UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2019 – 1st Year Examination – Semester 1

IT1205 – Computer Systems I

Multiple Choice Question Paper

22nd June, 2019

(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 **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.**
- Calculators are **not** allowed.
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1) In 1980s ……. automated his weaving factory using a series of punch card readers that recorded data using a combination of holes.

What is the suitable option to fill the blank above?

(a) Charles Babbage	(b) Herman Hollerith
(c) Joseph-Marie Jacquard	(d) John Von Neuman
(e) Howard Aiken	

2) Which of the following statements is/are **true** ?

(a) Ada Lovelace is considered to be the first computer programmer.
(b) The Pascaline developed by Blaise Pascal read data from punch cards.
(c) Joseph-Marie Jacquard developed by Blaise Pascal could perform addition with carry and subtraction.
(d) John Von Neuman designed the Analytical Engine.
(e) The Differential Engine was developed by Blaise Pascal.

3) Which of the following devices can be used to read the answers marked as shaded circles in a multiple-choice question paper?

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

4) Which of the following devices is/are part of a microprocessor?

(a) Instruction Register	(b) Program Counter
(c) Main Memory	(d) Cache Memory
(e) Control Unit	

5) Which of the following statements is/are **false** with respect to the Central Processing Unit (CPU)?

(a) Cache memory holds data that can be readily accessed by the CPU.
(b) Arithmetic-Logic-Unit (ALU) and Control Unit (CU) are two principal parts of the CPU.
(c) Control Unit sends signals to the CPU components to perform sequenced operations.
(d) ALU determines which actions are to be carried out according to the values in a Program Counter (PC) register and a status register.
(e) ALU operations are controlled by the Control Unit.

6) What is the decimal value of the hexadecimal number 7E3?

(a) 1911	(b) 1991	(c) 2011
(d) 2019	(e) 2021	

7) What is the binary value of decimal number $^{\mathbf{11}}/_{\mathbf{64}}$?

(a) 0.010111	(b) 0.001101	(c) 0.001110
(d) 0.001011	(e) 0.000111	

8) What is the decimal value of the binary number **0.010101**?

(a) $^{5}/_{64}$	(b) $^{13}/_{64}$	(c) $^{17}/_{64}$
(d) $^{21}/_{64}$	(e) $^{31}/_{64}$	

9) Which of the following logical operators is/are used in relation to **complement** numbers in Two's Complement binary numbers?

(a) NOT	(b) OR	(c) AND
(d) NAND	(e) XOR	

10) What is the IEEE standard 32-bit floating point representation for the decimal number **+1999.328125**?

(a) 0 10001001 11110011110101010000000
(b) 0 10000011 11110011110101010000000
(c) 0 10001011 11110011110101010000000
(d) 0 10010011 11110011110101010000000
(e) 0 10001101 11110011110101010000000

11) What is the 16-bit floating point number of the decimal number **+1999.3125**? Assume that 16-bit floating point representation is with a sign bit, 5-bit exponent and 10-bit mantissa.

(a) 0 11010 1111001111	(b) 0 11001 1111001111
(c) 0 11101 1111001111	(d) 0 10110 1111001111
(e) 0 10111 1111001111	

12) What is the loss of accuracy (round-off-error) when converting the decimal value **+1999.3125** to a 16-bit floating point representation with a sign bit, 5-bit exponent and 10-bit mantissa?

(a) 0.3125	(b) 0.25	(c) 0.1875
(d) 0.125	(e) 0.0625	

13) The equivalent decimal number to the IEEE standard 32-bit floating point representation of **0 10001001 01010101010100000000000** is

(a) +1365.75	(b) +1365.5	(c) +1365.25
(d) +1365.125	(e) +1365	

14) Consider the following Boolean function

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

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

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

15) Consider the following Boolean function

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

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

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

16) Consider the following Boolean function

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

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

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

17) Consider the following Boolean function

$$F(A,B,C) = (A.B) + (A.C) + (B.C)$$

What is the minimum number of NAND gates required for the above Boolean function, if it is to be implemented only using NAND gates?

(a) 3	(b) 4	(c) 5
(d) 6	(e) 7	

18) The output of the Boolean function $F(a,b,c) = (\overline{a.b}) + (\overline{b.c}) + (\overline{a.c})$ is 0 when

(a) a=1, b=1, c=0	(b) a=1, b=0, c=1	(c) a=0, b=0, c=1
(d) a=0, b=1, c=0	(e) a=1, b=1, c=1	

19) If any word of size 128 bit in a memory space can be addressed by using 33-bit memory address and each location holds one word, what should be the size of the memory space?

(a) 8GB	(b) 16GB	(c) 32GB
(d) 64GB	(e) 128GB	

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 64 bits. If a 16-byte variable is stored starting at location 1110 0011 0010 0101, what is the address of next available storage location?

(a) 1110 0011 0010 0110
(b) 1110 0011 0010 0111
(c) 1110 0011 0010 1001
(d) 1110 0011 0010 1011
(e) 1110 0011 0010 1011

Questions 21, 22 and 23 based on the following:

Consider a machine with an instruction format of the form **opcode R# R# M** where **R#** is a register address to specify one of 30 registers and **M** is a memory address. Instructions are 32 bits long and each of the instruction formats provides 5 bits for the op-code.

21) How large must the register address field be?

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

22) How large must the memory address field be?

(a) 8 bits	(b) 12 bits	(c) 15 bits
(d) 17 bits	(e) 20 bits	

23) Suppose in the above machine, each memory location can hold a word of size 128 bits. What is the addressable capacity of this machine's memory?

