Test Booklet No.
प्रश्नपत्रिका क्र.

**F**

# Paper-II
# COMPUTER SCIENCE AND APPLICATION

**Signature and Name of Invigilator**

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | |

(In figures as in Admit Card)

Seat No. .....

(In words)

OMR Sheet No. | | | | | | |

(To be filled by the Candidate)

**AUG - 37215**

**Time Allowed : 1¼ Hours]** **[Maximum Marks : 100**

Number of Pages in this Booklet : **16** Number of Questions in this Booklet : **50**

**Instructions for the Candidates**

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. This paper consists of **50** objective type questions. Each question will carry *two* marks. *All* questions of Paper-II will be compulsory, covering entire syllabus (including all electives, without options).
3. At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
   (*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 or 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 missing pages/ questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.**
   (*iii*) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each question 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.

   (A) (B) ● (D)

5. Your responses to the items are to be indicated in the **OMR Sheet given inside the 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 at the end of this booklet.
8. If you write your Name, Seat 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 original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and 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 marking for incorrect answers.**

**विद्यार्थ्यांसाठी महत्त्वाच्या सूचना**

1. परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत **50** बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
   (*ii*) **पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चूकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.**
   (*iii*) वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
   **उदा. :** जर (C) हे योग्य उत्तर असेल तर.

   (A) (B) ● (D)

5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहीलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. **फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
11. **कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
12. **चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

# Computer Science and Application

## Paper II

**Time Allowed : 75 Minutes]** **[Maximum Marks : 100**

**Note :** This paper contains **Fifty (50)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

1. Let $\Sigma = \{a, b\}$ be an alphabet. The strings of length seven over $\Sigma$ are listed in dictionary (lex) order. What is the first string after 'aaaabaa' that is a PALINDROME (which is same read forwards and backwards) ?

   (A) aaaabab

   (B) aaabaaa

   (C) aababaa

   (D) aabbbaa

2. The binary relation, $R = \{(0, 0), (1, 1)\}$ on $A = \{0, 1, 2, 3\}$ is :

   (A) Reflexive, Not Symmetric, Transitive

   (B) Not Reflexive, Symmetric, Transitive

   (C) Reflexive, Symmetric, Not Transitive

   (D) Reflexive, Not Symmetric, Not Transitive

3. For which of the following does there exist a tree satisfying the specified constraints ?

   (A) A full binary tree with 31 leaves, each leaf of height 5.

   (B) A rooted tree of height 3 where every vertex has at most 3 children and there are 41 total vertices.

   (C) A full binary tree with 11 vertices and height 6.

   (D) A binary tree with 2 leaves and height 100.

4. Match all items in List I with *correct* options from those given in List II. Choose the *correct* answer from the codes given below :

| | List I | | List II |
|---|---|---|---|
| (P) | Regular Expression | (1) | Syntax analysis |
| (Q) | Push down automata | (2) | Code generation |
| (R) | Dataflow analysis | (3) | Lexical analysis |
| (S) | Register allocation | (4) | Code optimization |

*Codes* :

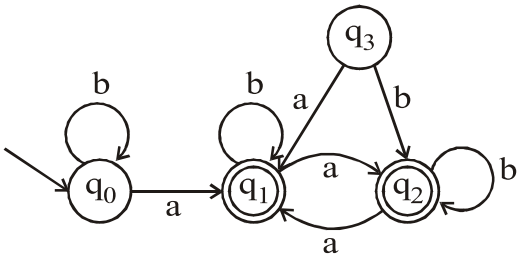
(A) (P)–(4), (Q)–(1), (R)–(2), (S)–(3)

(B) (P)–(3), (Q)–(1), (R)–(4), (S)–(2)

(C) (P)–(3), (Q)–(4), (R)–(1), (S)–(2)

(D) (P)–(2), (Q)–(1), (R)–(4), (S)–(3)

5. Consider the following Finite State Automaton :




The language accepted by this automaton is given by the regular expression :

(A) b*ab*ab*ab

(B) (a+b)*

(C) b*a(a+b)*

(D) b*ab*ab

6. Using binary arithmetic, a number c is computed by taking the n-bit two's complement of 'a – b'. If n is eleven, a = $10100001001_2$ and b = $10101_2$ then c = ?

(A) $01100001111_2$

(B) $01100001100_2$

(C) $01100011100_2$

(D) $01000111100_2$

7. Consider the following :

m = "Jack is a math major,"

c = "Jack is a computer science major,"

g = "Jack's friend is a literature major,"

h = "Jack's friend has read Shakespeare's Hamlet," and

t = "Jack's friend has read Shakespeare's The Tempest."

Which of the following expresses the statement "Jack is a computer science major and a math major, but his friend is a literature major who hasn't read Shakespeare's both The Tempest and Hamlet" ?

