Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

A

Paper-II

COMPUTER SCIENCE AND APPLICATIONS

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)

SEP - 37221

Time Allowed : 2 Hours] **[Maximum Marks : 200**

Number of Pages in this Booklet : **28**

Number of Questions in this Booklet : **100**

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 **100** objective type questions. Each question will carry *two* marks. *All* questions of Paper II will be compulsory.
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 100 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे.
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 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.
   (*iii*) वरीलप्रमाणे सर्व पडताळून पाहिल्यानंतरच 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)

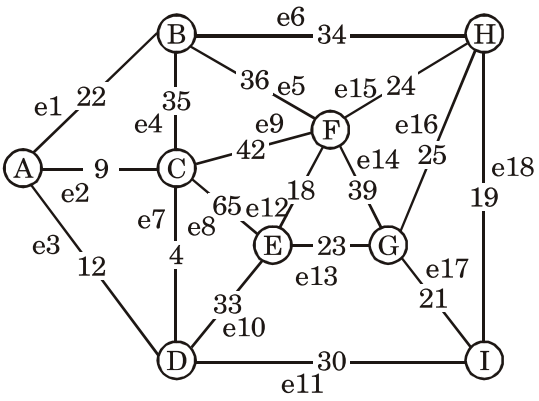
5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही 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. तथापि, 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 Applications

Paper II

Time Allowed : 120 Minutes] **[Maximum Marks : 200**

Note : This Paper contains **Hundred (100)** multiple choice questions. Each question carrying **Two (2)** marks. Attempt *All* questions.

1. 

V = {A, B, C, D, E, F, G, H, I}

E = {e1 = (A, B), e2 = (A, C), e3 = (A, D), e4 = (B, C), e5 = (B, F), e6 = (B, H), e7 = (C, D), e8 = (C, E), e9 = (C, F), e10 = (D, E), e11 = (D, I), e12 = (E, F), e13 = (E, G), e14 = (F, G), e15 = (F, H), e16 = (G, H), e17 = (G, I), e18 = (H, I)}

W = {22, 9, 12, 35, 36, 34, 4, 33, 30, 18, 23, 24, 39, 25, 21, 19}

The order of node (vertex)-edge incidence matrix for the undirected graph is ..... .

(A) 9×9

(B) 9×18

(C) 18×9

(D) 18×18

2. The code word ..... sent by the sender using the group codes words generated by

$$G = \begin{vmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{vmatrix},$$ which is

received as 001100 by the receiver.

(A) 000000

(B) 000111

(C) 101100

(D) 101011

3. Hamming distance of the following code words A and B is ..... .

A = 001001001001 and

B = 110100100110

(A) 4

(B) 6

(C) 10

(D) 12

4. Let X and Y be random variables with joint distribution :

$\Pr(X = i, Y = j) =$

$$\begin{cases} 1/6 & \text{for } i = 5,6 \text{ and } j = 3,6,9 \\ 0 & \text{otherwise} \end{cases}$$

Then the mutual information I (X, Y) = ...

(A) 0

(B) log(2)

(C) log(3)

(D) log(6)

5. Let X and Y be random variable with the following distributions respectively :

X	1	2	3	4	5
P	0.1	0.2	0.4	0.2	0.1

Y	10	20	35	50	60
P	0.1	0.2	0.4	0.2	0.1

(A) Entropy of distribution of X and Y are same, Coefficient of Variations are the same

(B) Entropy of distribution of X and Y are not same, Coefficient of Variations are the same

(C) Entropy of distribution of X and Y are same, Coefficient of Variations are not same

(D) Entropy of distribution of X and Y are not same, Coefficient of Variations are not same

6. Notation :

$C(n, r) = n!/(r!*(n-r)!))$

$n!$ is factorial n.

$|A|$ cardinality of set A

$\overline{s}$ is negation of s

The $C(2n + 2, n + 1)$ = ...

(A) $C(2n + 2, n + 1) + 2C(2n + 2, n) + C(2n + 2, n - 1)$

(B) $C(2n + 1, n + 1) + 2C(2n + 1, n) + C(2n + 1, n - 1)$

(C) $C(2n, n + 1) + 2C(2n, n) + C(2n, n - 1)$

(D) $C(2n, n + 1) + 2C(2n, n) + C(2n, n - 1)$

7. Consider the following Linear Programming Problem :

A company manufactures three products P1, P2, P3. The sale of one unit of P1 results in profit of Rs. 5. For one unit of P2 and P3 the profit is Rs. 6 and Rs. 4 respectively. P1 requires 3 hours of machine work and 2 hours of labour. P2 requires 1 hour of machine work and 3 hours of labour and P3 needs 4 hours of machine work and 3 hours of labour. In a week 60 machine hours and 75 hours of labour is available. How many units of P1, P2, P3 should be produced per week to maximize the profit ?

