PAPER-II
COMPUTER SCIENCE AND APPLICATIONS

Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

D	8	7	1	2

Time : 1 ¹/₄ hours]   [Maximum Marks : **100**

Number of Pages in this Booklet : **8**	Number of Questions in this Booklet : **50**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty 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 to open the booklet and compulsorily examine it as below :
   (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 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 : Ⓐ Ⓑ ● Ⓓ
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Paper I Booklet only.** If you mark at any place other than in the circle in the OMR 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, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
9. You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry duplicate copy of OMR Sheet on conclusion of 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.**
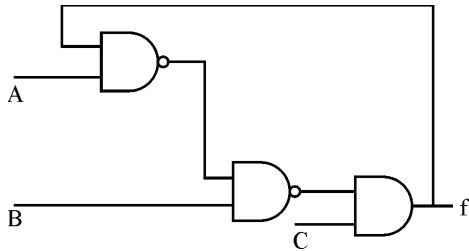
परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं ।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
   (i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
   (ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।**
   (iii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।
   उदाहरण : Ⓐ Ⓑ ● Ⓓ
   जबकि (C) सही उत्तर है ।
5. प्रश्नों के उत्तर **केवल प्रश्न पत्र I के अन्दर दिये गये OMR पत्रक पर ही** अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
8. यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें ।
11. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
12. गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

Note : This paper contains **fifty (50)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. Consider the circuit shown below. In a certain steady state, Y is at logical '1'. What are possible values of A, B, C ?

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

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

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

   (D) A = B = 1, C = 1

2. The worst case time complexity of AVL tree is better in comparison to binary search tree for
   (A) Search and Insert Operations
   (B) Search and Delete Operations
   (C) Insert and Delete Operations
   (D) Search, Insert and Delete Operations

3. The GSM network is divided into the following three major systems :
   (A) SS, BSS, OSS
   (B) BSS, BSC, MSC
   (C) CELL, BSC, OSS
   (D) SS, CELL, MSC

4. The power set of the set $\{\phi\}$ is
   (A) $\{\phi\}$
   (B) $\{\phi, \{\phi\}\}$
   (C) $\{0\}$
   (D) $\{0, \phi, \{\phi\}\}$

5. If the disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O blocks requests are 98, 37, 14, 124, 65, 67.
   (A) 239
   (B) 310
   (C) 321
   (D) 325

6. Component level design is concerned with
   (A) Flow oriented analysis
   (B) Class based analysis
   (C) Both of the above
   (D) None of the above

7. The 'C' language is
   (A) Context free language
   (B) Context sensitive language
   (C) Regular language
   (D) None of the above

8. The Mobile Application Protocol (MAP) typically runs on top of which protocol ?
   (A) SNMP (Simple Network Management Protocol)
   (B) SMTP (Simple Mail Transfer Protocol)
   (C) SS7 (Signalling System 7)
   (D) HTTP (Hyper Text Transfer Protocol)

9. If a packet arrive with an M-bit value is 'l' and a fragmentation offset value '0', then it is _____ fragment.
(A) First
(B) Middle
(C) Last
(D) All of the above

10. The number of bit strings of length eight that will either start with a 1 bit or end with two bits 00 shall be
(A) 32
(B) 64
(C) 128
(D) 160

11. In compiler design 'reducing the strength' refers to
(A) reducing the range of values of input variables.
(B) code optimization using cheaper machine instructions.
(C) reducing efficiency of program.
(D) None of the above

12. In which addressing mode, the effective address of the operand is generated by adding a constant value to the contents of register ?
(A) Absolute
(B) Indirect
(C) Immediate
(D) Index

13. Which of the following is true ?
(A) A relation in BCNF is always in 3NF.
(B) A relation in 3NF is always in BCNF.
(C) BCNF and 3NF are same.
(D) A relation in BCNF is not in 3NF.

14. Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) and processes of 212 K, 417 K, 112 K, and 426 K (in order), using the first-fit algorithm, in which partition would the process requiring 426 K be placed ?
(A) 500 K
(B) 200 K
(C) 300 K
(D) 600 K

15. What is the size of the Unicode character in Windows Operating System ?
(A) 8-Bits
(B) 16-Bits
(C) 32-Bits
(D) 64-Bits

16. In which tree, for every node the height of its left subtree and right subtree differ almost by one ?
(A) Binary search tree
(B) AVL tree
(C) Threaded Binary Tree
(D) Complete Binary Tree

17. The design issue of Datalink Layer in OSI Reference Model is
(A) Framing
(B) Representation of bits
(C) Synchronization of bits
(D) Connection control

18. Given the following expressions of a grammar
$$E \rightarrow E * F / F + E / F$$
$$F \rightarrow F - F / id$$
Which of the following is true ?
(A) $*$ has higher precedence than $+$
(B) $-$ has higher precedence than $*$
(C) $+$ and $-$ have same precedence
(D) $+$ has higher precedence than $*$

19. The maturity levels used to measure a process are
    (A) Initial, Repeatable, Defined, Managed, Optimized.
    (B) Primary, Secondary, Defined, Managed, Optimized.
    (C) Initial, Stating, Defined, Managed, Optimized.
    (D) None of the above

20. The problem of indefinite blockage of low-priority jobs in general priority scheduling algorithm can be solved using :
    (A) Parity bit
    (B) Aging
    (C) Compaction
    (D) Timer

21. Which API is used to draw a circle ?
    (A) Circle ( )
    (B) Ellipse ( )
    (C) Round Rect ( )
    (D) Pie ( )

22. In DML, RECONNCT command cannot be used with
    (A) OPTIONAL Set
    (B) FIXED Set
    (C) MANDATOR Set
    (D) All of the above

23. Coaxial cables are categorized by Radio Government rating are adapted for specialized functions. Category RG-59 with impedance 75 Ω used for
    (A) Cable TV
    (B) Ethernet
    (C) Thin Ethernet
    (D) Thick Ethernet

24. RAD stands for _____.
    (A) Rapid and Design
    (B) Rapid Aided Development
    (C) Rapid Application Development
    (D) Rapid Application Design

25. Suppose that someone starts with a chain letter. Each person who receives the letter is asked to send it on to 4 other people. Some people do this, while some do not send any letter. How many people have seen the letter, including the first person, if no one receives more than one letter and if the chain letter ends after there have been 100 people who read it but did not send it out ? Also find how many people sent out the letter ?
    (A) 122 & 22
    (B) 111 & 11
    (C) 133 & 33
    (D) 144 & 44

26. A hash function f defined as f (key) = key mod 13, with linear probing is used to insert keys 55, 58, 68, 91, 27, 145. What will be the location of 79 ?
    (A) 1
    (B) 2
    (C) 3
    (D) 4

27. Which of the following is true while converting CFG to LL(I) grammar ?
    (A) Remove left recursion alone
    (B) Factoring grammar alone
    (C) Both of the above
    (D) None of the above

28. Identify the Risk factors which are associated with Electronic payment system.

(A) Fraudulent use of Credit Cards.

(B) Sending Credit Card details over internet.

(C) Remote storage of Credit Card details.
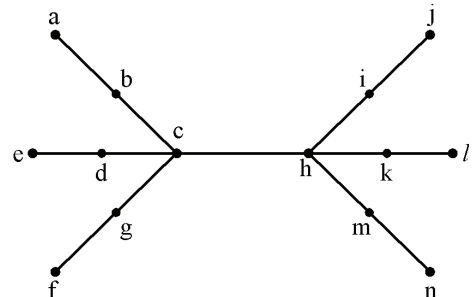
(D) All of the above

29. Which of the following are two special functions that are meant for handling exception, that occur during exception handling itself ?

(A) Void terminate ( ) and Void unexpected ( )

(B) Non void terminate ( ) and void unexpected ( )

(C) Void terminate ( ) and non void unexpected ( )

(D) Non void terminate ( ) and non void unexpected ( )

30. Which of the following memory allocation scheme suffers from external fragmentation ?

(A) Segmentation

(B) Pure demand paging

(C) Swapping

(D) Paging

31. Basis path testing falls under

(A) system testing

(B) white box testing

(C) black box testing

(D) unit testing

32. The User Work Area (UWA) is a set of Program variables declared in the host program to communicate the contents of individual records between

(A) DBMS & the Host record

(B) Host program and Host record

(C) Host program and DBMS

(D) Host program and Host language

33. Consider the tree given below :

Using the property of eccentricity of a vertex, find every vertex that is the centre of the given tree.

