Test Paper : **III**	Test Booklet Serial No. : _____
Test Subject : **COMPUTER SCIENCE AND APPLICATIONS**	OMR Sheet No. : _____
	Hall Ticket No.
Test Subject Code : **A-04-03**	(Figures as per admission card)

Name & Signature of Invigilator

Name : _____   Signature : _____

Paper : III
Subject : COMPUTER SCIENCE AND APPLICATIONS

Time : 2 Hours 30 Minutes	Maximum Marks : **150**
Number of Pages in this Booklet : **16**	Number of Questions in this Booklet : **75**

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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 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 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 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. You have to return the test question booklet and OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
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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అభ్యర్థులకు సూచనలు

1. ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
2. ఈ ప్రశ్న పత్రము డెబ్బైఐదు బహుళైచ్ఛిక ప్రశ్నలను కలిగి ఉంది.
3. పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములలో ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా సరిచూసుకోండి.
    (i) ఈ ప్రశ్న పత్రమును చూడడానికి కవర్‌పేజి అంచున ఉన్న కాగితపు సీలును చించండి. స్టిక్కర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నపత్రమును మీరు అంగీకరించవద్దు.
    (ii) కవరు పేజీ పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గాని లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజ్రపతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏవైనా తేడాలుండుట వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాలలో పరీక్ష పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగ్గా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.
    (iii) పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నపత్ర సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నపత్రము పైన నిర్దిష్టస్థలంలో రాయవలెను.
4. ప్రతి ప్రశ్నకు నాలుగు ప్రత్యున్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతిప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్న సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్‌తో కింద తెలిపిన విధంగా పూరించాలి.

    ఉదాహరణ : (A) (B) ● (D)

    (C) సరైన ప్రతిస్పందన అయితే
5. ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రంతో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై వేరొక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
6. ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
7. చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
8. OMR పత్రము పై నిర్దిష్ట స్థలంలో సూచించినవలసిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గాని లేదా ఇతర చిహ్నాలను పెట్టడం గాని చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
9. పరీక్ష పూర్తయిన తర్వాత మీ ప్రశ్నపత్రాన్ని మరియు OMR పత్రాన్ని తప్పనిసరిగా పరీక్షపర్యవేక్షకునికి ఇవ్వాలి. వాటిని పరీక్ష గది బయటకు తీసుకువెళ్ళకూడదు.
10. సిల్/నల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.
11. లాగరిథమ్ టేబుల్స్, క్యాలిక్యులేటర్లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.
12. తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.

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COMPUTER SCIENCE AND APPLICATIONS

Paper – III

1. A method of providing security to transport e-mails is

    (A) TLS

    (B) PGP

    (C) IP-sec

    (D) BGP

2. A combinational circuit is designed to take 4 bit input. The number from 0 to 9 are given as input in the binary form. The circuit outputs '1' if 5,6,7 or 9 are given input. For all other numbers the circuit outputs '0'. The circuit is designed only using AND, OR, NOT gates. What is the minimum number of gates required ?

    (A) 2

    (B) 3

    (C) 4

    (D) 5

3. The MAC protocol used in Ethernet is

    (A) ALOHA

    (B) Token ring

    (C) CSMA/CD

    (D) Token bus

4. The simplified form of the boolean expression $(x + y' + z)\ (x + y' + z')$ $(x + y + z)$

    (A) $x'y + z$

    (B) $xy + z$

    (C) $x + y'z$

    (D) $x' + y'z$

5. Arrange the following IP addresses in the order of Class A, Class B, Class C and Class D.

    I. 193. 200. 151. 2

    II. 189. 51. 21. 200

    III. 225. 2. 2. 200

    IV. 126. 8. 2. 200

    (A) I, IV, II, III

    (B) III, II, IV, I

    (C) IV, II, I, III

    (D) II, III, IV, I

6. Addressing modes of the following 8085 instructions in the same order.
LDA, LXI, ADD r_1, r_2, MOV A,M

    (A) Implicit, Indirect, Direct, Register

    (B) Implicit, Indirect, Register, Immediate

    (C) Direct, Indirect, Immediate, Register

    (D) Direct, Immediate, Register, Indirect

7. The concatenation of two lists is to be performed in 0(1) time. Which of the following implementation of a list should be used ?