The primal and the dual of this problem are :

(A) Maximize : $Z = 5x_1 + 6x_2 + 4x_3$

Subject to $3x_1 + x_2 + 4x_3 \leq 60$

$2x_1 + 3x_2 + 3x_3 \leq 75$

$x_1, x_2, x_3 \geq 0$

Dual : Maximize :

$Z' = 60y_1 + 75y_2$

Subject to $3y_1 + 2y_2 \geq 5$

$y_1 + 3y_2 \geq 6$

$4y_1 + 3y_2 \geq 4, y_1, y_2 \geq 0$

(B) Maximize : $Z' = 5x_1 + 6x_2 + 4x_3$

Subject to $3x_1 + x_2 + 4x_3 \leq 60$

$2x_1 + 3x_2 + 3x_3 \leq 75$

$x_1, x_2, x_3 \geq 0$

Dual : Minimize :

$Z' = 60y_1 + 75y_2$

Subject to $3y_1 + 2y_2 \leq 5$

$y_1 + 3y_2 \leq 6$

$4y_1 + 3y_2 \leq 4, y_1, y_2 \geq 0$

(C) Maximize : $Z = 5x_1 + 6x_2 + 4x_3$

Subject to $3x_1 + x_2 + 4x_3 \leq 60$

$2x_1 + 3x_2 + 3x_3 \leq 75$

$x_1, x_2, x_3 \geq 0$

Dual : Minimize :

$Z' = 60y_1 + 75y_2$

Subject to $3y_1 + 2y_2 \geq 5$

$y_1 + 3y_2 \geq 6$

$4y_1 + 3y_2 \geq 4, y_1, y_2 \geq 0$

(D) Minimize : $Z = 5x_1 + 6x_2 + 4x_3$

Subject to $3x_1 + x_2 + 4x_3 \geq 60$

$2x_1 + 3x_2 + 3x_3 \geq 75$

$x_1, x_2, x_3 \geq 0$

Dual : Maximize :

$Z' = 60y_1 + 75y_2$

Subject to $3y_1 + 2y_2 \leq 5$

$y_1 + 3y_2 \leq 6$

$4y_1 + 3y_3 \leq 4, y_1, y_2 \geq 0$

8. Which of the following statements is *true* ?
   (A) Simplex method is so robust that it is guaranteed to give the solution of any linear programming problem
   (B) Simplex method searches for the solution through interior of the feasible region
   (C) Karmarkar's algorithm searches for the solution through corner points of the feasible region
   (D) Simplex method approaches the solution by moving from corner to corner along the edges

9. Consider the following transportation problem :

Warehouse

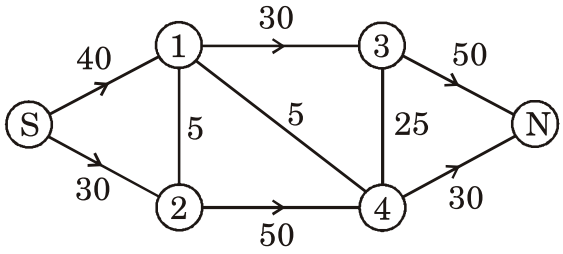
Factory	W_1	W_2	W_3	W_4	
F_1	1	2	3	4	6
F_2	4	3	2	0	8
F_3	0	2	2	1	10
	4	6	8	6	

A solution to the problem is given below :

	6		
		2	6
4		6	

Which of the following is true about the solution ?
   (A) Degenerate but not optimal
   (B) Degenerate and optimal
   (C) Non-degenerate and optimal
   (D) Optimality cannot be tested

10. Compute the maximal flow through the following network :



   (A) 70 units
   (B) 65 units
   (C) 60 units
   (D) 75 units

11. The t_{pd} for each flip-flop is 50ns, determine the maximum operating frequency for MOD-32 ripple counter :
   (A) 4 MHz
   (B) 3 MHz
   (C) 4 GHz
   (D) 2 MHz

12. The decimal equivalent of 8 D_H in sign magnitude form is :
   (A) 13
   (B) –13
   (C) –11
   (D) 11

13. If an even parity Hamming code 0110011 is transmitted and that 0100011 is received. The receiver is unaware of what was transmitted ? Determine the bit location where error has occurred using received code.

