SUBJECT CODE	SUBJECT	PAPER
A-04-03	COMPUTER SCIENCE AND APPLICATIONS	III

HALL TICKET NUMBER

QUESTION BOOKLET NUMBER

OMR SHEET NUMBER

600887

DURATION	MAXIMUM MARKS	NUMBER OF PAGES	NUMBER OF QUESTIONS
2 HOUR 30 MINUTES	150	16	75

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SEAL

Instructions for the Candidates

1. Write your Hall Ticket Number in the space provided on the top of this page.
2. This paper consists of seventy five multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested <u>to open the booklet and compulsorily examine it as below</u> :
   (i) **To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.**
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
   (iii) After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.

   Example: (A) (B) ● (D)

   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. The candidate must handover the OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table etc., is prohibited.
12. There is no negative marks for incorrect answers.

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COMPUTER SCIENCE AND APPLICATIONS

Paper – III

1. The transformation where in the object is first rotated about X-axis and then about Y-axis is

   (A) Instant
   (B) Rotation
   (C) Shearing
   (D) Tilting

2. In the Cohen-Sutherland line clipping algorithm, "trivial reject" means

   (A) That the intersection is trivial to compute

   (B) That the boundaries on the visible side of the line are incomplete

   (C) That the process of rejection is always trivial

   (D) That the line is not visible when its end points are on the invisible side of a clipping boundary

3. In Bresenham's circle algorithm, we do not require

   (A) Floating- Point arithmetic

   (B) Calculation along the line of a Pixel centre

   (C) Multiplication or division

   (D) All the above

4. The Distributive law of Boolean algebra is

   (A) $A+(B+C) = (A+B)+C$
   $A-(B-C) = (A-B)-C$

   (B) $A+BC = (A+B)(A+C)$
   $A.(B+C) = A.B + A.C$

   (C) $A +AB = A$
   $A(A+B) = A+B$
   $A + AB = A+B$

   (D) None of the above

5. What will be the decimal equivalent of $(111011.10)_2$?

   (A) 48.625

   (B) 59.487

   (C) 48.487

   (D) 59.625

6. An array of 32 bit integers is stored in addressable memory starting from the location 2000 H. The size of the array is 100. If the index addressing is used to access the array elements, what would be the contents of index register ?

   (A) 100

   (B) 4

   (C) 32

   (D) 2000 H

7. The three logical operations, which are said to be logically complete, as any Boolean function may be realized using these three operations are

   (A) AND, OR and NOT

   (B) AND, OR and XOR

   (C) AND, OR and NAND

   (D) XOR, NOR and NAND

8. Which of the following statement is correct statement ?

(A) 2PL protocol ensures conflict serializability

(B) Strict 2PL is not cascadeless

(C) Strict 2PL is not recoverable

(D) 2PL is free from deadlocks

9. Which of the following statement is incorrect ?

(A) A relation always can be decomposed into dependency preserving BCNF

(B) A relation in 3NF may have some redundancies

(C) If the decompositions is dependency preserving all functional dependencies can be derived from the individual relations

(D) There are relations for which there is no dependency preserving BCNF decomposition

10. When making corrections to the product table you would use the following command

(A) CHANGE PRODUCT

SET P_INDATE = '01|18|2002'

WHERE P_CODE = '13-Q2|P2';

(B) ROLLBACK PRODUCT

SET P_INDATE = '01|18|2002'

WHERE P_CODE = '13-Q2|P2';

(C) EDIT PRODUCT

SET P_INDATE= '01|18|2002'

WHERE P_CODE = '13-Q2|P2';

(D) UPDATE PRODUCT

SET P_INDATE = '01|18|2002'

WHERE P_CODE = '13-Q2/P2';

11. Which of the following statement is correct about serializability ?

(A) Checking for view serializability is np-complete

(B) Checking for conflict serializability is np-complete

(C) 2PL ensures view serializability

(D) Serialization graph ensures view serializability

12. Call management of GSM consists of the following entities

1. Call control
2. Short Message Services
3. Supplementary Services
4. Traffic Channels

Which of the above is correct ?

