A REPUBLIQUE DU CAMEROUN
PAIX – TRAVAIL – PATRIE
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MINISTERE DES ENSEIGNEMENTS SECONDAIRES
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REPUBLIC OF CAMEROON
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CENTRE REGION

CENTRE REGIONAL MOCK EXAMINATION IN PARTNERSHIP WITH CASPA	SUBJECT CODE NUMBER 795	PAPER NUMBER 1
CANDIDATE NAME: …………………………………… CANDIDATE NUMBER: ………………………………… CENTRE NUMBER: ……………………………………	**SUBJECT TITLE COMPUTER SCIENCE**	
ADVANCED LEVEL	DATE**: Tuesday, 19 March 2024**	

Time Allowed: One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper.

Make sure you have a soft HB pencil and eraser for this examination.

1. Use a soft HB pencil throughout the examination
2. Do not open the booklet until you are told to do so.

Before the examination

3. Check that this questions paper is headed 'Advanced Level COMPUTER SCIENCE 795'
4. Insert the information required in the space provided.
5. Without opening the booklet, pull out your answer sheet carefully form inside the front cover of this booklet. Take care that you do not erase or fold the answer sheet or make any mark on it other than those asked for in this instructions.
6. Insert the information required in the space provided on the answer sheet using your HB pencil.

Candidate Name, Centre Number and Name, Candidate Number, Subject Code Number and Paper Number.

7. Answer all the 50 questions in the examination. All question carry equal marks.
8. Non-programmable calculators are allowed.
9. Each question has FOUR suggested answers: A, B, C and D. Decide on which answer is correct. Find the number of the question on the sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen. For example if B is your correct answer, mark as shown below:

    [A] ▆ [C] [D]
10. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase that mark carefully, then mark your new answer.
11. Avoid spending too much time on any one question. You can come to these questions later.
12. Do all rough work in this booklet, using where necessary, and the blank spaces in the question booklet.
13. Mobile phones are not allowed in the examination room.
14. You must not take this booklet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.

1. Consider the following diagram showing some hardware component connections on a computer system:
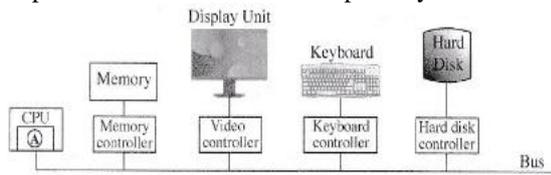
The **Hardware** part within the CPU indicated by **(A)** in the above diagram has a set of registers that has the memory translation maps of the currently running process. When given an input *virtual address* of the current process it outputs the relevant *physical address* (if any).
The **(A)** in the above diagram denotes the
   A. Arithmetic and logic unit (ALU)
   B. Control unit
   C. L1 cache memory
   D. Memory management unit

2. Which of the following is usually regarded as a bottleneck to von-Neumann computer Architecture?
   A. ALU
   B. Instruction set
   C. Processor/memory interface
   D. Control unit

3. The sequence of events that happen during the fetch phase of the machine instruction cycle is:
   A. *PC→Memory→MAR→MDR→IR*
   B. *PC→IR→MDR→MAR→Memory*
   C. *PC→MAR→Memory→MDR→IR*
   D. *PC→MDR→ MAR →Memory→IR*

4. Which of the following correctly list the given computer components in the **descending** order of **access speed**?
   A. Cache memory > main memory > magnetic disk > register
   B. Register > cache memory > main memory > magnetic disk
   C. Magnetic disk > main memory > cache memory > register
   D. Magnetic disk > main memory > register > cache memory

Use the following to answer question 5, and 6
A two-word instruction LOAD is stored at location 300 with its address field in the next location. The address field has value 600 and value stored at 600 is 500 and at 500 is 650. The words stored at 900, 901 and 902 are 400, 401 and 402, respectively. A processor register R contains the number 800 and index register has value 100.
Memory layout is shown adjacent

5. What is the effective address of the operand and operand value if addressing mode of the instruction is the **Memory Indirect addressing mode?**
   A. 600, 500
   B. 500, 650
   C. 301, 600
   D. 600, 401

300	LOAD
301	600
......	
500	650
.....	
600	500
700	900
800	700
900	400
901	401
902	402

6. What is the effective address of the operand and operand value if addressing mode of the instruction is the **Immediate addressing mode?**
   A. 301, 600
   B. 600, 500
   C. 700, 900,
   D. 901, 401

7. To design a combinational logic circuit to add two 4-bit numbers, ____ half adder and _____ full adder circuits are needed.
   A. (2, 2)
   B. (1, 3)
   C. (3, 1)
   D. (4, 1)