(A) Bit in 3rd location is wrong

(B) Bit in 4th location is wrong

(C) Bit in 5th location is wrong

(D) Bit in 1st location is wrong

14. The word size of memory IC can be increased by connecting 2 memory ICs in such a way that their :

(A) Data bus is in series and address bus in parallel

(B) Data bus is in parallel and address bus in parallel

(C) Data bus is in series and address bus in series

(D) Data bus is in parallel and address bus in series

15. A *t*-state is measured from the falling edge of one clock pulse to the falling edge of the next clock pulse. Fetch cycle and the execution cycle take how many of the following *t*-states ?

(A) 2 and 1

(B) 3 and 4

(C) 4 and 3

(D) 2 and 3

16. XLAT instruction in assembly is used to :

(A) Perform string conversions

(B) Perform character conversions

(C) Improve performance

(D) None of the above

17. Individual control words in a micro-programmed control unit is known as :

(A) Micro-routine

(B) Micro-program

(C) Micro-word

(D) Micro-instruction

18. Vector processing eliminates the overhead associated with time it takes to fetch and execute the instructions in the :

(A) Program

(B) Function

(C) Control structures

(D) Sub-routines

19. The amount of time required to read a block of data from a disk into memory is composed of transfer time, seek time and rotational latency. Rotational latency refers to :

(A) Time required by the platter to rotate the correct sector under the head

(B) Time required by the read-write head to move to the position over the appropriate track

(C) The time required by the platter to make a full rotation

(D) The time required by the r/w head to come under a cylinder

20. One of the following is *not* a key characteristic of NUMA machines :

(*i*) There is a single address space visible to all CPUs

(*ii*) Access to remote memory is via LOAD and STORE instructions

(*iii*) Access to remote memory is faster than access to local memory

(*iv*) Access to remote memory is slower than access to local memory

(A) (*i*)

(B) (*ii*)

(C) (*iii*)

(D) (*iv*)

21. The syntax of expression in a language can be characterised by :

(*i*) a table giving associativity and precedence

(*ii*) a grammar for expression

(*iii*) expression are always to be written in infix notation

(*iv*) use of terminal per precedence level

(A) (*i*) and (*ii*)

(B) (*ii*) and (*iii*)

(C) (*iii*) and (*iv*)

(D) (*i*), (*ii*) and (*iii*)

22. Which of the following are fundamental operation on pointers ?

(*i*) implicit dereferencing

(*ii*) indirection

(*iii*) explicit referencing

(*iv*) addressing

(A) (*i*), (*ii*) and (*iii*)

(B) (*i*) and (*ii*)

(C) (*ii*) and (*iii*)

(D) (*iv*) only

23. Consider the following 'C' program fragment :

```
if(tPTR ! = NULL)
    * tPTR = NULL;
else
    * tPTR = NULL;
```

Select the following statements that are having same effect :

(*i*) if (tPTR) * tPTR = NULL;

else * tPTR = NULL

(*ii*) *tPTR = NULL;

(*iii*) if (!tPTR) * tPTR = NULL;

else * tPTR = NULL;

(*iv*) if (tPTR = = NULL) * tPTR = NULL;

else * tPTR = NULL;

(A) (*i*) and (*ii*)

(B) (*i*), (*ii*), (*iii*) and (*iv*)

(C) (*ii*), (*iii*) and (*iv*)

(D) (*ii*) only

24. Which prevents programmer from using a program component in inappropriate ways and by limiting the portion of a program text in which a given component can be used, thereby limiting the portion that must be considered when searching for the cause of bug :

(A) conceptual load

(B) fault containment

(C) independence

(D) extension

25. The pointer to base classes are commonly used in design of container classes such as set, vector and lists. In this case which of the following solution exists ?

(*i*) yields homogeneous list

(*ii*) yields heterogeneous list

(*iii*) special type of secure variation of heterogeneous list

(*iv*) homogeneous and heterogeneous list

(A) (*i*) only

(B) (*ii*) only

(C) (*i*), (*ii*), (*iii*) and (*iv*)

(D) (*iv*) only

26. Which of the following defines a family of functions in the same way a class templates defines as family of classes ?

