

Answer Key: Assistant Professor (Computer Science & Engg.)

Q No	Key
1	D
2	C
3	B
4	D
5	C
6	A
7	A
8	C
9	C
10	B
11	D
12	C
13	A
14	C
15	D
16	C
17	D
18	B
19	B
20	C
21	D
22	C
23	C
24	D
25	D

Q No	Key
26	B
27	B
28	B
29	B
30	C
31	D
32	B
33	B
34	A
35	A
36	A
37	C
38	B
39	C
40	D
41	A
42	A
43	B
44	B
45	C
46	B
47	B
48	C
49	D
50	D

Test Booklet

Series

A

Test Booklet No.

**Test Booklet for the Post of
Assistant Professor Computer Science & Engineering**

Name of Applicant Answer Sheet No.

Applicant ID/Roll No. : Signature of Applicant :

Date of Examination: Signature of the Invigilator(s)
1.

Time of Examination : 2.

Duration : 1 Hour]

[Maximum Marks : 50

IMPORTANT INSTRUCTIONS

- (i) The question paper is in the form of Test-Booklet containing **50 (Fifty)** questions. All questions are compulsory. Each question carries four answers marked (A), (B), (C) and (D), out of which only one is correct. Choose the correct option or the most appropriate option.
- (ii) On receipt of the Test-Booklet (Question Paper), the candidate should immediately check it and ensure that it contains all the pages, i.e., **50** questions. Discrepancy, if any, should be reported by the candidate to the invigilator immediately after receiving the Test-Booklet.
- (iii) A separate Answer-Sheet is provided with the Test-Booklet/Question Paper. On this sheet there are **50** rows containing four circles each. One row pertains to one question.
- (iv) The candidate should write his/her Application ID/Roll number at the places provided on the cover page of the Test-Booklet/Question Paper and on the Answer-Sheet and **NOWHERE ELSE**.
- (v) No second Test-Booklet/Question Paper and Answer-Sheet will be given to a candidate. The candidates are advised to be careful in handling it and writing the answer on the Answer-Sheet.
- (vi) For every correct answer of the question **One (1) mark will be awarded**. There will be negative marking and 1/4 (0.25) mark will be deducted for every incorrect answer.
- (vii) Marking shall be done only on the basis of answers responded on the Answer-Sheet.
- (viii) To mark the answer on the Answer-Sheet, candidate should **darken** the appropriate circle in the row of each question with Blue or Black pen.
- (ix) For each question only **one** circle should be **darkened** as a mark of the answer adopted by the candidate. If more than one circle for the question are found darkened or with one black circle any other circle carries any mark, the answer will be treated as incorrect.
- (x) The candidates should not remove any paper from the Test-Booklet/Question Paper. Attempting to remove any paper shall be liable to be punished for use of unfair means.
- (xi) Rough work may be done on the blank space provided in the Test-Booklet/Question Paper only.
- (xii) *Mobile phones (even in Switch-off mode) and such other communication/programmable devices are not allowed inside the examination hall.*
- (xiii) No candidate shall be permitted to leave the examination hall before the expiry of the time.

DO NOT OPEN THIS QUESTION BOOKLET UNTIL ASKED TO DO SO.

1. What is the representation of $(-29)_{10}$ in 2's complement form in a 16-bit register?
(A) 1111111111111101 (B) 1000000000011101
(C) 1000000000000011 (D) 1111111111100011
2. What is the network diameter of a 2D Mesh interconnection network of size 64 ?
(A) 8 (B) 12
(C) 14 (D) 16
3. Dependency between statements I1: mul r1, r2, r3 and I2: add r2, r4, r5 is _____.
(A) Flow dependency (B) Anti-dependency
(C) Output dependency (D) Loop dependency
4. Which of the following cache optimization reduces miss penalty?
(A) Way prediction (B) Pipelined cache access
(C) Non-blocking caches (D) Critical word first and early restart
5. On which of the following factors, vector execution time depends _____.
(A) Length of the operand vectors (B) Structural hazards among operands
(C) Both (A) and (B) (D) None of the above
6. Suppose that you want to enhance the processor used for web serving. The new processor is 10 times faster on computation in the web serving application than the original processor. Assume that the original processor is busy with computation 40% of the time and is waiting for i/o 60% of the time, what is the overall speedup gained by incorporating the enhancement?
(A) 1.56 (B) 2.56
(C) 0.6 (D) 0.4

