සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

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KHALIFA NIYAS
කලීෆානියාස්

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2027
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General Certificate of Education (Adv. Level) Examination, 2027

තොරතුරු හා සන්නිවේදන තාක්ෂණය	I
தகவல், தொடர்பாடல் தொழினுட்பவியல்	I
Information & Communication Technology	I

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පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Instructions:

- *Answer **all** the questions.*
- *Write your* Full Name *in the space provided in the answer sheet.*
- *Instructions are also given on the back of the answer sheet. Follow those carefully.*
- *In each of the questions* 1 to 30, *pick one of the alternatives from* (1), (2), (3), (4), (5) *which is **correct or most appropriate** and **mark your response on the answer sheet with a cross** (x) **in accordance with the instructions given on the back of the answer sheet.***
- *Use of calculators is **not allowed.***

01. The Stepped Reckoner, unlike Pascaline, was capable of which extended operations?
(1) Only addition and subtraction
(2) Addition, subtraction, multiplication, division
(3) Addition, subtraction, square root, cube root
(4) Addition, multiplication, logarithmic functions
(5) Only multiplication and division

02. Charles Babbage is considered the Father of Computers mainly because:
(1) He designed the Mark I, the first automatic computer
(2) He introduced punch cards for input and output
(3) He conceptualized Input, Process, and Output architecture
(4) He invented the transistor-based computing model
(5) He developed the ENIAC with J. Presper Eckert

03. Which of the following computers was the first stored program computer?
(1) ENIAC (1946)
(2) UNIVAC (1951)
(3) EDVAC (1948)
(4) EDSAC (1947)
(5) Mark I (1939)

04. UNIVAC was significant because it:
(1) Was the first microprocessor-based computer
(2) Introduced the idea of binary-coded decimal system
(3) Used punch cards for input/output and stored data
(4) Was the first laptop computer prototype
(5) Used integrated circuits for faster processing

See Page 2

05. Which of the following does not belong to the 2nd Generation computers?
    (1) IBM 1620
    (2) IBM 7094
    (3) CDC 1604
    (4) UNIVAC 1108
    (5) PDP-11

06. Which is the correct chronological order of computer generations?
    (1) Vacuum Tubes → Transistors → ICs → VLSI → ULSI
    (2) ICs → Vacuum Tubes → Transistors → ULSI → VLSI
    (3) VLSI → ICs → ULSI → Vacuum Tubes → Transistors
    (4) Transistors → Vacuum Tubes → ICs → ULSI → VLSI
    (5) Vacuum Tubes → ICs → Transistors → VLSI → ULSI

07. The concept of General-purpose computer implies that:
    (1) It is portable and lightweight
    (2) It can handle one single specialized task only
    (3) It is designed for a wide range of tasks and problems
    (4) It is always digital and never analog
    (5) It is faster than any supercomputer

08. Although _____ is very old, it still plays a central role in the daily operations of the world's largest corporations. In addition to its power, the other main reason for its popularity is _____.
    (1) A - cloud computing, B - non-reliance on the internet
    (2) A - cloud computing, B - non-reliance on service providers
    (3) A - the mainframe computer, B - low cost
    (4) A - the mainframe computer, B - reliability
    (5) A - the mainframe computer, B - small size

09. Which of the following best describes the IBM-360 series?
    (1) Microcomputer designed for personal use
    (2) Minicomputer with analog-digital hybrid capacity
    (3) Mainframe system based on integrated circuits
    (4) Supercomputer based on vacuum tubes
    (5) Microprocessor-based portable device

10. Which of the following correctly matches dot matrix, inkjet and laser printers?
    (1) A - dot matrix, B - laser, C - inkjet
    (2) A - dot matrix, B - inkjet, C - laser
    (3) A - inkjet, B - dot matrix, C - laser
    (4) A - laser, B - dot matrix, C - inkjet
    (5) A - laser, B - inkjet, C - dot matrix

See Page 3

11. Which of the following is most suitable for minimizing book lending/returning time in a school library?
    (1) Using a digitizer
    (2) Using an external hard disk
    (3) Using a touch screen
    (4) Using a magnetic stripe reader
    (5) Using a bar code technology

12. Which is the biggest advantage of direct entry input devices over keyboard entry?
    (1) Faster internet access
    (2) Elimination of human intervention reduces cost and errors
    (3) Ability to multitask with CPU
    (4) Uses optical fiber for accuracy
    (5) Supports multiple monitors