8. Which of the following is the most simplified expression equivalent to $A\bar{B}\bar{C} + B\bar{C} + \bar{A}\bar{B}C + BC$?
   A. $A\bar{B}\bar{C} + \bar{A}\bar{B}C + B$
   B. $\bar{B}(A\bar{C} + \bar{A}C) + B$
   C. $A\bar{C} + \bar{A}C + B$
   D. $\bar{A}\bar{C} + B$

Consider the following logic circuit below to answer **9** and **10.**
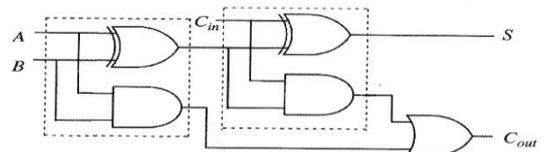
9. Which of the following statement(s) is/are correct about the above circuit?
   I – It implements a full adder.
   II – the Logic function S can be stated as
   $S = A \oplus B \oplus C_{in}$
   III – the logic function of C_{out} can be stated as $C_{out} = AB + BC_{in} + AC_{in}$
   A. I only
   B. II only
   C. II and III only
   D. All I, II, and III.

10. Which of the following statement(s) is/are correct about the part of the circuit within the area surrounded by the dotted line?
   I – It implements a half adder
   II – It can be implemented using only AND and OR gates.
   III – It can be implemented using only NAND gate.
   A. I only
   B. II only
   C. I and III only
   D. All I, II, and III.

11. Consider the transition diagram in the figure below:
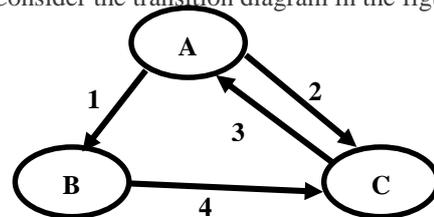
If the transition shown are as follows
1 – Process blocks for input/output
2 – Scheduler picks another process
3 – Scheduler picks this process
4 – Input/output is completed

Then what are the states indicated by A, B and C respectively?
A. Blocked, New, Ready
B. New, Ready, Running
C. Running, Blocked, Ready
D. Ready, Running, Blocked
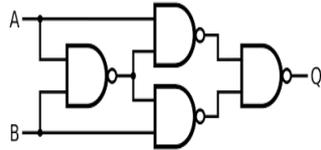
12. Is the following resource allocation graph in a deadlock state?

A. Yes
B. Not predictable
C. Insufficient data
D. No
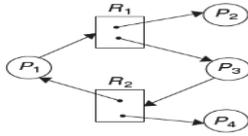
13. Consider the logic circuit below with two inputs A and B and the output Q. Which of the following logic gate is equivalent to the logic circuit below?

A. NAND
B. EXCLUSIVE-OR
C. EXCLUSIVE-NOR
D. NOR

14. What is the result of the following computation in one's complement using **eight-bits 0000 0111 + 1111 1100?**
A. 0000 0011
B. 10000 0011
C. 0000 0100
D. None of the above

15. What is the 2's complement of decimal -12?
A. 00001100
B. 00110011
C. 11110011
D. 11110100

16. A programmer writes a program that compares the elements of an array, *A* to a certain number, *Max.* He used the Boolean expression
$((A[i] = Max)\ OR\ (NOT(Max \neq A[i])))$.
The Boolean expression can be simplified to:
A. $A[i] \neq Max$
B. $A[i] = Max$
C. $A[i] < Max\ OR\ A[i] > Max$
D. The Boolean expression cannot be simplified further.

17. Which of the following is an advantage of low level programming?
A. Portability
B. Direct control over hardware
C. Abstraction
D. Low performance

18. Which of the following statements regarding compilers and interpreters are correct?
(i) A compiler transforms an entire high-level language program into its machine code.
(ii) An interpreter converts each high-level program statement into the relevant machine code during the program run.
(iii) Compiled codes usually run faster than interpreted codes.
A. (i) only
B. (i) and (ii) only
C. (i) and (iii) only
D. All (i), (ii) and (iii)

19. Consider the following paragraph:
To run a program, the program code is copied from -----A------ into -----B----- The Central Processing Unit's (CPU's) program counter is set to the memory location where the first instruction of the program has been saved and execution of the program starts. The ----C---- implements the fetch-decode-execute cycle.
Which of the following is the correct combination of A, B and C respectively?
A. CPU, main memory, secondary storage
B. CPU, secondary storage, main memory
C. Secondary storage, main memory, CPU
D. Secondary storage, CPU, main memory

20. The generation of monthly salary slips of employees in an organization is an example for
A. Batch processing
B. Real-time processing
C. Online processing
D. Transaction processing