(A) Function templates

(B) Generic functions

(C) Virtual function

(D) Friend function

27. The status line of servlet, which consist of the HTTP version, a status code and short message corresponding to status code, which statement from the following correctly signifies the purpose of using status code ?

(*i*) General method of setting status code is simply to call response-set status (int)

(*ii*) Setting status code does not necessarily mean that you don't need to return document

(*iii*) In most cases headers are optional

(*iv*) They are more reliable to use constant defined in Http Servlet Response

(A) (*i*), (*ii*) and (*iii*)

(B) (*ii*), (*iii*) and (*iv*)

(C) (*i*), (*ii*) and (*iv*)

(D) (*i*) and (*ii*) only

28. The beam penetration method for displaying color pictures are used in ..... .

(A) Refresh cathode ray tube monitors

(B) Random scan monitors

(C) Raster scan monitors

(D) Direct view storage tube monitors

29. In general pivot point rotation what is the correct sequence of transformations ?

(A) Rotation, translation, rotation

(B) Rotation, scaling, rotation

(C) Scaling, rotation, translation

(D) Translation, rotation, translation

30. Which of the following is *not* part of geometric tables used to represent the polygon surfaces ?

(A) Polygon surface table

(B) Vertex table

(C) Point table

(D) Edge table

31. Which of the following statements is not true for Relational Algebra ?

(A) Relational Algebra is a procedural query language

(B) Natural join is a fundamental operation in relational algebra

(C) The symbol σ is used for select operation in relational algebra

(D) In relational algebra, for select operation, predicates appear in the subscript

32. Which of the following statement(s) is/are true for weak entity ?

(*i*) Weak entity is existence dependent on strong entity

(*ii*) Weak entity does not have primary key of its own

(*iii*) Attributes of weak entity are derived from attributes of strong entity

(A) (*i*) only

(B) (*i*) and (*ii*)

(C) (*i*) and (*iii*)

(D) (*i*), (*ii*) and (*iii*)

33. To get a database in 3NF, which of the following steps are essential ?

(*i*) Converting composite attributes to individual attributes

(*ii*) Removal of partial dependencies

(*iii*) Removal of transitive dependencies

(A) (*i*) and (*ii*)

(B) (*iii*) only

(C) (*ii*) and (*iii*)

(D) (*i*), (*ii*) and (*iii*)

34. Database contains the relation Student (rollno, name, marks), Which of the following is an *incorrect* SQL query ?

(A) Select * from student where marks between 60 and 80;

(B) Select * from student where marks > = 60 and marks < = 80;

(C) Select * from student where marks < = 60 and marks > = 80;

(D) Select * from student where marks > = 60 and rollno < = 80;

35. Which command is used to remove a relation from an SQL database ?

(A) Drop

(B) Delete

(C) Purge

(D) Remove

36. On which of the following, the events in a trigger can be fired ?

(*i*) Select

(*ii*) Update

(*iii*) Delete

(*iv*) Insert

(A) (*i*), (*ii*) and (*iii*)

(B) (*ii*) and (*iii*)

(C) (*ii*), (*iii*) and (*iv*)

(D) (*i*), (*ii*), (*iii*) and (*iv*)

37. Which of the following statement(s) is/are true ?

(*i*) Dimension tables of star schema models are brought to normalized form to reduce redundancy.

(*ii*) Snowflake structure can reduce the effectiveness of browsing since more joins are needed for query.

(A) (*i*) only

(B) (*ii*) only

(C) (*i*) and (*ii*)

(D) None of the above

38. Which of the following form ordinal variables ?

(A) Apple, Orange, Grape

(B) Branch manager, Deputy manager, General manager

(C) Pen, Ball, Tea

(D) Both (A) and (B)

39. What is the default Hadoop dfs block size ?

(A) 32 MB/64 MB

(B) 64 MB/128 MB

(C) 32 MB/128 MB

(D) 128 MB/256 MB

40. Which of the following statement(s) is/are correct ?

(*i*) Documents can contain many different key value pairs, or key array pairs but not nested documents

(*ii*) Mango DB was official drivers for a variety of popular programming languages and development environments

(*iii*) When compared to relational databases, No SQL databases are more scalable and provide superior performance

(A) (*i*) and (*ii*)

(B) (*i*) and (*iii*)

(C) (*ii*) and (*iii*)

(D) (*i*), (*ii*) and (*iii*)

41. An application has to modify 34th byte in sector number 4 (on first track present on first side of the first plate) on a conventional hard disk. Operating system will copy how many bytes from that sector into primary memory to enable this operation to be performed ?