13. MICR is best suited for:
    (1) Barcode scanning in retail stores
    (2) Reading bank cheques with magnetic ink characters
    (3) Reading handwritten text from documents
    (4) Scanning high-resolution images
    (5) Capturing biometric details

14. Which monitor type relies on electron beams striking a phosphorescent surface?
    (1) LCD
    (2) LED
    (3) CRT
    (4) OLED
    (5) Plasma

15. In LCD monitors, what is the role of Thin Film Transistor (TFT)?
    (1) Controls brightness only
    (2) Provides electron beam focus
    (3) Controls each pixel individually
    (4) Reduces lifespan of display
    (5) Prevents overheating in panels

16. Which of the following is NOT a requirement for CPU compatibility with a motherboard?
    (1) Socket support
    (2) Chipset support
    (3) Wattage support (TDP)
    (4) BIOS upgrade support
    (5) Monitor refresh rate support

17. DVD-RAM differs from DVD-RW mainly because:
    (1) DVD-RAM supports random access and can be rewritten far more times
    (2) DVD-RAM can only be written once
    (3) DVD-RAM requires magnetic heads to store data
    (4) DVD-RAM is read-only and cannot be rewritten
    (5) DVD-RAM is smaller in capacity than CD-ROM

See Page 4

18. In a grid computing system, schedulers are mainly responsible for:
    (1) Storing backup data in cloud
    (2) Managing resources, task allocation, and execution order
    (3) Providing internet connectivity to all nodes
    (4) Encrypting all communication between computers
    (5) Upgrading CPUs and motherboards remotely

19. Which printing technology sprays ink through nozzles?
    (1) Dot Matrix
    (2) Inkjet
    (3) Laser
    (4) Plotter
    (5) Thermal

20. Consider the following statements about the Difference Engine:
    A - Was the first mechanical computer
    B - Was created by Allen Turing
    C - Was invented in the Electronic era

    (1) A only
    (2) A and B only
    (3) C only
    (4) A and C only
    (5) All of the above

21. Who developed the first “Automatic Sequence Controlled Calculator”?
    (1) Gottfried Wilhelm Von
    (2) Blaise Pascal
    (3) Charles Babbage
    (4) Ada Augusta Lovelace
    (5) Howard Aiken

22. Which of the following is the function of basic input-output system (BIOS)?
    (1) It provides physical interfaces for various devices
    (2) It provides programs for CPU in order to communicate peripherals
    (3) It provides memory space for loading of applications from hardware
    (4) It provides electric power required for computer
    (5) It provides memory space needed for computer

23. Jack Kilby created ..... in 1958 to establish that resistors and capacitors can be located in the same semiconductor.
    (1) Vacuum tube
    (2) Point-contact transistor
    (3) Integrated circuit
    (4) Microprocessor
    (5) Electronic valve

See Page 5

24. Which of the following can be used as both input and output devices?
    A. Magnetic Ink character Reader (MICR)
    B. Touch Screen
    C. Plotter
    D. CD / DVD writer

    (1) Only A
    (2) Only B
    (3) B and D only
    (4) A, B and D only
    (5) All A, B, C and D

25. Which of the following can be used to measure the clock speed of the central processing unit of a computer?

    (1) Gigahertz (GHz)
    (2) Gigabyte (GB)
    (3) Megabits per second (Mbps)
    (4) Instructions per second (Ips)
    (5) Revolutions per minute (Rpm)

26. Which of the following best explains the Von Neumann Bottleneck in computer architecture?
    (1) The CPU is unable to access RAM and ROM simultaneously
    (2) The ALU and CU cannot process data in parallel
    (3) Data and instructions share the same bus, creating a speed limitation
    (4) Input and Output devices use separate buses, increasing latency
    (5) The memory cannot store both program instructions and data

27. Which component in the Von Neumann architecture is primarily responsible for interpreting the fetched instruction before it is executed?
    (1) Decoder
    (2) Register
    (3) Bus
    (4) Cache
    (5) Buffer

28. Which of the following component within the CPU is directly responsible for temporarily holding the intermediate results of arithmetic operations?
    (1) ALU
    (2) Register
    (3) CU
    (4) Cache
    (5) Bus

See Page 6

29. Which major component of the CPU has the function of “Decoding and Managing the instruction execution”?
    (1) ALU
    (2) Register
    (3) Bus
    (4) Cache
    (5) CU

