

Test Booklet No.

प्रश्नपत्रिका क्र.

F

Paper-II

COMPUTER SCIENCE AND APPLICATIONS

Signature and Name of Invigilator

Seat No.

(In figures as in Admit Card)

1. (Signature)

(Name)

Seat No.

(In words)

2. (Signature)

(Name)

OMR Sheet No.

(To be filled by the Candidate)

DEC - 37213

Time Allowed : 1¼ Hours]

[Maximum Marks : 100

Number of Pages in this Booklet : 12

Number of Questions in this Booklet : 50

Instructions for the Candidates

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- 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).
- 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 :
 - 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.
 - 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.**
 - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- 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)	(C)	(D)
-----	-----	-----	-----
- 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.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- 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.
- 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.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table, etc., is prohibited.**
- There is no negative marking for incorrect answers.**

विद्यार्थ्यांसाठी महत्वाच्या सूचना

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 50 बहुपर्याय प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
 - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
 - पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा 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.
 - वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळ/निळ्या करावा.
उदा. : जर (C) हे योग्य उत्तर असेल तर.

(A)	(B)	(C)	(D)
-----	-----	-----	-----
- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर टिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या टिकाणा व्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

DEC-37213/II

COMPUTER SCIENCE AND APPLICATIONS

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. Rook is a piece in chess which travels in straight line either vertically or horizontally. In how many ways a rook can go from south-east to north-west corner of 8×8 chess board if it travels only upwards or to the left ?

- (A) ${}^{14}P_7$
 (B) ${}^{14}C_7$
 (C) 2^7
 (D) $14!$

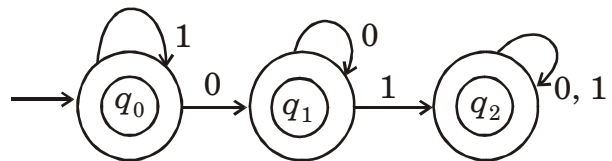
2. There are two sections in a question paper, each containing 5 questions. A student is required to answer 6 questions with at least *two* from each. In how many ways he/she can select the questions ?

- (A) 50
 (B) 100
 (C) 120
 (D) 200

3. For which languages given below, $L + = L * ?$

- (i) Null language
 (ii) Empty language
 (iii) $L = a^*$
 (iv) $L = aa^*$
 (A) (i) and (ii)
 (B) (i) and (iii)
 (C) (i), (ii) and (iii)
 (D) All of the above

4. The language accepted by the following DFA where $\Sigma = \{0, 1\}$ is :



- (A) Strings containing substring 01
 (B) Strings not containing substring 01
 (C) Strings starting with 0 and ending with 1
 (D) Strings starting with 0 and not ending with 1

5. If a planar graph has v vertices, e edges and f faces, then which of the following is *true* ?
- (A) $v + e = f + 2$
 (B) $e + f = v - 2$
 (C) $e - v + f = 2$
 (D) $v + f = e + 2$
6. Given— $E_x : x$ is an earth-like planet
 $L_x : x$ supports life
- Which of the following is equivalent of “Everything is an earth-like planet or nothing is an earth-like planet.”
- (A) $\forall x [E_x \vee \sim E_x]$
 (B) $\forall x [E_x] \vee [E_x]$
 (C) $\sim (\forall x) [E_x \vee \sim E_x]$
 (D) (A) and (B) but not (C)
7. PMOS transistors in parallel have corresponding NMOS transistors in series. While PMOS transistors in series have corresponding NMOS transistors in parallel.
- This is due to.....
- (A) Moore’s law
 (B) Amzalde’s law
 (C) De Morgan’s law
 (D) Thevenin’s equivalence in the circuit.
8. Simplify : $F(A, B, C) = \Sigma (0, 2, 4, 5, 6)$
- Result would be :
- (A) $f = C' + AB'$
 (B) $f = C + A'B$
 (C) $f = BC + AC'$
 (D) $f = AB' + AB'$
9. $(201)_{10} + (101)_3 =$
- (A) 211
 (B) 210
 (C) 402
 (D) 1102
10. A 9-bit binary number is converted into its octal equivalent. How many digits the octal number will have ?
- (A) 5
 (B) 4
 (C) 3
 (D) 9
11. Predict the output of the following C program :
- ```
include <stdio.h>
union A {
 char a;
 char b;
};
int main()
{
 union A a;
 a.a = 65;
 printf ("%c, %c", a.a, a.b);
 return 0;
}
```
- (A) 65, <garbage value>  
 (B) A, A  
 (C) A, <garbage value>  
 (D) syntax error