(A) 1

(B) 34

(C) 136

(D) 512

42. What is the most appropriate description for the term 'confidentiality' ?

(A) A set of rules to limit access to data

(B) Maintenance of and assurance of the accuracy and consistency of data over its entire life-cycle

(C) A guarantee of reliable access to the data by authorized people

(D) The process or action of verifying the identity of a user or process

43. Which of the following is not a valid kernel data structure in Linux ?

(A) File descriptor table

(B) File table

(C) I-node table

(D) Sector table

44. What is the most appropriate purpose of 'nice' command in Linux ?

(A) Send real-time messages among the users

(B) Check the status of memory

(C) Set execution priority level for a process

(D) Verify the availability of enough memory space for a process

45. A 32-bit X86 system with Windows operating system will have ..... GB as theoretical maximum size of virtual address space.

(A) 4

(B) 8

(C) 16

(D) 32

46. Consider a system with seven processes A through G and six resources R through W. Resource ownership is as follows :

Process A holds R and wants T

Process B holds nothing but wants T

Process C holds nothing but wants S

Process D holds U and wants S and T

Process E holds T and wants V

Process F holds W and wants S

Process G holds V and wants U

Are there any processes deadlocked ?

(A) No process

(B) Yes, A, B, C

(C) Yes, D, E, G

(D) Yes, A, B, F

47. An operating system (OS) crashes on the average once in 30 days, that is , the Mean Time Between Failures (MTBF) = 30 days. When this happens, it takes 10 minutes to recover the OS, that is, the Mean Time To Repair (MTTR) = 10 minutes. The availability of the OS with these reliability figures is approximately :

(A) 96.97%

(B) 97.97%

(C) 99.009%

(D) 99.97%

48. Consider a disk queue with I/O requests on the following cylinders in their arriving order 6, 10, 12, 54, 97, 73, 128, 15, 44, 110, 34, 45. The disk head is assumed to be at cylinder 23 and moving in the direction of decreasing number of cylinders. Total number of cylinders in the disk is 150. The disk head movement using SCAN-scheduling algorithm is :

(A) 172

(B) 173

(C) 151

(D) 228

49. A specific editor has 200 K of program text, 15 K of initial stack, 50 K of initialized data, and 70 K of bootstrap code. If five editors are started simultaneously and shared text is used, how much physical memory will be needed ?

(A) 1135 K

(B) 335 K

(C) 1065 K

(D) 320 K

50. The 'read' system call returns :

(A) Total number of bytes

(B) File descriptor of the file

(C) Successful read flag

(D) Address of the file

51. In software development process, ... is based on iterative incremental delivery as a response to changing and emergent requirements.

(A) Agile development model

(B) Evolutionary development model

(C) Rapid application development model

(D) Open source development model

52. What are the four framework activities found in the Extreme Programming (XP) process model ?

(A) analysis, design, coding, testing

(B) planning, analysis, design, coding

(C) planning, analysis, coding, testing

(D) planning, design, coding, testing

53. A report generation application prepares required reports from the data gathered from databases. Even though the application provides required output for given input, customer rejected the application. What may be the most appropriate reason for this rejection ?

(A) Failure to meet functional requirements

(B) Failure to meet non-functional requirements

(C) Failure to meet verification of output

(D) Failure to meet validation of input

54. Which of the following software architecture is prone to 'single point of failure' vulnerability ?

(A) Client-server

(B) Peer-to-peer

(C) Service-oriented

(D) Distributed-object

55. Vocabulary of a program is defined as :

(A) $n = n_1 + n_2$

(B) $n = n_1 - n_2$

(C) $n = n_1 \times n_2$

(D) $n = n_1 / n_2$

56. Which model assumes that effort and development time are functions of product size alone ?

(A) Basic COCOMO

(B) Detailed COCOMO

(C) Intermediate COCOMO

(D) COCOMO

57. During the change control process, which of the following activities are required to be initiated ?

(*i*) While software configuration identification (SCI) is under development it can change freely since it is not under SCM.

(*ii*) While under review, the software configuration identification (SCI) is considered to be "Frozen".

(*iii*) Once SCI is reviewed and approved, it is entered into a library; the SCI is now formally under SCM.

