Test Paper : **II**
Test Subject : **COMPUTER SCIENCE AND APPLICATIONS**
Test Subject Code : **K-2413**

Test Booklet Serial No. : _____
OMR Sheet No. : _____
Roll No. | | | | | | | | |
(Figures as per admission card)

Name & Signature of Invigilator/s

Signature: _____ Signature : _____
Name : _____ Name : _____

Paper : II
Subject : COMPUTER SCIENCE AND APPLICATIONS

Time : 1 Hour 15 Minutes Maximum Marks : 100

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

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

1. ಈ ಪುಟದ ಮೇಲ್ತುದಿಯಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
2. ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ಐವತ್ತು ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
3. ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ, ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪುಸ್ತಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರೀಕ್ಷಿಸಲು ಕೋರಲಾಗಿದೆ.
   (i) ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆಗೆ ಪ್ರವೇಶಾವಕಾಶ ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ಟಿಕ್ಕರ್ ಸೀಲ್ ಇಲ್ಲದ ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆ ಸ್ವೀಕರಿಸಬೇಡಿ. ತೆರೆದ ಪುಸ್ತಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
   (ii) **ಪುಸ್ತಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳೆ ನೋಡಿರಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ, ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿಲ್ಲದ ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪುಸ್ತಿಕೆಯನ್ನು ಕೂಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವೀಕ್ಷಕರಿಂದ ಸರಿ ಇರುವ ಪುಸ್ತಿಕೆಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ, ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.**
4. ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕಪ್ಪಾಗಿಸಬೇಕು.
   ಉದಾಹರಣೆ: (A) (B) ● (D)
   (C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
5. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ರಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ, **ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ಮತ್ತು ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ II ರಲ್ಲಿ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು.** OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಅಂಡಾಕೃತಿಯಲ್ಲದೆ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
6. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
7. ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪುಸ್ತಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
8. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆದರೆ, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗಿರುತ್ತೀರಿ.
9. ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವೀಕ್ಷಕರಿಗೆ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಹೊರಗೆ OMR ನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯ ಕೂಡದು.
10. ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
11. **ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್‌ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.**
12. **ಕ್ಯಾಲ್ಕುಲೇಟರ್ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.**
13. **ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.**

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.**
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval 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 questions are to be indicated in the **OMR Sheet kept inside the Paper I Booklet only**. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.
6. Read the instructions given in OMR 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 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. You can take away question booklet and carbon copy of OMR Answer Sheet soon after the examination.
11. **Use only Blue/Black Ball point pen.**
12. **Use of any calculator or log table etc., is prohibited.**
13. **There is no negative marks for incorrect answers.**

COMPUTER SCIENCE AND APPLICATIONS
Paper – II

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

1. Let A = Z^+, the positive integers, and R be the relation defined by aRb if and only if there exists a K in Z^+ so that a = b^K (k depends on a and b). Which of the following belong to R ?

(A) (4, 16)

(B) (1, 7)

(C) (8, 2)

(D) (2, 8)

2. If R = [(a, d), (b, c), (c, a), (d, e)] is a relation on A = [a, b, c, d, e], then R is a tree with root.

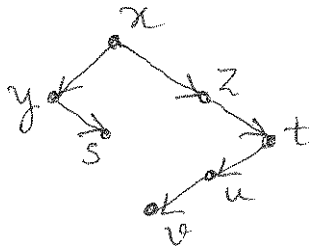
(A) a

(B) c

(C) d

(D) b

3. The result of performing a post order search of the tree with the following digraph is



(A) xysztuv

(B) xztysuv

(C) yxzstuv

(D) syvutzx

4. If (S, *) is a semigroup, where S = [1, 2, 3, 6, 12] and * is defined by : a * b = GCD (a, b). Then, S is appropriately characterized as

(A) monoid

(B) commutative

(C) commutative monoid

(D) commutative monoid with identity 12

5. If e is the (2, 5) encoding function defined by

e (00) = 00000

e (01) = 00111

e (10) = 01110

e (11) = 11111

then the number of errors detected by e is

(A) 1

(B) 0 or 1

(C) 2

(D) 2 or fewer

6. A microprocessor has memory location from 0000 to 3FFF. Each memory location stores 1 byte. How many bytes can the memory store ?