(A) $c \wedge m \wedge (g \vee (\sim h \vee \sim t))$

(B) $c \wedge m \wedge g \wedge (\sim h \wedge \sim t)$

(C) $c \wedge m \wedge g \wedge (\sim h \vee \sim t)$

(D) $c \wedge m \wedge (g \vee (\sim h \wedge \sim t))$

8. In a half-adder, CARRY is obtained by using :

(A) OR gate

(B) NAND gate

(C) EX-OR gate

(D) AND gate

9. A circuit produces 1's complement of the input word, one application is binary subtraction. It is called :

(A) Logic gate

(B) Register

(C) Multiplexer

(D) BCD converter

10. When an inverter is placed between both inputs of an SR flip-flop, then resulting flip-flop is :

(A) JK flip-flop

(B) D flip-flop

(C) SR flip-flop

(D) Master slave JK flip-flop

11. Explicit call to a constructor means ?

(A) Not providing the construction name at all

(B) Is the shorthand method

(C) Providing the constructor name explicitly to invoke it

(D) Providing the constructor name implicitly to invoke it

12. A class having no public constructors is :

(A) A public protected class

(B) A public class

(C) A protected class

(D) A private class

13. Pick out the *correct* statement :

(A) A derived class's constructor cannot explicitly invoke its base class's constructor.

(B) A derived class's destructor cannot invoke its base class's destructor.

(C) A derived class's destructor can invoke its base class's destructor.

(D) None of the mentioned

14. How do we declare an interface class ?

(A) By declaring the class as interface with keyword interface

(B) By making all the methods abstract using the keyword abstract in the class

(C) By making all the methods pure virtual in the class

(D) It is not possible to create interface classes in C++

15. In which header file is the NULL macro defined ?

(A) stdio.h

(B) stddef.h

(C) stdio.h and stddef.h

(D) math.h

16. A value that appears in one relation for a given set of attributes also appears for a certain set of attributes in another relation :

(A) Integrity constraints

(B) Referential-Integrity constraints

(C) Domain constraints

(D) Assertions

17. Consider relations student and takes :

student(id, name, dept-name, tot_cred)

takes(id, course_id, sec_id, semester, year, grade)

Choose the *correct* query for "Find all students who have not taken any course".

(A) Select id from student natural left outer join takes where course-id is null

(B) Select id from student natural right outer join takes

(C) Select * from student natural right outer join takes

(D) Select * from student join takes on student.id = takes.id

18. If $\alpha \rightarrow \beta$ holds and $\nu\beta \rightarrow \delta$ holds, then $\alpha\nu \rightarrow \delta$ holds.

Which rule of Armstrong's axioms satisfies this property ?

(A) Reflexivity Rule

(B) Transitivity Rule

(C) Union Rule

(D) Pseudotransitivity Rule

19. The number of possible variations of connectivity in *n*-ary relationship is :

(A) $n + 2$

(B) $n + 1$

(C) $n - 3$

(D) $n + 3$

20. Which construct can be used to perform multiple updates with a single update statement in SQL ?

(A) if then else

(B) case

(C) if then elsif

(D) for loop

21. The terms PUSH and POP are related to :

(A) Arrays

(B) Stacks

(C) Linked list

(D) Queue

22. The postfix expression for *+ab–cd is :

(A) ab+cd – *

(B) abcd + – *

(C) ab+cd*–

(D) ab+ – cd*

23. Data warehouse bus matrix is a combination of :

(A) Dimensions and data marts

(B) Dimensions and facts

(C) Facts and data marts

(D) Dimensions and detailed facts

24. A hash table has space for 100 records. What is probability of collision before the table 10% full ?

(A) 0.45

(B) 0.5

(C) 0.3

(D) 0.34

25. In what features, the data link layer and transport layer are common :

(A) Both layers can provide recovery from transmission errors

(B) Both layers can provide flow control

(C) Both layers can multiplexing

(D) Options (A), (B) and (C) only

26. Does the Ethernet support connection oriented and connectionless services, both :

(A) It depends on configuration

(B) No, connectionless only

(C) No, connection oriented only

(D) Both (B) and (C)

27. Formal analysis of protocols is an important part of establishing confidence in the correctness of proposed communications products. The tools that are widely used in formal analysis are :

(A) Petri net model

(B) Finite State Machine

(C) Options (A) and (B)

(D) CRC model

28. The role of bit stuffing in DLL for frame transmission is to :

(A) Avoid abnormal interpretation of header preamble occurring in data pay load

(B) To improve the error checking and correcting mechanism

(C) To make robust checking mechanism compared to checksum

(D) It is to avoid the CRC check

29. The ALOHA protocol is used to share a 56-kbps satellite channel. Suppose that frames are 1000 bits long. Find the maximum throughput of the system in frames/second.