30. Which of the following statement/s is/are correct regarding the Von Neumann Architecture?
    A - Data and instructions are stored in separate memories
    B - Instructions and data share the same memory and bus
    C - Execution follows a linear fetch-decode-execute cycle
    (1) Only A and B
    (2) Only A
    (3) Only B and C
    (4) Only C
    (5) All A, B and C

31. What is the primary advantage of a multi-core processor compared to a single-core processor?
    (1) Uses less power
    (2) Runs multiple instructions simultaneously
    (3) Has a larger cache size
    (4) Requires less memory
    (5) Simplifies programming

32. Which of the following is NOT a main advantage of a multi-core processor?
    (1) Parallelism
    (2) Faster execution
    (3) Single thread processing
    (4) Divided workload
    (5) High performance

33. Which of the following examples are NOT the examples of Volatile memory?
    (1) ROM, RAM, Cache memory
    (2) RAM, SRAM, DRAM
    (3) Cache memory, SDRAM, SRAM
    (4) ROM, EPROM, EEPROM
    (5) DRAM, SRAM, SDRAM

34. Which of the following correctly ranks Cache memory levels based on Capacity and Speed in ascending order?
    (1) L3 < L2 < L1 : Capacity, L1 > L2 > L3 : Speed
    (2) L1 < L2 < L3 : Capacity, L1 > L2 > L3 : Speed
    (3) L2 < L1 < L3 : Capacity, L3 > L2 > L1 : Speed
    (4) L3 < L1 < L2 : Capacity, L3 > L2 > L1 : Speed
    (5) L1 < L2 < L3 : Capacity, L3 > L2 > L1 : Speed

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35. Which types of cache memories are located outside and on the CPU respectively?
    (1) L3 and L2 Cache
    (2) L1 and L2 Cache
    (3) L1 and L3 Cache
    (4) L2 and L3 Cache
    (5) L2 and L1 Cache

36. Which of the following is regarded as the “main memory of the computer that holds data for running applications and required data for a computer”?
    (1) RAM
    (2) ROM
    (3) Cache memory
    (4) PROM
    (5) EPROM

37. Which type of RAM requires continuous refreshing to retain data and is slower compared to SRAM?
    (1) SDRAM
    (2) DRAM
    (3) SRAM
    (4) ROM
    (5) EPROM

38. Which of the following statement is NOT false regarding the types of ROM?
    (1) PROM can be written multiple times using the UV light
    (2) EPROM can be erased by exposing to an electrical charge
    (3) EEPROM is erased by UV light
    (4) PROM can only be programmed once and retains data permanently
    (5) ROM is volatile memory that loses data when power is off

39. Which of the following statements about the Computer Memory are TRUE?
    A - SRAM is faster and more expensive than DRAM
    B - DRAM must be refreshed periodically to retain data
    C - PROM can be programmed only once and cannot be erased
    (1) A and B only
    (2) B and C only
    (3) A and C only
    (4) None of the above statements
    (5) All of the above statements

40. Which of the following is NOT an example of a magnetic storage device?
    (1) Hard disk
    (2) Floppy disk
    (3) Magnetic tape
    (4) DVD
    (5) None of the above

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41. Which of the following storage type is described as being more durable than tape but slower than typical hard drives?
    (1) Optical storage
    (2) Magnetic storage
    (3) Solid state storage
    (4) RAM
    (5) ROM

42. Which of the following option contains the three form factors that can be found in Solid State Storage?
    (1) Hard disk drive, Solid state device, Solid state card
    (2) Solid state device, Solid state card, Solid state module
    (3) Flash drive, Solid state card, Hard disk drive
    (4) Solid state drive, Flash drive, Memory card
    (5) Solid state module, Solid state card, Flash drive

43. Which storage device primarily uses sequential access memory?
    (1) RAM
    (2) Hard disk drive
    (3) Magnetic tape
    (4) Solid state drive
    (5) Optical disk

44. Which of the following statements appropriately explains the limitations of sequential access memory compared to random access memory?