(A) 4095

(B) 16384

(C) 32740

(D) 46040

7. Which of the following input combinations is not allowed in an SR flip-flop ?
   (A) S = 0 R = 0
   (B) S = 0 R = 1
   (C) S = 1 R = 1
   (D) None of the above

8. How many full address are required to construct an m – bit parallel adder ?
   (A) m/2 (B) m + 1
   (C) m (D) m – 1

9. Which logic family dissipates the minimum power ?
   (A) TTL (B) ECL
   (C) CMOS (D) DTL

10. The remainder obtained from 11011.10 ÷ 101 is
   (A) 01 (B) 10
   (C) 11 (D) 00

11. A C++ operator that works in a special way on a newly defined data type is said to be
   (A) encapsulated (B) classified
   (C) polymorphed (D) overloaded

12. Consider the following elements 14, 'd', 3.268, galaxy, galaxy ( ). In that sequence they represent
   (A) constant, ASCII, numeral, variable, function
   (B) integer constant, character constant float point constant, identifier or variable, function name
   (C) numeral constant, alpha constant, numeral variable, function name, mathematical function
   (D) none of the above

13. The library function exit ( ) causes an exit from
   (A) the loop in which it occurs
   (B) the block in which it occurs
   (C) the program in which it occurs
   (D) the function in which it occurs

14. A structure brings together a group of
   (A) related data types and variables
   (B) items of the same data type and variables
   (C) integers with user defined names
   (D) variables only

15. The most important role of a function is
   (A) provide a name to a block of code
   (B) just help in reducing the size of code
   (C) help organise a program into conceptual units and thereby possibly to reduce the program size
   (D) accept arguments and return a value

16. Classes are useful because they are best known for the following
   (A) permit data to be hidden from other classes
   (B) bring together all aspects of an entity in one place
   (C) can closely models objects in the real world
   (D) all the above (A, B, C)

17. A specialization with a constraint that a subclass can be a subclass in more than one class/subclass relationship is referred to as
   (A) specialization lattice
   (B) specialization hierarchy
   (C) total specialization
   (D) none of the above

18. The data structures used for indexing in multiple key access methods are

(A) B – tree

(B) B^+ – tree

(C) hash data structure

(D) none of the above

19. A relation schema R is an 3NF if every nonprime attribute of R is

(A) fully functionally dependent on every key of R

(B) non-transitively dependent on every key of R

(C) both (A) and (B)

(D) partially dependent on primary key

20. The operation that selects certain columns from a relational table and discards the other columns is

(A) PROJECT

(B) SELECT

(C) INTERSECTION

(D) None of the above

21. The SQL function that specifies universal quantifier in relational calculus is

(A) EXISTS

(B) NOT EXISTS

(C) UNION

(D) DIVISION

22. Assume a 2 – d array having m rows and n – columns. It is required to swap i^{th} column and j^{th} column. Which of the following statement is not true ?

(A) A 1 – d array of m elements is required

(B) A statement such as A (K, i) for K $\leftarrow$ 1 to m will be utilised

(C) The computing time is 0 (m)

(D) Copy the contents of i^{th} column into j^{th} column and vice versa

23. Assume a square array of size n×n. What should be the algorithmic segment to go through lower triangular elements

(A) for i $\leftarrow$ 1 to n do for j $\leftarrow$ 1 to i

(B) for i $\leftarrow$ 1 to n do for j $\leftarrow$ i to n

(C) for i $\leftarrow$ 1 to n do for j $\leftarrow$ 1 to n

(D) for i $\leftarrow$ 1 to n do for j $\leftarrow$ n down to i

24. If the earliest computing time for an unsuccessful search is 1 then the type of search and the corresponding data type could be

(A) binary search in 1 – d array of sorted elements

(B) linear search in 1 – d array of unsorted elements

(C) linear search in 1 – d array of sorted elements

(D) in all above mentioned three cases

25. The structure of a heap should be

(A) A tree

(B) A complete binary tree

(C) A graph

(D) A binary tree

26. In-order, Pre-order and Post-order traversals are associated with

(A) any graph having n vertices and more than n edges

(B) any graph which is connected and in which there is one and only one path between any two vertices

(C) any graph which is circuitless and connected and one vertex is root or reference vertex

(D) any graph which has n vertices and less than n edges

27. The total number of pendant vertices in a full binary tree of n vertices is

(A) $\frac{n}{2}$ (B) $\frac{(n-1)}{2}$

(C) $\frac{n}{2}+1$ (D) $\frac{n+1}{2}$

28. If a binary signal is sent over a 3 KHz channel whose signal-to-noise ratio is 20 dB. What is the maximum achievable data rate ?