(*iv*) Check in-check out process : once the change has been approved, the SCI has to be checked out from the library for change; once the change has been implemented, the SCI must be checked in to the library.

(A) (*i*), (*ii*), (*iii*) and (*iv*)

(B) (*ii*), (*iii*) and (*iv*)

(C) (*i*), (*ii*) and (*iii*)

(D) (*i*) and (*iv*)

58. Basic path testing is ..... .
(A) a whitebox testing technique
(B) a blackbox testing technique
(C) Both whitebox and blackbox testing techniques
(D) Neither whitebox nor blackbox testing technique

59. The test conducted to ensure that due to addition of modules, software do not unintended behaviour or extra errors are not added, is known as ..... .
(A) Smoke testing
(B) Regression testing
(C) Performance testing
(D) Stress testing

60. Which amongst the following statements are not true for Quality Assurance ?
(*i*) Quality Assurance aims to prevent the defects
(*ii*) Quality Assurance is a reactive measure
(*iii*) Quality Assurance manages the quality validation
(*iv*) Quality Assurance covers full development life cycle
(A) (*i*) and (*ii*)
(B) (*i*) and (*iv*)
(C) (*ii*) and (*iv*)
(D) (*ii*) and (*iii*)

61. The prefix form of (A – B / C) * (A / K – L) is :
(A) * – / – / A B C A K L
(B) A B C A K L * – / – /
(C) * – A / B C – / A K L
(D) * – A B C / – A K L /

62. Which of these best describes an array ?
(A) A data structure that shows a hierarchical behaviour
(B) Container of objects of similar types
(C) Container of objects of mixed types
(D) Heterogeneous data types

63. Which of the following application makes use of a circular linked list ?
(A) Undo operation in a text editor
(B) Allocating CPU to resources
(C) Recursive function calls
(D) Expression evaluation

64. AVL tree is used :

(A) to save memory

(B) to attain faster memory access

(C) to avoid formation of skew trees

(D) to simplify storing

65. The basic operations on sets :

(A) Push and pop

(B) Insert and delete

(C) Union, intersection, difference and subset

(D) Traversing and merging

66. If A is an adjacency matrix of a graph G, if $A = A^T$, where A^T is the transpose matrix of A, then G is :

(A) A simple undirected graph

(B) A graph with only self loop

(C) A graph with only parallel edges

(D) A general graph

67. Suppose that we have numbers between 1 and 500 in a binary search tree and want to search for the number 258. Which of the following sequences could not be the sequence of nodes examined ?

(A) 453, 200, 448, 210, 363, 258

(B) 3, 240, 398, 256, 399, 258

(C) 458, 250, 357, 255, 355, 258

(D) 3, 390, 358, 257, 312, 258

68. The technique that exploits the relationship between solution to the given instance of a problem and smaller instance of the same problem is known as :

(A) Divide and Conquer

(B) Decrease and Conquer

(C) Transform and Conquer

(D) Dynamic Programming

69. The FFT (a) returns DFT (y). To compute inverse of DFT, FFT algorithm can be modified to :

(*i*) Switch the roles of a and y

(*ii*) Replace w_n by w_n^{-1}

(*iii*) Divide the final result by n

(A) (*i*) and (*ii*)

(B) (*i*) and (*iii*)

(C) (*ii*) and (*iii*)

(D) (*i*), (*ii*) and (*iii*)

70. Which of the following is not true for problem reducibility ?

(A) Satisfiability is not reducible to halting problem

(B) Satisfiability is reducible to every NP-complete problem

(C) Optimization problems reduce to their corresponding decision problem

(D) Reducibility satisfies transitivity property

71. ..... is a compiler capable of creating an executable code for a platform other than the one on which ..... is run.

(A) Cross compiler, decompiler

(B) Just-in time compiler, cross compiler

(C) Cross compiler, cross compiler

(D) Just-in time compiler, just-in time compiler

72. Among the various ways an Intermediate code is represented, ... intermediate code representation is close to the source program/language itself and ..... intermediate code representation is close to the target machine.

(A) Low level, High level

(B) Low level, Medium level

(C) High level, Low level

(D) High level, Medium level

73. Procedure activation record must contain :

(*i*) Space for arguments

(*ii*) Space for local data and local temporaries

(*iii*) Space for global data

(A) (*ii*) only

(B) (*i*) and (*iii*) only

(C) (*ii*) and (*iii*) only

(D) (*i*) and (*ii*) only

74. In some languages the meaningless operation will be detected when the program is compiled and rejected by the compiler is known as ..... .