(A) d & h

(B) c & k

(C) g, b, c, h, i, m

(D) c & h

34. The maximum number of keys stored in a B-tree of order m and depth d is

(A) $md + 1 - 1$

(B) $\dfrac{md + 1 - 1}{m - 1}$

(C) $(m - 1)(md + 1 - 1)$

(D) $\dfrac{md - 1}{m - 1}$

35. Which of the following is the most powerful parring method ?

(A) LL(I)

(B) Canonical LR

(C) SLR

(D) LALR

36. In UNIX, which of the following command is used to set the task priority ?
(A) init
(B) nice
(C) kill
(D) PS

37. AES is a round cipher based on the Rijndal Algorithm that uses a 128-bit block of data. AES has three different configurations. _____ rounds with a key size of 128 bits, _____ rounds with a key size of 192 bits and _____ rounds with a key size of 256 bits.
(A) 5, 7, 15
(B) 10, 12, 14
(C) 5, 6, 7
(D) 20, 12, 14

38. Match the following IC families with their basic circuits :
a. TTL   1. NAND
b. ECL   2. NOR
c. CMOS   3. Inverter
Code :

	a	b	c
(A)	1	2	3
(B)	3	2	1
(C)	2	3	1
(D)	2	1	3

39. Match the following with respect to C++ data types :
a. User defined type   1. Qualifier
b. Built in type   2. Union
c. Derived type   3. Void
d. Long double   4. Pointer
Code :

	a	b	c	d
(A)	2	3	4	1
(B)	3	1	4	2
(C)	4	1	2	3
(D)	3	4	1	2

40. Given an empty stack, after performing push (1), push (2), Pop, push (3), push (4), Pop, Pop, push(5), Pop, what is the value of the top of the stack ?
(A) 4
(B) 3
(C) 2
(D) 1

41. Enumeration is a process of
(A) Declaring a set of numbers
(B) Sorting a list of strings
(C) Assigning a legal values possible for a variable
(D) Sequencing a list of operators

42. Which of the following mode declaration is used in C++ to open a file for input ?
(A) ios : : app
(B) in : : ios
(C) ios : : file
(D) ios : : in

43. Data Encryption Techniques are particularly used for _____.
(A) protecting data in Data Communication System.
(B) reduce Storage Space Requirement.
(C) enhances Data Integrity.
(D) decreases Data Integrity.

44. Let L be a set accepted by a non-deterministic finite automaton. The number of states in non-deterministic finite automaton is |Q|. The maximum number of states in equivalent finite automaton that accepts L is
(A) $|Q|$
(B) $2|Q|$
(C) $2^{|Q|} - 1$
(D) $2^{|Q|}$

45. What is the result of the following expression ?

$(1 \,\&\, 2) + (3 \,\&\, 4)$

(A) 1

(B) 3

(C) 2

(D) 0

46. Back propagation is a learning technique that adjusts weights in the neural network by propagating weight changes.

(A) Forward from source to sink

(B) Backward from sink to source

(C) Forward from source to hidden nodes

(D) Backward from since to hidden nodes

47. Match the following :

a. TTL   1. High fan out

b. ECL   2. Low propagation delay

c. CMOS   3. High power dissipation

Code :

	a	b	c
(A)	3	2	1
(B)	1	2	3
(C)	1	3	2
(D)	3	1	2

48. _____ is an "umbrella" activity that is applied throughout the software engineering process.

(A) Debugging

(B) Testing

(C) Designing

(D) Software quality assurance

49. Identify the operation which is commutative but not associative ?

(A) OR

(B) NOR

(C) EX-OR

(D) NAND

50. Given a Relation POSITION (Posting-No, Skill), then query to retrieve all distinct pairs of posting-nos. requiring skill is

(A) Select p.posting-No, p.posting-No

from position p

where p.skill = p.skill

and p.posting-No < p.posting-No

(B) Select p_1.posting-No, p_2.posting-No

from position p_1, position p_2

where p_1.skill = p_2.skill

(C) Select p_1.posting-No, p_2.posting-No

from position p_1, position p_2

where p_1.skill = p_2.skill

and p_1.posting-No < p_2.posting-No

(D) Select p_1.posting-No, p_2.posting-No

from position p_1, position p_2

where p_1.skill = p_2.skill

and p_1.posting-No = p_2.posting-No

Space For Rough Work