(A) 1, 2 and 3

(B) 1,2 and 4

(C) 2, 3 and 4

(D) 1, 3 and 4

13. In GSM, mobility management is monitored by

(A) Traffic channels

(B) Half-duplex channels

(C) Full-duplex channels

(D) Control channels

14 The following postfix expression with single digit operands is evaluated using a stack

$5\ 6\ 2\ \wedge\ 3\ *\ 2\ -\ 7\ 4\ /\ +$

Note that $\wedge$ is the exponentiation operator. The top two elements of the stack after the * is evaluated are

(A) 3, 5

(B) 108, 5

(C) 108, 3

(D) 112, 2

15. Given the contents of EMPLOYEE table, the SQL command to output the table contents will be:

(A) SELECT EMP_LNAME, EMP_FNAME, EMP_INITIAL

EMP_AREA CODE, EMP_phone

FROM EMPLOYEE

LIST BY EMP_LNAME, EMP_FNAME, EMP_INITIAL;

(B) SELECT EMP_LNAME, EMP_FNAME, EMP_INITIAL,

EMP_AREA CODE, EMP_PHONE

FROM EMPLOYEE

ORDER BY EMP_LNAME, EMP_FNAME, EMP_INITIAL;

(C) SELECT EMP_LNAME, EMP_FNAME, EMP_INITIAL,

EMP_AREA CODE, EMP_PHONE

FROM EMPLOYEE

DISPLAY BY EMP_LNAME, EMP_FNAME, EMP_INITIAL'

(D) SELECT EMP_LNAME, EMP_FNAME, EMP_INITIAL,

EMP_AREA CODE, EMP_PHONE

FROM EMPLOYEE

SEQUENCE BY EMP_LNAME, EMP_FNAME, EMP_INITIAL;

16. The referential integrity rule requires that

(A) Every null foreign key value must reference an existing primary key value

(B) It makes it possible for an attribute to have a corresponding value

(C) Every non-null foreign key value must reference an existing primary key value

(D) It makes it possible to delete a row in one table whose primary key does not have a matching foreign key value in another table

17. In CSMA/CD, after the 4th couision, what is the probability that the node will attempt to retransmit immediately ?

(A) 0.0625   (B) 0.5

(C) 0.125   (D) 0.25

18. How does the SSL network protocol provide confidentiality ?

(A) Through symmetric encryption such as RSA

(B) Through asymmetric encryption such as Data Encryption Standard (DES)

(C) Through asymmetric encryption such as Advanced Encryption Standard (AES)

(D) Through symmetric encryption such as Data Encryption Standard (DES)

19. Which of the following do digital signatures provide ?

   (A) Authentication and integrity of data

   (B) Authentication and confidentiality of data

   (C) Confidentiality and integrity of data

   (D) Authentication and availability of data

20. The maximum data frame that can be sent in Ethernet is

   (A) 64 Bytes   (B) 1500 Bytes

   (C) 4 KB   (D) 8 KB

21. You are designing a network which needs to support 200 users. You don't plan to extend the segment beyond the current number of users. Which subnet mask would best meet your needs ? Select the best answer :

   (A) 255.255.0.0

   (B) 255.255.255.0

   (C) 255.0.0.0

   (D) 255.255.255.200

22. Which of the following network devices operates only in the physical layer ?

   (A) Router   (B) Bridge

   (C) Switch   (D) Repeater

23. According to the testing criteria "TEST ALL PATHS", what numbers must the following code be tested by to verify or debug it completely:

   Scanf (& x, &y, "%d %d");

   if (x < 10) then

      Statement 1;

   else

      Statement 2;

   if (y > 5) then

      Statement 3;

   else

      Statement 4;

   (A) $(x, y) = (9, 7), (11, -2), (2, 9), (8, 6)$

   (B) $(x, y) = (-1, 9), (8, -2), (2, 8), (19, 8)$

   (C) $(x, y) = (9, 7), (11, 3) (19, 11), (3, 4)$

   (D) $(x, y) = (9, 19), (5, 3), (6, 11), (11, 3)$

24. Which of the following statements is correct about software testing ?

   (A) Testing is common method of verification

   (B) Testing is common method of validation

   (C) Testing common method of both verification and validation

   (D) Testing can be used to prove the correctness of a program

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25. Which of the following machines recognizes the even Palindrome of the form WW^R (W = word and W^R being its reverse) ?