(A) Dynamic type checking

(B) Weak typing

(C) Strong typing

(D) Static type checking

75. LL(1) parsing uses an explicit ..... rather than recursive calls to perform a parse.

(A) Deque

(B) Stack

(C) Queue

(D) Linked List

76. If there exists a Turing machine M which when applied to any problem in the class terminates if the correct answer is yes and may not terminate otherwise is said to be ..... .

(A) Stable

(B) Unsolvable

(C) Partially solvable

(D) Unstable

77. Which of the following are *incorrect* statements ?

(*i*) A language L is said to be recursively enumerable if there exists a Turing machine that accepts L

(*ii*) Let $K \geq 1$ be an integer. Any K-tape Turing machine cannot be converted to an equivalent one tape Turing machine

(*iii*) Every computational process which can be considered to be algorithm can be converted to a Turing machine

(A) (*i*) only

(B) (*ii*) only

(C) (*iii*) only

(D) (*i*) and (*ii*) only

78. Consider the context free Grammar with 7 (seven) productions.

$S \rightarrow Aa / B$

$B \rightarrow A / bb$

$A \rightarrow a / bc / B$

After removing all unit productions the resulting equivalent grammar will contain ..... productions.

(A) 18

(B) 12

(C) 10

(D) 11

79. Which of the following is *correct* statement ?

(*i*) A language is a regular language if and only if it can be represented by a regular expression.

(*ii*) A language is a regular if and only if it cannot be generated by a regular grammar.

(*iii*) Every regular grammar is context free grammar.

(A) (*i*) only

(B) (*i*) and (*ii*) only

(C) (*i*) and (*iii*) only

(D) (*iii*) only

80. The grammar $S \rightarrow aSa/bS/d$ is :

(A) LL(1) but not LR(1)

(B) Neither LL(1) nor LR(1)

(C) LR(1) but not LL(1)

(D) Both LL(1) and LR(1)

81. Suppose we have to send an E-mail with an attachment of 2.5 kbyte with 1 Gbps bandwidth. Assume that the distance between the sender and the receiver is 12000 km and the light travels at 2.4×10^8 m/s. What will be the propagation time ?

(A) 208 ms

(B) 50 ms

(C) 200 ms

(D) 600 ms

82. We have a LAN with 10 Mbps bandwidth and average 12000 frames per minutes and size of each frame is 10000 bits. Then its throughput will be ..... .

(A) 0.83 Mbps

(B) 2 Mbps

(C) 0.2 Mbps

(D) 20 Mbps

83. Which is the only layer of OSI model that prevents itself from adding its own header to the data during the data transmission process ?

(A) Application layer

(B) Network layer

(C) Physical layer

(D) Transport layer

84. In a leaky bucket used to control liquid flow, how many gallons of liquid are left in the bucket if the output rate is 6 gal/min, there is an input burst of 100 gal/min for 12 sec and there is no input for 48 sec ?

(A) 20 gal

(B) 5 gal

(C) 15 gal

(D) 13 gal

85. In symmetric-key cryptography, if every person in a group of 10 people needs to communicate with every other person in another group of 10 people, how many minimum secret keys are needed ?

(A) 1

(B) 10

(C) 100

(D) 50

86. Which mechanism in transport layer supplies multiple network connections along with the distribution of traffic over them in a round-robin basis/fashion ?

(A) Upward Multiplexing

(B) Downward Multiplexing

(C) Buffering and Flow Control

(D) Crash Recovery

87. While linking to the internet mail system which of the following 'mailto' anchors is correct ?

(A) <a href = "mailto : amitkumar @ gmail.com"> send a page to amit </a>

(B) <a href = "emailto : amitkumar @ gmail.com"> send a page to amit </a>

(C) <a href : "mailto : amitkumar @ gmail.com"> send a page to amit </a>

(D) <a href : "emailto : amitkumar @ gmail.com"> send a page to amit </a>

88. Role of "data streamer" in Hadoop Distributed File System (HDFS) is :
(A) Send a request to the Data Node to send list of Name Node to store replica of first block
(B) Send a request to the Name Node to get a list of suitable Data Nodes to store replica of first block
(C) Streaming service to indicate failure of Data Nodes
(D) Streaming service to indicate failure of Name Nodes