12. Predict the output of the following

C program :

```
include <stdio.h>
void foo(int nVal)
{
 int i;
 if (nVal)
 {
 nVal----
 foo(nVal);
 for(i=0;i<nVal;i++)printf(":*");
 }
 printf("\n");
}
int main()
{
 foo(4);
 return0;
}
```

- (A) \*  
\* \*  
\* \* \*
- (B) \* \* \*  
\* \*  
\*
- (C) \*  
\* \* \*  
\* \* \*
- (D) \* \* \*  
\*  
\* \*

13. Predict the output of the following

C code snippet :

```
int nVal1, nVal2;
float fResult;
nVal1 = 5; nVal2 =2;
fResult = nVal1/nVal2;
printf("%F", fResult);
```

- (A) 2.5  
(B) Compilation Error  
(C) Runtime Error  
(D) 2

14. With respect to C++ language, which of the following statement(s) is/ are true for a pointer but not for a reference ?

- (i) can be declared without initialization  
(ii) can be reassigned  
(iii) can contain a null value

Choose the *correct* option :

- (A) (i)  
(B) (i) and (ii)  
(C) (ii) and (iii)  
(D) (i), (ii) and (iii)

15. Pair the following C++ exceptions with their appropriate purposes :

| Exception         | Purposes                          |
|-------------------|-----------------------------------|
| (i) domain_error  | (a) violation of a precondition   |
| (ii) range_error  | (b) invalid range request         |
| (iii) bad_typeid  | (c) null pointer in an expression |
| (iv) out_of_range | (d) violation of a postcondition  |

- Choose the *correct* option :

- (i) (ii) (iii) (iv)
- (A) (a) (d) (c) (b)
- (B) (a) (b) (c) (d)
- (C) (d) (a) (b) (c)
- (D) (d) (c) (b) (a)
16. A weak entity type always has :
- (A) Partial participation constraint
- (B) No participation constraint
- (C) Total participation constraint
- (D) Either partial or total participation constraint
17. An attribute Y may be functionally dependent on :
- (i) a single attribute X ( $\neq$ Y)
- (ii) a composite attribute X, Y
- (iii) a composite of many attributes
- Choose the *correct* option :
- (A) (i)
- (B) (i) and (ii)
- (C) (i) and (iii)
- (D) (i), (ii) and (iii)

18. The query

```
SELECT * FROM EMPLOYEE
WHERE SALARY > ALL (SELECT
SALARY FROM EMPLOYEE
WHERE DNO = 5)
```

generates records from employee table which :

- (A) may also have few records from DNO = 5
- (B) also have all records from DNO = 5
- (C) will also have records from DNO = 5 whose salary is greater than any other employees from other departments
- (D) will not have any records from DNO = 5
19. The cascade option for the referential triggered action of an SQL statement can be used with :
- (A) CREATE
- (B) DELETE
- (C) UPDATE
- (D) Both (B) and (C)
20. If a data dictionary system is used only by designers, users and administrators and not by the DBMS, software, it is called as :
- (A) active data dictionary
- (B) passive data dictionary
- (C) static data dictionary
- (D) dynamic data dictionary