    1. Access time increases linearly with data position in sequential memory
    2. Sequential access memory can directly access any data without reading intermediate data
    3. It is more suitable for streaming applications where data is processed in order
       (1) 1 and 2 only
       (2) 2 and 3 only
       (3) 1 and 3 only
       (4) 1 only
       (5) All 1, 2 and 3

45. Which of the following statements about sequential access memory are FALSE?

    1. Data must be accessed in a predetermined order making it inefficient for random data retrieval
    2. It is typically faster than random access memory for accessing data located far from the start
    3. It is commonly used in magnetic tape storage systems due to its linear data arrangement
       (1) 1 and 3 only
       (2) 3 only
       (3) 1 and 2 only
       (4) 2 only
       (5) All of the above

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46. Which memory access type allows data retrieval in any order with equal access time?
    (1) Sequential
    (2) Random
    (3) Direct
    (4) Indexed
    (5) Serial

47. Which of the following best describes the Indexed memory access?
    (1) Accessing data sequentially from start to end
    (2) Using an index register to calculate the effective address
    (3) Accessing data only at fixed memory locations
    (4) Accessing data randomly without any calculation
    (5) Storing data permanently in ROM

48. Which of the following storage device is considered as to provide quick data access?
    (1) Flash drive
    (2) Magnetic tape
    (3) Internal hard disk
    (4) Compact disc
    (5) Digital versatile disk

49. Consider the following memory components:

    1. CPU Registers
    2. L2 Cache
    3. Virtual Memory
    4. RAM
    5. Magnetic Disk

    Which of the following correctly ranks these components from fastest access time to slowest access time?
    (1) 1 > 2 > 4 > 5 > 3
    (2) 1 > 4 > 2 > 3 > 5
    (3) 2 > 1 > 4 > 3 > 5
    (4) 1 > 2 > 4 > 3 > 5
    (5) 2 > 1 > 3 > 4 > 5

50. Which of the following correctly presents the memory components from smallest storage capacity to largest?
    (1) Registers < Cache < RAM < Virtual Memory < HDD
    (2) Cache < Registers < RAM < HDD < Virtual Memory
    (3) Registers < Cache < Virtual Memory < RAM < HDD
    (4) Cache < Registers < RAM < Virtual Memory < HDD
    (5) Registers < RAM < Cache < Virtual Memory < HDD

See Page 10

Structured Questions

01. Von Neumann Architecture is also referred to as **Stored Program Concept**.

a. State 02 main characteristics of the Von Neumann Architecture.

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.....

.....

b. Mention 02 limitations of the Von Neumann Architecture in modern computing.

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.....

c. Name the main components of Von Neumann Architecture.

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.....

d. What causes the Von Neumann bottleneck?

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.....

e. Describe the functions of the following components of CPU.

Registers :

.....

.....

ALU :

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.....

Control Unit /CU :

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.....

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f. Define Multi-core processors.

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.....

g. Mention any 03 needs of a Multi-core processor.

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02. Computer Memory can be mainly classified into Volatile and Non-Volatile Memory.

a. Write 02 examples for each of the Volatile and Non-Volatile memories.

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b. Write a difference between Volatile and NON-Volatile memories.

.....

.....

.....

c. Define the following terms,

a. RAM :

.....

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b. ROM :

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c. Cache memory :

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.....

See Page 12

d. Write a difference between the Magnetic and Optical storage devices.

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e. What are the 03 forms of factors that can be found in the Solid storage devices?

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f. Arrange the following components available in the Computer Memory Hierarchy in the descending order of their Speed and Capacity.

"Magnetic disk, Optical disk, Main memory, Registers, Solid state devices"

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See Page 13

Essay Question

01. Computers have evolved rapidly through different eras, generations, and classifications, and modern systems now depend on advanced technologies such as parallel computing, grid computing, and efficient scheduling.

    a) Explain why Charles Babbage is considered the "Father of the Computer".

    b) Describe two main advantages of direct entry input devices over keyboard entry.

    c) Compare the working mechanism of a laser printer and an inkjet printer.

    d) Identify two compatibility factors that must be checked between a CPU and a motherboard.

02.

a)

I. Sketch the Von-Neumann Architecture and briefly describe it's major function.
II. Define Cache memory and compare the types of Cache memory in terms of it's speed, capacity and location.

b)

I. Briefly describe the activities that takes place in Fetch-Execute cycle and draw it's diagram.
II. Explain the 02 types of Memory access mathods with their relevant diagrams and examples.

c)

I. Compare the types of RAM and their functions.
II. Compare the types of ROM and their fuctions.

d) Sketch the complete Computer Memory Hierarchy and clearly indicate the order of it's Speed and Capacity.

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