(A) Singly linked list

(B) Doubly linked list

(C) Circularly doubly linked list

(D) Array implementation of list

8. Match the following :

I. Non vectored interrupt   1. ISR

II. Non Maskable interrupt   2. RST2

III. Program for interrupt   3. TRAP

IV. Software Interrupt   4. INTR

       I   II   III   IV

(A)   4   3   1   2

(B)   2   3   4   1

(C)   1   4   3   2

(D)   2   1   3   4

9. Search algorithms are Judged on the basis of

I. Completeness

II. Optimality

III. Time complexity

IV. Space complexity

(A) I and II

(B) I, II and III

(C) II, III and IV

(D) All of the above

10. Choose the answer from the following register(s) that store the address of a memory location.

I. Program counter

II. Accumulator

III. MAR

IV. BC Register pair

(A) I and II are correct

(B) II and III are correct

(C) I and IV are correct

(D) I and III are correct

11. If G be a complete undirected graph on 6 vertices. If vertices of G are labeled then the number of distinct cycles of length 4 in G is equal to

(A) 15

(B) 30

(C) 90

(D) 360

12. The number of vectored interrupts in 8085 is

(A) 4

(B) 5

(C) 6

(D) 3

13. The Java compiler translates source code into

(A) Machine Code

(B) Assembly Code

(C) Byte Code

(D) All of the above

14. Object-Modelling Technique was proposed by

(A) Booch

(B) Rambaugh

(C) Jacobson

(D) All of the above

15. The following scheduling algorithm is inherently pre emptive

(A) FCFS

(B) SJF

(C) LJF

(D) Round Robin

16. An Abstract Data Type (ADT) is

(A) same as an abstract class

(B) a data type that cannot be instantiated

(C) a data type for which only the operations defined on it can be used

(D) all of the above

17. In a paged memory the page hit ratio is 0.35. The time required to access a page in secondary memory is equal to 100 nsec. The time required to access a page in primary memory is 10 nsec. The average time required to access a page is

(A) 55 nsec.

(B) 68 nsec.

(C) 68.5 nsec.

(D) 78.5 nsec.

18. _____ abstraction is a named sequence of instructions that has a specific and limited function.

(A) Procedural

(B) Data

(C) Control

(D) Physical

19. A process executes the code

fork ( ) ;

fork ( ) ;

fork ( ) ;

fork ( ) ;

The total number of child processes created is

(A) 4

(B) 15

(C) 7

(D) 5

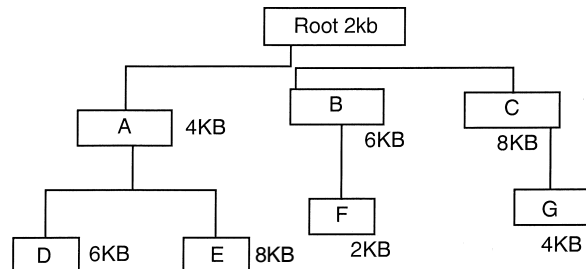**20.** If A = { 0, 1 }, then the number of possible strings of length 'n' is

(A) n !

(B) $n \times n$

(C) n^n

(D) 2^n

21. The overlay tree for a program is given below. What will be the size of the physical memory partition required to load and run the program ?