21. What is the postfix form of the following prefix expression ?  
 $-A/B * C \$ D E$   
 (A)  $A B C D E \$ * / -$   
 (B)  $A - B C D E \$ * / -$   
 (C)  $A B C \$ E D * / -$   
 (D)  $A - B C D E \$ * /$
22. The pre-order and post-order traversal of a Binary tree generates the same output. The tree can have maximum :  
 (A) Three nodes  
 (B) Two nodes  
 (C) One node  
 (D) Any number of nodes
23. Step 1 : A circular linked list C has been created and initialized with a comma separated list L1 of elements  $\langle, x, +, y, \rangle, -, \langle, x, +, y, \rangle, -$   
 Step 2 : The nodes with the values either ' $\langle$ ' or ' $\rangle$ ' are deleted  
 Step 3 : The expression as read from C is evaluated with the conventional meanings of the operators '+' and '-'. Which of the following is true ?  
 (A) Evaluation in step 3 results in  $2y - 2x$  irrespective of the node from which you start reading of the data in C  
 (B) The expression in C gets evaluated to  $-2y$   
 (C) The answer remains unchanged even if I alter the sequence L1 to L2 :  $\langle, x, +, y, \rangle, -, \langle, x, +, y, \rangle, -$   
 (D) A and C but not B
24. Statement of purpose (SOP) that is limited to 150 words in the case of each student is to be maintained in a file. 1 million students have been enrolled in a course. Administrator may require accessing an individual's record, given a student's id (i.e. roll no.). Which of the following organizations will prove better ?  
 (A) Hash table  
 (B) Directly addressed array  
 (C) Binary search tree  
 (D) Sequential file
25. Partially vacant blocks in B+ tree :  
 (A) Cause space inefficiency in the structure  
 (B) Expedite insertion and deletion in the tree  
 (C) Reduce the speed of deletion in the tree  
 (D) Expedite insertion but reduce the speed of deletion in the tree
26. The UDP is a..... and ..... protocol.  
 (A) Reliable, connection oriented  
 (B) Reliable, connectionless  
 (C) Unreliable, connection oriented  
 (D) Unreliable, connectionless

27. In which of the following multiplexing the users get turns in a round-robin fashion, each one periodically getting the entire bandwidth for a little burst of time ?
- (A) Frequency division multiplexing
  - (B) Time division multiplexing
  - (C) Amplitude division multiplexing
  - (D) Both (A) and (B)
28. A packet containing 12 databytes, where each elementary data size is 1 byte, gets fragmented after passing through a network with maximum packet size of 8 payload bytes and header. The further fragment after passing through another network with maximum packet size of 3 payload bytes and header. How many fragments are found at the end of both of these networks ?
- (A) 2
  - (B) 4
  - (C) 5
  - (D) 8
29. In datagram subnet :
- (A) circuit setup is needed
  - (B) routers hold state information about connections
  - (C) congestion control is difficult
  - (D) quality of service can be ensured
30. As per public key cryptography, which of the following is *not* true for the encryption algorithm E and the decryption algorithm D ?
- (A)  $D(E(P)) = P$
  - (B) It is highly difficult to deduce D from E
  - (C) E cannot be broken by a chosen plain text
  - (D) E can be deduced using D
31. Nested Macro calls are expanded using the :
- (A) FIFO rule (first in first out)
  - (B) LIFO rule (last in first out)
  - (C) FILO rule (first in last out)
  - (D) Priority
32. Resolution of externally defined symbols is performed by :
- (A) Linker
  - (B) Loader
  - (C) Compiler
  - (D) Editor
33. Which of the following is most general phase structured grammar ?
- (A) Context-Sensitive
  - (B) Regular
  - (C) Context-Free
  - (D) Non-regular