21. In a public key encryption system, the private key of a person x is given by the function *priv(x)* and the public key is given by *pub(x).* Consider the following statements:
(a) – pub(x) is used to encrypt a message which can only be decrypted by priv(x).
(b) – pub(x) is used to sign a message to be sent to x.
(c) - A message encrypted using pub(x) can be decrypted using pub(x).
Which of the statements is/are correct?
A. (a) only
B. (b) only
C. (c) only
D. (b) and (c) only

22. In which of the following network classes does the IP address 192.248.254.1 belong?
A. A
B. C
C. B
D. D

23. What is the process carried-out in the ***modulation*** technique in data transmission?
A. Encoding information in transmitted signal.
B. Encoding signals in transmitted information.
C. Extracting information from the transmitted signal.
D. Transfer information with minimum distortion.

24. You are installing network cabling in a highly secure facility. The cables need to be immune to electronic eavesdropping. What type of cable should you use?
A. Fiber-optic
B. UTP
C. STP
D. Coaxial

25. Which of the following options contain only *guided media*?
A. Coaxial, Fiber optics and Infrared
B. Coaxial, Fiber optics and Microwave
C. Coaxial, Fiber optics and Twisted pair
D. Coaxial, Infrared and Twisted pair

26. Sone just bought a 2 GB flash drive. What is the maximum number of pictures that he can store in the flash drive given that each picture has a size of 7 MB?
    A. 293
    B. 292
    C. 294
    D. None of the above

27. Determine the number of address lines, input/output lines and the number of bytes that can be stored in the memory chip **4G x 64**.
    A. 32 lines, 32 lines, 32GB
    B. 32 lines, 64 lines, 32GB
    C. 32 lines, 32 lines, 4GB
    D. 32 lines, 32 lines, 8GB

28. The (1) prefix and (2) postfix forms of the expression $P + (Q - R) * A/B$ are
    A. (1) $+P * -QR/AB$ (2) $PQR - AB/* +$
    B. (1) $PQR - AB/* +$ (2) $+P * -QR/AB$
    C. (1) $PQR - A * B/+$ (2) $+P/* -QRAB$
    D. (1) $+P/* -QRAB$ (2) $PQR - A * B/+$

29. When will the function, Q below cause a stack overflow (i.e., cause computer memory to be exhausted)?

    ```
    INTEGER FUNCTION Q (int x, int y)
    Start
        IF (x > y) THEN
            Return x * y;
        ELSE
            Return Q(x - 1, y);
        ENDIF
    Stop
    ```

    A. Only when $x > y$
    B. For all values of x and y
    C. Only when $x \leq y$
    D. The function will never cause a stack overflow.

30. Which one of the following is a recursive definition of Fibonacci series?
    A. $\begin{cases} f(0) = 0 \\ f(1) = 1 \\ f(n) = f(n-1) + f(n-2) \end{cases}$
    B. $\begin{cases} f(0) = 0 \\ f(1) = 1 \\ f(n) = n * f(n-2) \end{cases}$
    C. $\begin{cases} f(n) \leftarrow 1 \\ for\ x \leftarrow 1\ to\ n\ do \\ f(n) = f(n * x) \end{cases}$
    D. None of the above

31. The following is generally true for the time t_1 taken to search a binary search tree and the time t_2 taken to search a linked list
    A. $t_1 \leq t_2$
    B. $t_1 \geq t_2$
    C. $t_1 > t_2$
    D. $t_1 < t_2$

32. Which of the following represents (1) inorder, (2) preorder, and (3) postorder traversals of the tree shown?

    A. (1) GJAPES (2) JAGPES (3) GAESPJ
    B. (1) GJAEPS (2) JGAPES (3) GESPAJ
    C. (1) EPSAJG (2) PESJGA (3) ESPGAJ
    D. (1) GJAEPS (2) GESPAJ (3) JGAPES
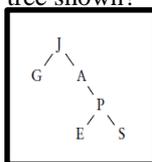
33. A program stores the signs seen on a journey which are then used to trace one's way back (to the journey's start). Which of the following is the most appropriate data structure to use for the program?
    A. Records
    B. Array of records
    C. Strings
    D. Stack

34. The scope of a variable refers to its:
    A. Length
    B. Name
    C. Accessibility
    D. Data type

35. What will be the output of the following pseudocode?
    ```
    Set x = 1
    Set y = 100
    While x < 100
        Set y = y - x
        Set x = x + 1
        If x + y < 90 Then
            breakpoint
        End If
    End While
    Display y
    ```
    A. 100
    B. 85
    C. 79
    D. 72

36. Which of the following represents the type of validation check performed on x by the algorithm below?
    A. Presence check
    B. Range check
    C. Format check
    D. Length check