89. While virtualizing X-86 architecture with "hardware assisted virtualization" which of the following is *true* ?
(A) Priviledged and sensitive calls are automatically trapped to the hypervisor
(B) Is done using binary translation
(C) Is done using para-virtualization
(D) Priviledged and sensitive calls are trapped using Application Binary Interface (ABI)

90. Which DNS resource record is used to provide the ability to associate arbitrary text with a host name ?
(A) A
(B) MCX
(C) TXT
(D) Text

91. How are conflicts resolved in multi-agent systems ?
(A) Co-operation
(B) Negotiation
(C) Seclusion
(D) Competition

92. Pragmatic interpretation in natural language understanding relates to :
(A) Symbols
(B) Structure
(C) Context
(D) Syntax

93. Sensorless planning is also known as :
(A) Conformant planning
(B) Conditional planning
(C) Contingency planning
(D) Continuous planning

94. Which amongst the following are essential components of an expert system ?

(*i*) Inference engine

(*ii*) Context graph

(*iii*) Knowledge base

(*iv*) Computer vision

(A) (*i*) and (*ii*)

(B) (*i*) and (*iii*)

(C) (*i*), (*ii*) and (*iii*)

(D) (*ii*), (*iii*) and (*iv*)

95. What features amongst the following would be required for a computer program to pass the Turing test ?

(*i*) Natural language processing

(*ii*) Knowledge representation

(*iii*) Automated reasoning

(*iv*) Computer vision

(*v*) Machine learning

(*vi*) Problem solving

(A) (*i*), (*ii*) and (*iii*)

(B) (*i*), (*ii*), (*iii*) and (*iv*)

(C) (*i*), (*ii*), (*iii*) and (*v*)

(D) (*i*), (*ii*), (*iv*) and (*vi*)

96. The probability of 1-point crossover, with crossover rate P_c, to break the schema of length 'l' given by :

(A) $\frac{P_c * P_c}{l-1}$

(B) $\frac{P_c * D(H)}{l-1}$

(C) $\frac{P_c}{l}$

(D) $\frac{P_c * D(H)}{l}$

97. If

$$\underset{\sim}{P} = \left\{\frac{0.1}{C_1} + \frac{0.5}{C_2} + \frac{10}{C_3}\right\} \text{ and}$$

$$\underset{\sim}{S} = \left\{\frac{0.3}{S_1} + \frac{0.8}{S_2}\right\}.$$

The relation between $\underset{\sim}{P}$ and $\underset{\sim}{S}$ in set theoretic form is :

(A) $\begin{bmatrix} 0.1 & 0.1 \\ 0.3 & 0.5 \\ 0.3 & 0.8 \end{bmatrix}$

(B) $\begin{bmatrix} 0.1 & 0.3 \\ 0.5 & 0.8 \\ 1 & 0.1 \end{bmatrix}$

(C) $\begin{bmatrix} 0.2 & 0.5 \\ 0.1 & 0.8 \\ 0.1 & 0.2 \end{bmatrix}$

(D) $\begin{bmatrix} 0.2 & 0.8 \\ 0.9 & 0.5 \\ 0.3 & 0.3 \end{bmatrix}$

98. If the fuzzy relations $\underset{\sim}{R}$ and $\underset{\sim}{S}$ are defined as follows :

$$\underset{\sim}{R} = \begin{bmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{bmatrix} \quad \text{and}$$

$$\underset{\sim}{S} = \begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix}$$

then using max-min composition T = RoS is represented as :

(A) $\begin{bmatrix} 0.7 & 0.6 & 0.5 \\ 0.8 & 0.6 & 0.4 \end{bmatrix}$

(B) $\begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix}$

(C) $\begin{bmatrix} 0.2 & 0.1 & 0.1 \\ 0.7 & 0.1 & 0.1 \end{bmatrix}$

(D) $\begin{bmatrix} 0.2 & 0.3 & 0.4 \\ 0.1 & 0.1 & 0.9 \end{bmatrix}$

99. Hopfield networks have the "energy", E, associated with them. Thus for Hopfield network with symmetric weights, this energy, E at each state may ..... .

(A) Increase

(B) Decrease

(C) Decrease or remain same

(D) Decrease or increase

100. In artificial neural network (ANN) training, epochs represent the total number of :

(A) Input layer nodes

(B) Passes of the training data through the network

(C) Network nodes

(D) Passes of the test data through the network

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