34. Which of the following statements is *not true* for top-down parsers ?
- (A) Grammars containing left recursion are unfit for top-down parsing
- (B) Left factoring is essential in case of top-down parsers to avoid backtracking
- (C) Top-down parsers use a parsing table
- (D) Top-down parsers make use of stack
35. Which of the following rule is *not* required in the shift-reduce parsing of the expression :  $X = 5 * 7$  ?
- (A)  $\text{Product} \leftarrow \text{Product} * \text{Value}$
- (B)  $\text{Product} \leftarrow \text{Value}$
- (C)  $\text{Value} \leftarrow \text{id}$
- (D)  $\text{Value} \leftarrow \text{int}$
36. Consider a magnetic disk with 100 cylinders. The requests to access the cylinders occur in the following sequence :
- 4, 34, 10, 7, 19, 73, 2, 15, 6, 20
- Assuming that the head is currently at cylinder 50, what is the time taken to satisfy all requests if it takes 1 m to move from one cylinder to adjacent one and shortest seek time first policy is used ?
- (A) 95 ms
- (B) 119 ms
- (C) 233 ms
- (D) 276 ms
37. The `enter_CS()` and `leave_CS()` functions to implement critical section of a process are realized using test-and-set instruction as follows :
- ```
void enter_CS(X)
{
    ()
    while test-and-set(X);
}
void leave_CS(X)
{
    X = 0;
}
```
- In the above solution, X is a memory location associated with the CS and is initialized to 0. Now consider the following statements :
- (i) The above solution to CS problem is deadlock-free
- (ii) The solution is starvation free
- (iii) The processes enter CS in FIFO order
- (iv) More than one process can enter CS at the same time
- Which of the above statements is *true* ?
- (A) (i) only
- (B) (i) and (ii)
- (C) (ii) and (iii)
- (D) (iv) only

38. A process executes the following code
`for (i = 0; i < n; i + +) fork();`
 The total number of child processes created is :
- (A) n
 (B) $2^n - 1$
 (C) 2^n
 (D) $2^{n+1} - 1$
39. Pair the following UNIX commands with their appropriate usage :
- | UNIX
Commands | Usages |
|--------------------------|---|
| (i) top | (a) Rename a file |
| (ii) df | (b) Print system usage and resource log |
| (iii) mv | (c) Estimate free disk space |
| (iv) chmod | (d) Change file permissions |
- Choose the *correct* option :
- (i) (ii) (iii) (iv)
 (A) (a) (b) (c) (d)
 (B) (b) (c) (a) (d)
 (C) (c) (b) (a) (d)
 (D) (d) (c) (b) (a)
40. With respect to system calls in UNIX, which of the following statement(s) is/are *true* ?
- (i) close() frees a file descriptor for use with some other file.
 (ii) unlink() removes a file name from the file system
- (A) (i)
 (B) (ii)
 (C) (i) and (ii)
 (D) Both the statements are false
41. Coding phase of software product development life cycle essentially involves :
- (A) Integration of hardware and software
 (B) Integration of feasibility study
 (C) Integration of maintenance stage
 (D) Integration of system engineering stage
42. Customer's responsibility during the software development process includes :
- (A) Planning, monitoring and control
 (B) Providing functional requirements
 (C) Providing the product design
 (D) (A), (B) and (C)

43. In a software project management, product life cycle is :
- (A) related to business plan
 (B) related to monitoring plan
 (C) related to control plan
 (D) related to execution plan
44. Spiral model for software development life cycle encourages :
- (A) Software reuse
 (B) Prototyping
 (C) Prototyping & software reuse
 (D) Combination of parallel and sequential phases
45. Which of the following is a tool for data flow analysis ?
- (A) Decision table
 (B) Decision tree
 (C) Flow chart
 (D) Data dictionary
46. SONET sends.....frames per second.
- (A) 1000
 (B) 2000
 (C) 4000
 (D) 8000
47. At any given time parallel virtual machine (PVM) has send buffer(s) andreceive buffer(s).
- (A) one, one
 (B) one, two
 (C) two, two
 (D) two, one
48. Which of the following data mining application is related to outlier analysis ?
- (A) Market Basket Analysis
 (B) Target Marketing
 (C) Fraud Detection
 (D) Gross Market Analysis
49. Which of the following libraries is more preferable to develop applications for the internet ?
- (A) Standard C library
 (B) STL
 (C) ATL
 (D) MFC
50. What is the sequence of message travel through the following components involved in windows environment ?
- (i) WinMain
 (ii) Applications Message Queue
 (iii) System Level Message Queue
 (iv) Windows Procedure
 (v) System Level Window Procedure
- (A) (iii) (v) (ii) (i) (iv)
 (B) (i) (iii) (v) (ii) (iv)
 (C) (i) (ii) (iii) (iv) (v)
 (D) (iii) (ii) (i) (iv) (v)

DEC-37213/II

ROUGH WORK