    ```
    Get (x)
    IF (x < 0 OR x > 10) THEN
        Print("Invalid")
    ENDIF
    ```

37. Consider the array **[8, 5, 2, 3, 7]** on which a certain sorting algorithm was applied to sort the elements in ascending order. The state of the array after the second pass is given as **[2, 3, 8, 5, 7]**. Which sorting algorithm was used on the array?
    A. Insertion sort
    B. Bubble sort
    C. Selection sort
    D. Stepwise sort

38. Switch statement is an alternative of:
    A. Nested if
    B. If-else
    C. Nested if-else
    D. If

39. The output of the compiler is called:
    A. Library code
    B. Source code
    C. Linked code
    D. Object code

40. Consider the following code fragment. A and B are integers. What is the purpose of the code fragment?
    A. It transfers the contents of A+B to A
    B. It transfers the contents of A-B+1 to B
    C. It swaps the contents of A and B
    D. It negates the contents of A and B

    ```
    A ← A + B
    B ← A - B
    A ← A - B
    ```

41. A particular programming language uses facts and rules. For one problem in a college, some of the program statements about students and courses are listed. What is the name for this type of programming language?
    A. Procedural programming language
    B. Object oriented programming language
    C. Declarative programming language
    D. Functional programming language

42. Which of the following is correct regarding comments in programming languages?
    A. At the time of execution, comments are translated into special machine instructions.
    B. Comments should always be limited on a single line.
    C. Comments should start with // in all programming languages.
    D. It is a good practice to include comments in a program to explain its functionality.

43. Consider the algorithms with the following time functions.
    $$T1 (n) = n! + n^2 + 400$$
    What is the tight upper bound for the algorithm with the time function, T1 (n)?
    A. $O(400)$
    B. $O(1)$
    C. $O(n!)$
    D. $O(n^2)$

44. What is the result of the following operation
    Pop (Push (S, X))?
    A. X
    B. null
    C. S
    D. None of these.

45. Consider the Information System types in **List A** and some examples in **List B**.

List A	List B
A1 – Enterprise Resource Planning System	**B1** – A customer account system in a bank
A2 – Expert system	**B2** – A system that facilitates manufacturing, marketing and sales of a garment business
A3 - Transaction processing system	
	B3 – A system that prescribes medicines using a knowledge base

A good matching between lists A and B is:
    A. A1-B1, A2-B2, A3-B3
    B. A1-B2, A2-B3, A3-A1
    C. A1-B3, A2-B1, A3-B2
    D. A1-B2, A2-B1, A3-B3

46. Which of the following shows the correct order of software testing?
    A. acceptance testing → system testing → integration testing → unit testing
    B. unit testing → Acceptance testing → system testing → integration testing
    C. unit testing → integration testing → acceptance testing → system testing
    D. unit testing → integration testing → system testing → acceptance testing

47. A software development company identifies that their new system development project has complex requirements and has a *medium* to *high* risk level. Further, an evaluation is needed to clear the requirements and significant changes are expected during system development.
    A. Spiral
    B. Agile
    C. Waterfall
    D. Prototyping

48. Consider the set of relations:
    – EMP (**EmployeeNo**, DeptNo, EmployeeName, Salary)
    – DEPT (**DeptNo** , DeptName, Location).
    What is the role of the following SQL query?

    ```
    SELECT EMP.EmployeeName
    FROM DEPT INNER JOIN EMP ON EMP.DeptNo=DEPT.DeptNo
    WHERE DEPT.Location= "MENDONG" AND EMP.Salary > 50000;
    ```

    A. Retrieves and displays all departments found in MENDONG having greater than 50000
    B. Retrieves and displays MENDONG and also displays 50000
    C. Retrieves and displays all employee names who work in departments located in MENDONG and whose salary is greater than 50, 000.
    D. Retrieves and displays all department names whose department no is known and located in MENDONG and whose salary is greater than 50, 000.

49. Consider the following SQL statement:
    UPDATE school SET contact_person = 'Spiral W.'
    WHERE school_id ='04';
    Which of the following is true when the SQL statement is executed?
    A. It changes the value of *contact_person* as 'Spiral W.' only in the record having *school_id* = '04'
    B. It selects all the records having *school_id* = 04 and *contact_person* as 'Spiral W.'
    C. It changes the field name of *contact_person* as 'Spiral W.' when selecting the records with *school_id* = 04.
    D. It adds an additional value to the *contact_person* as 'Spiral W.' only in the records having *school_id* = 04

50. Which of the following about keys in a relational database is true?
    A. A primary key can be a composite and may contain NULL in certain cases
    B. A candidate key is ALWAYS a super key
    C. A super key is ALWAYS a candidate key
    D. A foreign key is a minimal set of a primary key and candidate key