(A) 13

(B) 12

(C) 10

(D) 11

30. A Compiler-Compiler is a/an :

(A) Compiler, which compiles a compiler program

(B) Software tool used in automatic generation of a compiler

(C) Compiler written in the same language it compiles

(D) Another name for cross compiler

31. Which of the following statements is *true* ?

(A) SLR is more powerful than LALR

(B) LALR is more powerful than canonical LR

(C) Canonical LR is more powerful than LALR parser

(D) The SLR, canonical CR and LALR have same power

32. Context-free languages are :

(A) Closed Under Union

(B) Closed Under Complementation

(C) Closed Under Intersection

(D) Closed Under Kleene Closure

33. To overcome the problems of the assembler in dealing with branching code we use :

(A) Interpreter

(B) Debugger

(C) OP-Assembler

(D) Two-pass Assembler

34. Generation of intermediate code based on an abstract machine model is useful in compilers because :

(A) It makes implementation of lexical analysis and syntax analysis easier

(B) Syntax-directed translations can be written for intermediate code generation

(C) It enhances the portability of the front end of the compiler

(D) It is not possible to generate code for real machines directly from high level language program

35. Consider the 3 processes, P1, P2 and P3 shown in the table :

| Process | Arrival time | Time units required |
|---|---|---|
| P1 | 0 | 5 |
| P2 | 1 | 7 |
| P3 | 3 | 4 |

The completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units) are :

(A) FCFS : P1, P2, P3;
RR2 : P1, P2, P3

(B) FCFS : P1, P3, P2;
RR2 : P1, P3, P2

(C) FCFS : P1, P2, P3;
RR2 : P1, P3, P2

(D) FCFS : P1, P3, P2;
RR2 : P1, P2, P3

36. A thread is usually defined as a "light weight process" because an operating system maintains smaller data structures for a thread than for a process. In relation to this, which of the following is *true* ?

(A) On per-thread basis, the OS maintains only CPU register state

(B) The OS does not maintain a separate stack for each thread

(C) On per-thread basis, the OS does not maintain virtual memory state.

(D) On per-thread basis, the OS maintains only scheduling and accounting information

37. For every successful login, which script will be executed ?

(A) /etc/inittab

(B) /etc/profile

(C) /etc/login

(D) /etc/init

38. The first thing that is searched when a command references a file is its :

(A) i-node

(B) i-node number

(C) permission setting

(D) directory entry

39. As per software engineering process, one of the attributes of good software is :

(A) Software's interface to user

(B) Software's response time to user querry

(C) Software's complexity level

(D) Software's services to user

40. In Software Engineering, code of ethics and professional practice is given by joint task force of :

(A) ANSI/IEEE-CS

(B) ACM/IEEE-CS

(C) ACM/ANSI-CS

(D) ACM/UTI-CS

41. In software engineering, one of the requirements included in software performance specification is :

(A) OOP

(B) Unified Modeling

(C) Reliability analysis

(D) Prototyping

42. In software engineering, structured approach to requirement analysis consists of :

(A) Hardware level requirement analysis and Software level requirement analysis

(B) Product level requirement analysis and System level requirement analysis

(C) System level requirement analysis and Software level requirement analysis

(D) System level requirement analysis and Hardware level requirement analysis

43. The software engineering discipline related with software production is concerned with :

(A) Practicalities of validating and delivering useful software

(B) Practicalities of validating and evolving useful software

(C) Practicalities of specifying and evolving useful software

(D) Practicalities of developing and delivering useful software

44. MPI stands for :

(A) Message Parallel Interface

(B) Multiple Passing Interface

(C) Message Passing Interface

(D) Member Passing Interface

45. FLOPS stands for :

(A) Functional Layout Operation Per Second

(B) Floating Operations Per Second

(C) Fluctuating Operations Per Seconds

(D) Function Living Operation Per Second

46. Increased security is the main advantage of the ..... IR system in wireless communication.

(A) Point-to-Multipoint

(B) Point-to-Point

(C) Multipoint to one point

(D) Multipoint to Multipoint Possibly

47. The data is stored, retrieved and updated in :

(A) OLAP

(B) OLTP

(C) SMTP

(D) FTP

48. An ..... system is market-oriented and is used for data analysis by knowledge workers, including managers, executives and analysts.

(A) OLAP

(B) OLTP

(C) ONGC

(D) FTP

49. Which of the following processes includes data cleaning, data integration, data selection, data transformation, datamining, pattern evolution and knowledge presentation ?

(A) KDD process

(B) ETL process

(C) KTL process

(D) MDX process

50. What is a mobile intelligent agent ?

(A) A mobile agent is needed for a computer to communicate with another computer over a network

(B) A mobile intelligent agent is an intelligent program that contains the clients requests

(C) A mobile intelligent agent is an intelligent robot used for communication

(D) None of the above

ROUGH WORK

ROUGH WORK