   (A) DFSM (Deterministic FSM)

   (B) NFSM (Non-Deterministic FSM)

   (C) DPDM (Deterministic PDM)

   (D) NPDM (Non-Deterministic PDM)

26. Which of the following statements is not true about FSM ?

   (A) Every regular set can be recognized by some FSM

   (B) FSM can remember arbitrarily large amounts of information

   (C) FSM eventually produces a sequence of periodic sequence of states

   (D) FSM has fixed number states

27. Consider the grammar G = (N, T, P, S), where

   $$N = \{S, A, B\}$$

   $$T = \{a, b\}$$

   $$P = \{(S \rightarrow AB), (B \rightarrow AB), (A \rightarrow aa),$$

   $$(A \rightarrow a), (B \rightarrow b)\}$$

   Which of the following statement is true about G ?

   (A) G is context – sensitive

   (B) G is context – free

   (C) It is type- 0 grammar

   (D) G is type 3

28. Which of the following statements is true about the Push Down Automata (PDA) ?

   (A) PDAs recognize context-sensitive languages

   (B) PDAs recognize context-free languages

   (C) PDAs recognize type 1 languages

   (D) PDAs recognize type 0 languages

29. Consider the Grammar G = (N, T, P, S), where

   $$N = \{S, B, C\}$$

   $$T = \{a, b\}$$

   $$P = \{(S \rightarrow bB), (B \rightarrow bc), (B \rightarrow aB),$$

   $$(C \rightarrow a), (B \rightarrow b)\}$$

   Which of the following statement is wrong about G ?

   (A) G is left linear grammar

   (B) G is right linear grammar

   (C) G is context free

   (D) G is type 2

30. Consider the following C code :

   ```
   Void test (float &v1, float &v2, float v)
   {
       v1 -= v;
       v2 += v;
   }
   ```

   Further x, y and z are set to 4.0, 6.0 and 1.0 respectively, and the above procedure is invoked by the call test (x, y, z). Which of the following statement best describes the above scenario ?

   (A) The invocation results in dangling pointer problem

   (B) The invocation results in aliasing problem

   (C) The invocation results in side effect

   (D) The invocation results in run-time error

31. The perspective transformation between object and image can be

    (A) a linear 3x3 transformation
    (B) a linear 4x4 transformation
    (C) a nonlinear 3x3 transformation
    (D) a nonlinear 4x4 transformation

32. A touch screen is recommended for

    (A) Pressure – sensitive drawing and painting
    (B) Projects that track users
    (C) Program involving public input and simple tasks
    (D) Day-to-day computer work

33. A "picking" Input Device is an example of a

    (A) Sampling Based Input Device
    (B) Request Based Input Device
    (C) Physical Input Device
    (D) Logical Input Device

34. Consider the following C Program Segment :

    test ( )
    { int i;
      static int j = 0;
      - - -
      - - -
    }

    Which of the following statements is true about the allocation of memory to i and j ?

    (A) Both i and j use dynamic allocation
    (B) 'i' uses static allocation and 'j' uses dynamic allocation
    (C) Both i and j use static allocation
    (D) i uses dynamic allocation and j uses static allocation

35. Consider the following 'C' function:

    Static int count;
    Void test (int x, int*P)
    { int y;
        y = x*2;   /* line 1*/
        ++ P;   /* line 2*/
        P = 123;   / line 3*/
        Count = Count + 234   /* line 4*/
    }

    Which of the lines (lines 1 – 4) in the given C function would make the function non- reentrant ?