(A) 8 KB

(B) 20 KB

(C) 12 KB

(D) 14 KB

22. The complexity of inter connection among modules is described by

(A) Cohesion

(B) Temporal cohesion

(C) Logical cohesion

(D) Coupling

23. A 1000 K byte memory is managed using variable partitions but to compaction. It currently has two partitions of sizes 200 K bytes and 340 K bytes respectively. The smallest allocation request in K bytes that could be denied is for

(A) 380

(B) 520

(C) 481

(D) 461

24. The grammar guaranteed by production rules

$S \rightarrow a\, SBc$, $CB \rightarrow BC$, $aB \rightarrow aa$ is

(A) $a^n b^n c^n$, $n \geq 1$

(B) $a^n b^n c^n$, $n \geq 0$

(C) $a^n b^n c^n$, $n > 0$

(D) $a^n b^n c^n$, $n \leq 0$

25. The following page replacement algorithms suffer from Belady's anomaly.

I. Optimal replacement

II. LRU

III. FIFO

IV. MRU

(A) I and IV correct   (B) I and III correct

(C) II and III correct   (D) II and IV correct

26. Given the basic ER and relational models, which of the following is INCORRECT ?

(A) An attribute of an entity can have more than one value

(B) An attribute of an entity can be composite

(C) In a row of a relational table, an attribute can have more than one value

(D) In a row of a relational table, an attribute can have exactly one value or a NULL value

27. The algorithm used for searching AND-OR graph is

(A) A*

(B) AO*

(C) Iterative deepening A*

(D) Iterative deepening AO*

28. The PROJECT operator of a relational algebra creates a new table that has always

(A) More number of columns than original table

(B) More number of rows than the original table

(C) Same number of rows as the original table

(D) Same number of columns as the original table

29. The Natural Language sentence will be represented in NLP with

I. ATN

II. RTN

III. FPL

IV. FRAMES

(A) III, IV

(B) IV, I

(C) I, II

(D) II, III

30. The file organization in which the physical location of a record is determined by a Mathematical function that maps the key to address of the record is

(A) Hashed file organization

(B) B Tree file organization

(C) B′ Tree file organization

(D) Sequential file organization

31. Consider the following statements about the cyclomatic complexity of the control flow graph of a program module. Which of these are TRUE ?

  i. The cyclomatic complexity of a module is equal to the maximum number of linearly independent circuits in the graph.

  ii. The cyclomatic complexity of a module is the number of decisions on the module plus one. Where a decision is effectively any conditional statement in the module.

  iii. The cyclomatic complexity can also be used as a number of linearly independent paths that should be tested during path coverage testing

(A) i and ii

(B) ii and iii

(C) i and iii

(D) i, ii and iii

32. Which of the sorting algorithm is the slowest ?

(A) Bubble sort

(B) Quick sort

(C) Shell sort

(D) Heap sort

33. The approach used in top-down analysis and design is

(A) to identify the top level functions by combining many smaller components into a single entity

(B) to identify a top level function and then create a hierarchy of lower level modules and components

(C) to prepare flowcharts after programming has been completed

(D) all of the above

34. Match the following :

I. Flow control   1. Token Bucket

II. Error control   2. Sliding window

III. Congestion control 3. Manchester encoding

IV. Synchronization   4. Parity bit

	I	II	III	IV
(A)	2	4	1	3
(B)	3	4	2	1
(C)	4	2	1	3
(D)	1	4	2	3

35. Slow start is a technique used by the TCP to reduce

(A) Number of buffers

(B) Number of timers

(C) Number of TCP connections

(D) Number of timeouts of segments

36. A B-Tree used as an index for a large database table has four levels including root node. If a new key is inserted in this index, then the maximum number of nodes that could be newly created in the process are

(A) 5

(B) 4

(C) 3

(D) 2

37. Consider the following proportional statements

$P_1 : ((A \wedge B) \rightarrow C) \equiv ((A \rightarrow C) \wedge (B \rightarrow C))$

$P_2 : ((A \vee B) \rightarrow C) \equiv ((A \rightarrow C) \vee (B \rightarrow C))$

Which one of the following are true ?