7. Identify the tags SEQUENCE used in description list of HTML
- (A) `<DL><DT>.....</DT><DD>.....</DD></DL>`
 - (B) `<DT><DL>.....</DL><DD>.....</DD></DT>`
 - (C) `<DL><DD>.....</DD></DL>`
 - (D) `<DT><DD>.....</DD></DT>`
8. Identify the correct code for image as a hyperlink in HTML
- (A) `Flower_image`
 - (B) `
Image`
 - (C) `
`
 - (D) All are correct
9. Which of the following statements is/are true?
- I. HTML is case insensitive language.
 - II. Once a web server returns a cookie to a browser, the cookie will be included in all future requests from the browser to the same server.
 - III. ATOM, Sublime, Visual studio code are the examples for browsers to run HTML code.
 - IV. CSS is cascading style sheet used for styling the HTML document.
- (A) I, II, IV
 - (B) II, III, IV
 - (C) I, IV
 - (D) I, III, IV
10. Arrange the following concepts used in normalization in increasing order of Normal forms (NF1, NF2, NF3, BCNF, NF4)
- I. Every determinant is a candidate key.
 - II. Each non-key attribute be dependent on the primary key.
 - III. Does not contain multivalued dependencies.
 - IV. Should contain only atomic values.
 - V. Non-transitive dependency.
- (A) I, II, III, IV, V
 - (B) IV, II, V, I, III
 - (C) V, IV, III, II, I
 - (D) IV, V, I, II, III

11. The employee information of an Organization is stored in the relation :

Employee (name, sex, salary, deptname)

Consider the following SQL query

Select deptname from Employee Where sex = 'M' group by deptname having avg (salary) > {select avg (salary) from Employee}

Output of the given query corresponds to

- (A) Average salary of employee more than average salary of the organization
 - (B) Average salary less than average salary of the organization
 - (C) Average salary of employee equal to average salary of the organization
 - (D) Average salary of male employees in a department is more than average salary of the organization
12. A protocol that permits a transaction to lock a new data item only if it has not yet unlocked any data item, is called _____.
- (A) Two-phase unlocking protocol
 - (B) One-phase locking protocol
 - (C) Two-phase locking protocol
 - (D) One-phase unlocking protocol
13. One solution to the multivalued dependency constraint problem is to _____.
- (A) split the relation into two relations, each with a single theme
 - (B) change the theme
 - (C) create a new theme
 - (D) add a composite key
14. Consider a fuzzy set A defined on the interval $X = [0, 10]$ of integers by the membership function :
- $$\mu_A(x) = x/(x + 2)$$
- Then the α cut corresponding to $\alpha = 0.5$ will be :
- (A) {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
 - (B) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
 - (C) {2, 3, 4, 5, 6, 7, 8, 9, 10}
 - (D) { }

15. If T consists of 500000 transactions, 20000 transactions contain bread, 30000 transaction contain jam, 10000 transaction contain both bread and jam. Then the confidence of buying Jam with bread is _____.
- (A) 33.33% (B) 66.66%
(C) 45% (D) 50%
16. A 3-input neuron is trained to output a zero when the input is 110 and a one when the input is 111. After generalization, the output will be zero when and only when the input is :
- (A) 000 or 110 or 011 or 101 (B) 010 or 100 or 110 or 101
(C) 000 or 010 or 110 or 100 (D) 100 or 111 or 101 or 001
17. Four jobs J1, J2, J3 and J4 are waiting to be run. Their expected run times are 9, 6, 3 and 5 respectively. In order to minimize average response time, the jobs should be run in the order :
- (A) J1 J2 J3 J4 (B) J4 J3 J2 J1
(C) J3 J4 J1 J2 (D) J3 J4 J2 J1
18. Which of the following statement(s) is/are correct about Extensible Messaging and Presence Protocol (XMPP)?
- (i) XMPP uses XML.
(ii) It provides end-to-end encryption.
(iii) It supports QoS.
(iv) Binary data is first encoded and then transmitted in band.
- (A) (ii) & (iii) only (B) (i) & (iv) only
(C) (ii), (iii) & (iv) only (D) (i), (ii) & (iii) only
19. Identify the correct answer :
- S1. Transformation of object shape from one form to another is known as morphing.
S2. Tweening is the process, which applies to animation objects defined by a sequence of points, and that change shape from frame to frame.
- (A) S1 is False, S2 is True (B) S1 is True, S2 is True
(C) S1 is False, S2 is False (D) S1 is True, S2 is False

20. The Central Limit Theorem implies that the distribution of the sample mean_____.
- (A) Approaches a uniform distribution as sample size increases
 - (B) Is independent of the population mean
 - (C) Approaches a normal distribution as sample size increases
 - (D) Does not change with sample size

21. Consider the following C program :

```
#include<stdio.h>
int main() {
    int a[ ] = {2, 4, 6, 8, 10};
    int i, sum = 0, *b = a + 4;
    for (i = 0; i < 5; i++ )
        sum = sum + (*b - i) - *(b - i);
    printf("%dn", sum);
    return 0;
}
```

The output of above C program is _____ .