    (A) Line 1
    (B) Line 2
    (C) Line 3
    (D) Line 4

36. Which of the following is a correct statement about TCP ?

    (A) It is between two adjacent nodes
    (B) It is between two hosts
    (C) It is between two modems
    (D) It is between two routers

37. The purpose of the Ethernet frame preamble is to provide:

    (A) a mechanism where by Ethernet's CSMA / CD can determine if a collision has occurred
    (B) the destination MAC address at the beginning of the frame
    (C) information that identifies the type of data in the frame
    (D) a mechanism whereby each node can synchronize itself to the passing frame

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38. Which of the following is not used as a cost estimation technique during the project planning stage ?

(A) Delphi technique

(B) Expert judgment

(C) Program Evaluation Review Technique (PERT) charts

(D) Function Points (FP)

39. White-box testing is most often used as a form of

(A) Top-down testing

(B) Big-band testing

(C) Unit testing

(D) Acceptance testing

40. Which of the following is a measure of the size of an information system based on the number and complexity of a system's inputs, outputs and files the user has to interact with ?

(A) Lines Of Code (LOC)

(B) Function Point (FP)

(C) Critical Path Method (CPM)

(D) Program Evaluation Review Technique (PERT).

41. In LISP, the function evaluates <object> and assigns this value to the unevaluated <sconst>.

(A) (constant <sconst><object>)

(B) (def constant <sconst><object>)

(C) (eva<sconst><object>)

(D) (eva<object><sconst>)

42. Which approach to speech recognition avoids the problem caused by the variation in speech patterns among different speakers ?

(A) Continuous speech recognition

(B) Isolated word recognition

(C) Connected word recognition

(D) Speaker-dependent recognition

43. PROLOG is an AI programming language which solves problems with a form of symbolic logic known as predicate calculus. It was developed in 1972 at University of Marseilles by a team of specialists, name the person who headed this team.

(A) Alain Colmeerauer

(B) Nicklaus Wirth

(C) Seymour Papert

(D) John McCarthy

44. You want to connect 2 networks that are both IO base T Ethernet networks. The 2 networks are located in separate buildings so that they are approximately 1,000 meters apart. Which media should you use ?

(A) Type 1 STP cable

(B) RG-58 A/U co-axial cable

(C) Fiber-optic cable

(D) Wireless infrared

45. What does the transport protocol do ?

(A) It defines how data should be presented to the next receiving layer, Packages the data accordingly, and then passes the data to the application through the session layer interface.

(B) It provides low-level access to the network adapters by providing data transmission support and some basic adapter management functions.

(C) It supports communications between applications on different computers by creating sessions, defining-data-exchange formats, and providing application – support services.

(D) It is responsible for establishing logical names on the network, establishing connections between two logical names on the network, and supporting reliable data transfer between computers that have established a session.

46. What must you do to create a printer pool containing four shared printers on your windows NT server computer ?

(A) Set up all the printers to share the same parallel port

(B) Set individual printer properties for each printer

(C) Set up all printers as network-interface printer devices

(D) Specify the same printer driver and settings for all printers

47. You need to install network adapters in 20 ISA-bus computers, which rule must you follow when installing the network adapters ?

(A) All adapters in a computer, including the network adapter, must be set to the same IRQ.

(B) All adapters in a computer, including the network adapter, must be set to the different IRQs.

(C) All network adapters in all computers on the same network must be set to same IRQ.

(D) All network adapters in all computers on the same network must be set to different IRQs.

48. From your client computer, you are able to access several servers on your 10Base2 Ethernet network. However, you are NOT able to access a server names RED. Other client computers are able to access RED. What is the most likely cause of the problem ?

