocal mirror display | (e) Stereoscopy | |

32) Which of the following technology (or technologies) is/are used to set up a short range point-to-point communication?

- | | | |
|---------------|--|-----------------|
| (a) IrDA | (b) RFID (Radio Frequency Identification) | (c) TransferJet |
| (d) Bluetooth | (e) DSRC (Dedicated Short Range Communication) | |

33) Which of the following is /are (a) functionality/ functionalities of an Operating System?

- (a) Translates user commands to a form that can be understood by the relevant computer component.
- (b) Creates a logical file structure on the computer hard disk so that user data can be stored and retrieved easily.
- (c) While allocating portions of main memory to programs at their request, freeing the allowed memory for reuse when no longer needed.
- (d) Reduces the resolution of high quality images to the required level when the file sizes exceed the capacity expected by an application.
- (e) Executes special programs to repair damaged files and backup data.

34) Which of the following statement(s) is/are true with regards 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 to establishing a 10/100 Ethernet (wired) network.

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

- (a) Fire-Wire requires a connector on your computer, to transfer information from one PC to another device.
- (b) Fire-Wire contains its own processor and a memory to improve its performance.
- (c) Fire-Wire 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.

36) Which of the following statement(s) is/are true with respect to CRT and Flat-Panel LCD monitors?

- (a) A CRT monitor tube is a glass vacuum tube with one-end having an electron gun and the other a display surface coated with phosphors.
- (b) CRT monitor tube uses four electron beams to generate the red, green, UV and blue light.
- (c) Electron beams are used to determine the refresh rates of the CRT monitor screen.
- (d) Early LCD Flat-Panels worked in a three-colour RGB mode.
- (e) A backlight mechanism is introduced to illuminate what is displayed on LCD screen.

37) Which of the following is/are not component(s) of a motherboard?

- (a) BIOS ROM
- (b) Microprocessor
- (c) Hard Disk
- (d) PCI/ISA/AGP bus slots
- (e) CD ROM Drive

38) Which of the following expansion card(s) contain(s) its onboard processor and memory to improve the performance?

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

39) Which of the following factor(s) can be considered as advantage(s) in a networked computing system?

- (a) Enforceability of Standards
- (b) Higher Reliability
- (c) Data Redundancy
- (d) Resource share ability
- (e) Remote Computability

40) Which of the following transmission media can be considered as unguided data transmission media?

- (a) Twisted Pair Copper
- (b) Line of sight Microwave
- (c) Satellite
- (d) Optical fiber
- (e) Infrared

41) Which of the following statement(s) 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 type.
- (c) The motherboard has to be compatible with the monitor.
- (d) The power supply has to be of the same form factor as the motherboard.
- (e) The motherboard has to be compatible with the hard disk type.

42) Which of the following network(s) configurations would be completely affected in case of a failure of any node?

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

43) Which of the following device(s) is/are used to separate voice and data into relevant end devices within a home telephone network?

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

44) Which of the following software is/are not a utility type of software?

- (a) Scan Disk
- (b) Data Compression
- (c) Organizer Notes
- (d) Anti-Virus
- (e) Backup Software

45) Which of the following option(s) in a software installation process allow(s) users to select the components they wish to install?

- (a) Custom
- (b) Typical
- (c) Network
- (d) Standard
- (e) Full

46) Which of the following software is/are focused on collaboration and coordination type of development?

- (a) Content Management System
- (b) Human-based genetic Algorithm
- (c) Whiteboarding
- (d) Management Information System
- (e) Enterprise Application Software

47) Which of the following Operating System(s) is/are used in a typical embedded system?

- | | | |
|----------------|--------------|-------------|
| (a) LiteOS | (b) Matchbox | (c) Symbian |
| (d) Windows NT | (e) Android | |

48) Which of the following system component(s) 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 statement(s) is/are correct about POST?

- | |
|---|
| (a) The main devices tested by the POST are the CPU, motherboard support circuits, ROM, RAM, video graphic adapter and the Hard disk drive. |
| (b) POST program is loaded just after locating the first boot sector to start up the computer system |
| (c) POST program indicates errors in the form of audio codes, on screen messages or check point codes. |
| (d) POST program protects the bootstrapped code from being interrupted by faulty hardware. |
| (e) The BIOS program handles the main duties of POST. |

50) Which of the following components is/are needed to be taken into considerations when upgrading the processor on a computer system?

- | | | |
|-----------------|-----------------|------------------|
| (a) Motherboard | (b) Main Memory | (c) Power Supply |
| (d) VGA Card | (e) Hard Disk | |