(A) 3 Kbps (B) 4 Kbps

(C) 5 Kbps (D) 6 Kbps

29. A laser beam 1 mm wide is aimed at a detector 1 mm wide 100 m away on the roof of a building. How much of an angular diversion (in degrees) does the laser have to have before it misses the detector ?

(A) 0.00057 degrees

(B) 0.00067 degrees

(C) 0.00077 degrees

(D) 0.00087 degrees

30. Which best describes a router ?

(A) Acts as a multi-port repeater and occupies the center of a star topology network

(B) Extends the operating distance of a network by clearing and amplifying signals

(C) Screens network traffic based on source and destination MAC addressing

(D) Forwards packets from one network to another based on network layer information

31. What does the twisting of the wires do in a CAT-5 cable ?

(A) Reduces noise problems

(B) Make it thinner

(C) Make it less expensive

(D) Allow 6 pairs to fit in the space of 4 pairs

32. What happens to packets that are involved in a collision ?

(A) The packets return to the originator

(B) The packets destroyed bit by bit

(C) The packets continue on to the target device with corrupt data

(D) None of the above

33. The postfix notation for (8 – 5) + 3 is

(A) 85 – 3 +

(B) 853 – +

(C) 853 + –

(D) none of the above

34. Which of the following tool is referred to as parser generator ?

(A) LEX
(B) TeX
(C) YACC
(D) None of the above

35. The resolution of external references in an object module generated by a compiler is done by

(A) loader
(B) compiler
(C) linker
(D) all the above three : (A), (B) and (C)

36. The automatic garbage collection refers to

(A) allocation of memory to unreachable data
(B) deallocation of memory to unreachable data
(C) allocation of memory to reachable data
(D) deallocation of memory to reachable data

37. In directed acyclic graph for expressions, the following is true

(A) leaves correspond to atomic operands and interior nodes correspond to operators
(B) leaves correspond to operators and interior nodes correspond to operands
(C) operands and operators correspond to alternate nodes on a path
(D) none of the above

38. Suppose a new process in a system arrives at an average of six processes per minute and each process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor

(A) 60% (B) 70%
(C) 80% (D) 90%

39. A file has several lines of data. How can we get the line of data whose following line has a string pattern "AAA" in it

(A) /AAA/ {print $0}
(B) ? AAA/ {print $1}
(C) /AAA ? {print $ 0}
(D) /AAA/ {print $1}

40. Thrashing

(A) is a natural consequence of virtual memory system
(B) can always be avoided by swapping
(C) can be caused by poor paging algorithms
(D) none of the above

41. Addresses in sed can be in one out of how many types

(A) one (B) two
(C) three (D) four

42. In unix system default permission for a file and directory is

(A) 666, 777
(B) 555, 666
(C) 777, 666
(D) 666, 555

43. The linear sequential model in Software Engineering is

(A) Prototype modeling

(B) Waterfall modeling

(C) Incremental modeling

(D) Spiral modeling

44. Top-down divide strategy is employed in Software Engineering for

(A) to refine the statement of the problem in terms of decomposed partitions of the problem

(B) to draw specification requirements

(C) to estimate the software cost

(D) to collect the data to test a code

45. Software metrics enable

(A) clarity in understanding the problem

(B) assessing the skill sets of the software team involved

(C) improving the entire software process-planning, tracking and controlling

(D) pre-empting the bugs in a software

46. Software testing conducted at the modular interface refers to

(A) on-site testing

(B) white box testing

(C) first release testing

(D) black box testing

47. Modularity in Software Engineering

(A) is a feature because of top-down design

(B) helps make large programs more understandable

(C) both (A) and (B)

(D) neither (A) nor (B)

48. A Data-Cube is an example for

(A) Data Warehouse

(B) Data generation

(C) Data transformation

(D) None of the above

49. Principal components best define the following

(A) Data integration

(B) Data selection

(C) Data transformation

(D) Data cleaning

50. Geographic Information System (GIS) typically works with

(A) Historic data of the area

(B) Spatial data of the area

(C) Data of an area gathered through questionnaire

(D) Only (A) and (C)

ಚಿತ್ತು ಬರಹಕ್ಕಾಗಿ ಸ್ಥಳ
Space for Rough Work