(a) 1 MB	(b) 2 MB	(c) 4 MB
(d) 8 MB	(e) 16MB	

24) A computer has a two-level cache. Suppose that 80% of the memory references hit on the first level cache, 10% on the second level cache, and 10% misses. The access times are 10 nano seconds (nsec) for the first level cache, 20 nsec for the second level and 60 nsecfor the main memory reference respectively. What is the effective access time?

(a) 8 nsec	(b) 10 nsec	(c) 14 nsec
(d) 16 nsec	(e) 18 nsec	

25) A **non-pipelined system A** takes on average 80 nano seconds (to process an instruction). A **pipelined system B** has a 4-stage pipeline, where each stage takes 20 nano seconds. What is the "**Speed-Up Ratio**" for **system B** for a 200 instruction program?

(a) 3.6	(b) 3.92	(c) 3.94
(d) 3.96	(e) 3.98	

26) Which of the following registers is used to keep track of the address of the memory location where the next instruction is located?

(a) Instruction Register
(b) Status Register
(c) General Purpose Register
(d) Memory Address Register
(e) Program Counter

27) ……. is loaded with the contents of the memory address pointed to by the Program Counter (PC) before fetching the instruction during the CPU Cycle.
Select the most suitable answer for the black

(a) Status Register
(b) Transition Lookaside Buffer (TLB)
(c) Instruction Register
(d) Cache Memory
(e) General Purpose Registers

28) Which of the following devices is/are loaded with the contents of the data, instruction or memory address during the execution of the CPU Cycle.

(a) Program Counter (PC)
(b) Control Unit
(c) Instruction Register
(d) Cache Memory
(e) General Purpose Registers

29) Which of the following devices is/are partially visible to users and loaded with the contents of the data pointed to the Arithmetic Logic Unit (ALU)?

(a) Status Register
(b) Transition Lookaside Buffer (TLB)
(c) Instruction Register
(d) Cache Memory
(e) General Purpose Registers

30) What type of control pins are needed in a microprocessor to regulate traffic on the bus, in order to prevent two devices from trying to use it at the same time?

(a) Control Unit
(b) Status Register
(c) Arithmetic Logic Unit (ALU)
(d) Bus Arbiration
(e) Instruction Register

31) A data storage used to store data to compensate for the difference in the speed at which the different units can handle data is the

(a) Cache Memory
(b) Memory
(c) Virtual Memory
(d) Memory Management Unit (MMU)
(e) Buffer

32) Which of the following is an/are Optical Storage Device/s?

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

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

(a) Barcode Readers
(b) Smart Card Readers
(c) Credit Card Readers
(d) ePassport
(e) IRIS Scanners

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

(a) Compressive Light Field Displays
(b) Volumetric Displays
(c) Integral Imaging
(d) Movie Projectors
(e) Holographic Displays

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

(a) InkJet Printers
(b) Label Printer
(c) Dot Matrix Printers
(d) Game Boy Printer
(e) Solid Ink Printers

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

(a) Scanner
(b) Disk Drive
(c) Network Card
(d) Punch Card
(e) Serial Management Interface (SMI)

37) Which of the following technologies is/are used to set up short-range point-to-point communication?

(a) IrDA
(b) Radio Frequency
(c) Bluetooth
(d) Microwave
(e) HiperLAN

38) Which of the following wireless technologies can be used to connect external devices to a computer?

(a) IrDA
(b) Radio Frequency
(c) Bluetooth
(d) Microwave
(e) Wi-Fi

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

(a) Optical Fiber
(b) Radio Frequency
(c) Unshielded Twisted Pair (UTP)
(d) Microwave
(e) Hub

40) What is the latest medium used by many smartphone manufacturers to begin incorporating into their devices, thereby enabling a smartphone to be used as universal remotes via an included or downloadable mobile application?

(a) Laser	(b) Mircowave
(c) Flash Light	(d) Ultra Violet
(e) Infrared	

41) Which of the following software is/are designed be able to modify the source code of the programs?

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

42) The Operating System is the intermediary between Application Programs and which of the following?

(a) Utilities	(b) Command Prompt
(c) Hardware	(d) Drivers
(e) User Interfaces	

43) Which of the following Operating Systems is/are used in a typical embedded system?

(a) OpenZaurus	(b) Mobilinux
(c) MotoMagx	(d) Amoeba
(e) OPhone	

44) Which of the following software is/are utility type of software?

(a) Disk Compression
(b) File Synchronization
(c) Cryptographic
(d) Registry Notes
(e) Clipboard Managers

45) Which of the following is a/are limitation/s of a high-level language?

(a) Machine Dependence
(b) Efficiency
(c) Accuracy
(d) Versatility
(e) Reliability

46) An error in software or hardware is called a bug. What is the alternative computer jargon for it?

(a) Leech	(b) Squid	(c) Slug
(d) Rough	(e) Glitch	

47) Once you load a suitable program and provide the required data, a computer does not need human intervention. This feature is known as

(a) Accuracy	(b) Reliability	(c) Automatic
(d) Versatility	(e) Efficiency	

48) The arranging of data in a logical sequence is called

(a) Sorting	(b) Classifying	(c) Reproducing
(d) Summarizing	(e) Clustering	

49) The ability of a computer system to remain operational despite various failures is

(a) Relation	(b) Schema	(c) Resilience
(d) Versatility	(e) Diligence	

50) Which of the following will frequently produce obfuscated code which can be used for the recovery of lost source code, and is also useful in some cases for computer security, interoperability and error correction?

(a) Compiler	(b) Interpreter	(c) Translator
(d) Decompiler	(e) Debuggers	

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