(A) P_1 is tautology, but not P_2

(B) P_2 is tautology, but not P_1

(C) P_1 and P_2 are tautologies

(D) Both P_1 and P_2 are not tautologies

38. What is difference between a Java applet and a Java application ?

(A) An application can in general be trusted whereas an applet can't

(B) An applet must be executed in a browser environment

(C) An applet is not able to access the files of the computer it runs on

(D) All of the above

39. The following machine will accept the string
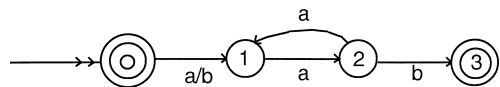
(A) aaab

(B) aabab

(C) baaab

(D) bab

40. Types of validation testing

(A) Alpha and Beta Testing

(B) Top down and Bottom up testing

(C) Recovery and Integrity testing

(D) All the above

41. Choose the correct answer, the protocols which returns IP address.

    I. ARP

    II. RARP

    III. HTTP

    IV. DNS

(A) I and II correct

(B) All correct

(C) I, II, III correct

(D) II and IV correct

42. Assuming $P \neq NP$, which of the following is TRUE ?

(A) NP – complete = NP

(B) NP – complete nP = ϕ

(C) NP – hard = NP

(D) P = NP – Complete

43. What is the appropriate pairing of items in the two columns, listing various activities encountered in a software life cycle ?

P. Requirements capture	1. Module Development and Integration
Q. Design	2. Domain analysis
R. Implementation	3. Structural Behavioural Modelling
S. Maintenance	4. Performance Tuning

(A) P – 3, Q – 2, R – 4, S – 1

(B) P – 2, Q – 3, R – 1, S – 4

(C) P – 3, Q – 2, R – 1, S – 4

(D) All of the above

44. In UNIX, when the read system call encounters EOF, it returns

(A) Some positive integer

(B) Positive integer related to error code

(C) 0

(D) –1

45. Which of the following regular expression identities are true ?

(A) $(r')^1 = r$

(B) $(r's')^1 = (r + s)^1$

(C) $(r + s)^1 = r' + s'$

(D) $r's' = r' + s'$

46. The message 11001001 is to be transmitted using the CRC polynomial $x^3 + 1$ to protect it from errors. The message that should be transmitted is

(A) 11001001000

(B) 11001001011

(C) 11001010

(D) 110010010011

47. _____ is black box testing method.

(A) Boundary value analysis

(B) Basic path analysis

(C) Code validation analysis

(D) All of the above

48. If the hamming distance is 'm' then the number of errors that can be corrected is

(A) Equal to 'm'

(B) Less than m/2

(C) Equal to 2 m

(D) Greater than 2 m

49. What is the maximum number of I/O devices that can be interfaced to 8085 ?

(A) 64

(B) 8

(C) 32

(D) 256

50. Compression Ratio is defined as

(A) 1 – (compressed size/uncompressed size)

(B) compressed size/uncompressed size)

(C) 1 – (compressed data rate/ uncompressed data rate)

(D) All of the above

51. Neural Networks are models of

(A) Decision making system

(B) Data processing system

(C) Control systems

(D) Biological nervous systems

Question No.'s 52 and 53

Disk requests come to a disk drive for cylinders 10, 22, 20, 2, 40, 6 and 36 in that order at a time when the disk drive is reading from cylinder 20. The seek time is 6 ms per cylinder. The disk can be rotated either clockwise or counter clockwise.

52. The total seek time if the disk arm scheduling algorithm is first-cum-first-served.

(A) 360 msec.

(B) 850 msec.

(C) 876 msec.

(D) 900 msec.

53. If the scheduling algorithm is closest cylinder next, then the total will be

(A) 360 msec.

(B) 876 msec.

(C) 900 msec.

(D) 330 msec.

Question No.'s 54, 55 and 56

The next three questions are based on Huffman's coding for the symbol A with probability 0.3, B with 0.15, C with 0.1, D with 0.25 and E with 0.2.