(A) There is an incorrect IRQ setting on the network adapter in your client computer

(B) There is a break in the cable

(C) There is a protocol mismatch between your client computer and RED

(D) An excessive number of collisions are occurring on the media

49. Why does a high number of broadcast messages adversely affect overall network performance ?

(A) Each broadcast message requires an acknowledgement packet from every computer on the network

(B) No computer on the network can transmit data until each broadcast message has been acknowledged by every computer on the network

(C) Broadcast messages are automatically routed to every segment of a LAN

(D) Every computer on the network must process each broadcast message

50. Let the weight of minimum spanning tree of a given graph G as per Kruskal's algorithm is W_k and as per Prim's algorithm is Wp, then

(A) $W_k <$ Wp

(B) $W_k >=$ Wp

(C) $W_k =$ Wp

(D) None of these

51. Consider the following binary search tree with AVL property
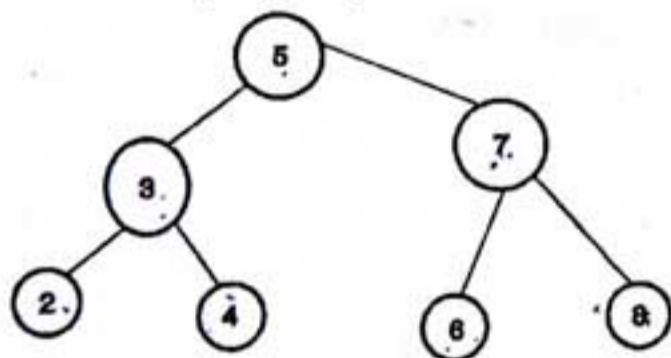
What will be the tree in array representation after element 'a' is inserted and the tree has to maintain both the binary search tree and AVL properties ?

(A) | 5 | 3 | 2 | 4 | 7 | 6 | 1 | 8 |

(B) | 5 | 3 | 7 | 2 | 4 | 6 | 8 | 1 |

(C) | 4 | 2 | 6 | 1 | 3 | 5 | 7 | 8 |

(D) | 5 | 3 | 7 | 2 | 4 | 6 | 1 | 8 |

52. Which of the following is the correct sequence of the statements to be executed to insert a node in a single linked list after a node whose address is p ? The pointer field next ptr points to the next node and the address of the new node is q.

(A) p $\rightarrow$ nextptr = q; q $\rightarrow$ nextptr = p;

(B) p $\rightarrow$ nextptr = q; q $\rightarrow$ nextptr = p $\rightarrow$ next ptr;

(C) q $\rightarrow$ nextptr = p $\rightarrow$ nextptr; p $\rightarrow$ next ptr = q;

(D) q $\rightarrow$ nextptr = p $\rightarrow$ nextptr; p $\rightarrow$ next ptr = q $\rightarrow$ next ptr;

53. Consider the following recurrence relation

$T(n) = 2T(n/2) + \log n$,

$T(n) = b$ for $n < 2$, for some constant $b > 0$

If T(n) were to denote the running time of an algorithm, what would it be equal to in Big O notation ?

(A) O (n)

(B) O (n log n)

(C) $O(n^2)$

(D) $O(n^2 \log n)$

54. Which of the following statements about NP-complete is false ?

(A) A problem Q is NP – Complete and if it is NP and NP-hard.

(B) If any NP-complete problem is in P, then P=NP

(C) $P \leq NP$

(D) If a problem Q is NP-hard, it implies Q is in NP

55. Which of the following is not the function of process control subsystem of UNIX ?

(A) Does inter-Process Communication

(B) Does Process Scheduling

(C) Does Memory Management

(D) Does Device Management

56. If the block size of Unix file system is 4K bytes, what would be the maximum size of a file possible with only direct and single indirect blocks ? Each entry in the single indirect block is of 4 bytes. An inode accommodates 9 direct block entries.