54. The minimum number of bits required to represent B is

(A) 1   (B) 2

(C) 3   (D) 4

55. The minimum number of bits required to represent all the symbols together is

(A) 14

(B) 11

(C) 12

(D) 15

56. The average code length of the given problem is

(A) 2

(B) 2.25

(C) 2.45

(D) 3

57. Character Recognition is application of

(A) Fuzzy Logic

(B) Neural Networks

(C) Genetic Algorithm

(D) Logic

58. Inference Engine consists of

  I. Facts

  II. User Interface

  III. Search

  IV. Domain Expert

(A) I, II

(B) II, III

(C) I, III

(D) II, IV

59. With regarding to exceptions following is TRUE

(A) Raised by program

(B) Raised by user

(C) Raised by OS

(D) Raised by program and OS

60. Which of the following concurrency control protocols ensure both conflict serializability and freedom from dead deadlock

  I. 2 – phase locking

  II. Time-stamp ordering

(A) I only

(B) II only

(C) Both I and II

(D) Neither I nor II

61. The following system calls are related to file operations in UNIX

    I.   Signal

    II. Kill

    III. Seek

    IV. Unlink

    (A) I and III correct

    (B) III and IV correct

    (C) II and III correct

    D) II and IV correct

62. HTML (Hyper Text Markup Language) has language elements which permit certain actions other than describing the structure of the web document. Which one of the following actions is not supported by pure HTML (without any server or client side scripting) pages ?

    (A) Embed web objects from different sites into the same page

    (B) Refresh the page automatically after a specified interval

    (C) Automatically redirect to another page upon download

    (D) Display the client time as part of the page

63. Search engine is a _____ agent.

    (A) Learning

    (B) Negotiation

    (C) Intelligent

    (D) Business

64. The commonly used UNIX commands like date, ls, cut etc. are stored in

    (A) / dev directory

    (B) / sys directory

    (C) / unix directory

    (D) / bin and /usr/bin directory

65. ADO stands for

    (A) Active × Data Object

    (B) Active × Dynamic Object

    (C) Active × Downloadable Object

    (D) Active × Durability Object

66. If f is a linear transformation from the plane to the real numbers and if f(1, 1) = 1 and f(−1, 0) = 0 then f (3, 5) =

    (A) − 6

    (B) − 5

    (C) 0

    (D) 9

67. Fuzzy Logic is proposed by

(A) MAMDHANI

(B) ZADEH

(C) MUZIMITO

(D) TANAKA

68. If the inorder and postorder traversal results of a binary tree are A, C, B, F, E, D, G and A, B, C, E, G, D, F respectively. Identify the root node of it.

(A) A

(B) D

(C) C

(D) F

69. NLP includes problems

(A) in which the objective function is linear but some constraints are not linear

(B) in which the constraints are linear but the objective function is not linear

(C) in which both the objective function and all the constraints are not linear

(D) all of the above

70. Class C is inherited from Class A and Class B, Class D is inherited from Class C Which of the following is true ?

  I. Class C inherits Class A attributes

  II. Class C inherits Class B attributes

  III. Class D inherits Class B attributes only

  IV. Class D inherits Class A attributes only

(A) I, II

(B) I, II, III, IV

(C) I, III

(D) None of the above

71. Which of the following is an assertion ?

(A) P is true, P and Q are true and K or not (Q) is true implies K is true

(B) P is true, P and Q are true and K or not (Q) is true implies K is false

(C) P is true, P and Q are false and K or not (Q) is true implies K is true

(D) P is true

72. In 8085, the addressing mode used for LDAX rp instruction is

(A) Direct

(B) Indirect

(C) Register

(D) Immediate

73. Given an arbitrary Non-deterministic Finite Automation (NFA) with N states, the maximum number of states in an equivalent minimized DFA is atleast

(A) N^2

(B) 2^N

(C) $2N$

(D) $N!$

74. The maximum packet size of IPV_4 is

(A) 1500 bytes

(B) 2 MB

(C) 65535 bytes

(D) 48 bytes

75. Which of the following statements are TRUE about an SQL query ?

P : An SQL query can contain a HAVING clause even if it doesnot have a GROUP by clause.

Q : An SQL query can contain a HAVING clause only if it has GROUP by clause.

R : All attributes used in the GROUP by clause must appear in the SELECT clause.

S : Not all attributes used in the GROUP by clause need to appear in the SELECT clause.

(A) P and R

(B) P and S

(C) Q and R

(D) Q and S

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A-04-03