(A) 36 K

(B) 4 MB

(C) 4MB + 36 K

(D) 44 MB + 36 K

57. What is the mechanism used to describe deadlocks ?

(A) Precedence Graph

(B) Process State Diagram

(C) Resource Allocation Graph

(D) Process Control Block

58. Overlays are used for the following purpose

(A) To save memory

(B) To increase processing speed

(C) To reduce fragmentation

(D) To reduce functional time

59. Which of the following page replacement algorithms suffers from Belody's anomaly ?

(A) FIFO

(B) LRU

(C) LFU

(D) None

60. Which of the following components of a program state are shared across threads in a multithreaded process ?

(A) Register values

(B) Program counter

(C) Stack memory

(D) Heap memory

61. Which of the following scheduling algorithms could result in starvation ?

1. FCFS

2. Shortest job first

3. Round Robin

4. Priority

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 4 only

(D) 2 only

62. Banker's algorithm of Deadlock Avoidance avoids deadlock by ensuring the following necessary condition for a deadlock to occur never holds

(A) No pre-emption

(B) Hold and wait

(C) Circular wait

(D) Mutual exclusion

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63. Which of the following disk space allocation method is used by UNIX operating system?

(A) Contiguous allocation

(B) Linked allocation

(C) Indexed allocation

(D) FAT scheme

64. How many page frames are required to execute the following instruction ?

MOV OP1, OP2

Where the instruction is of two words and OP1 and OP2 are indirect addresses.

(A) 2

(B) 4

(C) 6

(D) 8

65. Which of the following statements is incorrect about HTTP ?

(A) HTTP is stateless

(B) HTTP is an application layer protocol

(C) HTTP uses UDP as its transport layer

(D) HTTP protocol operates between browser and web server

66. Which of the following equation gives average access time to a memory system with main memory access time as T_1, cache access time as T_2 and a hit ratio as H ?

(A) $T_a = T_1 + (1-H)T_2$

(B) $T_a = H.T_1 + (1-H)(T_1+T_2)$

(C) $T_a = T_2 + (1-H)T_1$

(D) $T_a = (1-H)T_2 + HT_1$

67. Which of the following statements is incorrect ?

(A) LR Parsers can be constructed to recognize virtually all programming language constructs for which context free grammar can be written

(B) The LR parsing method is the most general non backtracking shift-reduce parsing method known

(C) The class of grammars that can be parsed using LR methods is a subset of the class of grammars that can be parsed with predictive parsers

(D) An LR parser can detect syntactic error as soon as it is possible to do so on a left-to-right scan of the input

68. The library files that come with 'C' are

(A) Text editors for programme development

(B) The compiler and linker

(C) Programme examples

(D) File that contain functions which carry out various operations and calculations

69. Another technique for tree indexing where the branching criterion at a particular level in a tree will be based on the position of the key value rather than

(A) Its entire key value and this concept called tree

(B) Its entire key value and this concept called B tree

(C) Its entire key value and this concept called C tree

(D) None of the above

70. _____ is used for external searching.

(A) Binary Tree

(B) B-Tree

(C) AVL Tree

(D) Any Tree

71. A Decision Support System (DSS)

(A) is aimed at solving highly structured problems

(B) combines the use of models with non-traditional data access and retrieval functions

(C) emphasises flexibility in the decision-making approach of users

(D) supports only structured decision-making tasks

72. The knowledge base of an expert system that uses questionnaires to lead the user through a series of choices before a conclusion is reached is known as

(A) Rules

(B) Decision trees

(C) Nets

(D) Data flow diagrams

73. Change control for business application systems being developed using prototyping could be complicated by

(A) Iterative nature of prototyping

(B) Rapid pace of modifications in requirements and design

(C) Emphasis on reports and screens

(D) None of the above

74. Consider the activity of extracting and reusing design and program components. This is an example of

(A) Reverse engineering

(B) Prototyping

(C) Software reuse

(D) Re-engineering

75. The most common reason for the failure of information systems to meet the needs of users is that

(A) User needs are constantly changing

(B) The growth of user requirements was forecast inaccurately

(C) The hardware system limits the number of concurrent users

(D) User participation in defining the system/s requirements was inadequate