- (A) 10
 - (B) 22
 - (C) 30
 - (D) 38
22. The second derivative test for $f(x, y) = x^3 - 3xy^2 + 4$ at $(0, 0)$ indicates that the point is a_____.
- (A) Local minimum
 - (B) Local maximum
 - (C) Saddle point
 - (D) None of the above

23. Which of the following statement(s) is/are true with reference to the way of describing XML data?

- S1. XML uses DTD to describe the data.
- S2. XML uses XSL to describe the data.
- S3. XML uses a description node to describe the data

Codes :

- (A) S1 only
- (B) S2 only
- (C) S1 and S3
- (D) S1 and S2

24. Which of the following tags are provided by JavaServer Pages Standard Tag Library (JSTL)?
- (i) core tags
 - (ii) sql tags
 - (iii) xml tags
 - (iv) internationalization tags
 - (v) functions tags
- (A) (i), (iii), (v) only (B) (i), (ii), (iii) only
- (C) (i), (iii), (iv) only (D) (i), (ii), (iii), (iv), (v)

25. Consider the following two statements :

Statement I : The concept of group, subgroups and cosets are used in Cryptography and Public Key algorithms

Statement II : A monoid is always a group.

In light of the above statements, choose the most appropriate answer from the codes given below :

- (A) Both Statement I and Statement II are correct.
- (B) Both Statement I and Statement II are incorrect.
- (C) Statement I is correct and Statement II is incorrect.
- (D) Statement I is incorrect and Statement II is correct.

26. What is the correct order of the procedure for handling a page fault?

- 1. Check PCB validity for memory access
 - 2. If valid, terminate the process, else continue
 - 3. Schedule disk operation to read the page
 - 4. Find free frame update process and page tables after read
 - 5. Restart the process to access the page
- (A) 2-1-5-3-4 (B) 1-2-4-3-5
- (C) 1-2-5-3-4 (D) 5-1-4-3-2

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

- (i) RNN is a deep learning unsupervised model.
- (ii) Boltzman Machine is a deep learning supervised model
- (iii) Logistic Regression is a supervised learning model.
- (iv) Auto-encoder is a deep learning unsupervised model.

- (A) (i), (ii), (iii) & (iv) (B) (iii) & (iv) only
(C) (i), (ii) & (iii) only (D) (ii), (iii) & (iv) only

28. Determine the output of the following Java code snippet.

```
public class Myclass{  
    public static void main(String[] args) {  
        System.out.println(2+0+3+"CSE"+4+5);  
    }  
}
```

- (A) 5CSE9 (B) 5CSE45
(C) 5CSE (D) CSE

29. What is true about the language $L = \{0^n1^n | n \geq 0\}$?

- (A) It is regular
- (B) It is context-free but not regular
- (C) It is neither regular nor context-free
- (D) It is context-sensitive

30. The halting problem for Turing machines states that _____.

- (A) It is always possible to determine if a Turing machine will halt on a given input
- (B) There is a universal Turing machine that can determine if any other Turing machine will halt
- (C) It is undecidable to determine in general whether a given Turing machine will halt on a particular input
- (D) Most Turing machines can solve the halting problem

31. Determine the output of the following code fragment in Java, if p=10 and q=2.

```
public int division(int p, int q) {  
    try {  
        System.out.print("Try block, ")  
    }  
    return p / q;  
    } catch (ArithmeticException e) {  
        System.err.println("Catch block, ");  
        return -1;  
    } finally {  
        System.out.println("Finally block");  
    }  
}
```

- (A) Try block
- (B) Try block, Catch block
- (C) Try block, Catch block, Finally block
- (D) Try block, Finally block

32. A hash function H defined $H(\text{key}) = \text{key} \bmod 7$, with linear probing, is used to insert the keys 45, 44, 91, 55, 77, 18, 63 into a table indexed from 0 to 6. What will be the location of key 63?

- (A) 4
- (B) 5
- (C) 6
- (D) 1

33. Consider the following languages :

- I. $\{a^m b^n c^p d^q \mid m + p = n + q, \text{ where } m, n, p, q \geq 0\}$.
- II. $\{a^m b^n c^p d^q \mid m = n \text{ and } p = q, \text{ where } m, n, p, q \geq 0\}$.
- III. $\{a^m b^n c^p d^q \mid m = n = p \text{ and } p \neq q, \text{ where } m, n, p, q \geq 0\}$.
- IV. $\{a^m b^n c^p d^q \mid mn = p + q, \text{ where } m, n, p, q \geq 0\}$.

Which of the above languages are context-free?

- (A) I and IV
- (B) I and II
- (C) II and III
- (D) II and IV

34. Match the following :

List-I		List-II
(a) Cavalier Projection	(i)	The direction of projection is chosen so that there is no foreshortening of lines perpendicular to the xy plane.
(b) Cabinet Projection	(ii)	The direction of projection is chosen so that lines perpendicular to the xy planes are foreshortened by half their lengths.
(c) Isometric Projection	(iii)	The direction of projection makes equal angles with all of the principal axis.
(d) Orthographic Projection	(iv)	Projections are characterized by the fact that the direction of projection is perpendicular to the view plane.
(A) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)		(B) (a)–(ii), (b)–(i), (c)–(iii), (d)–(iv)
(C) (a)–(i), (b)–(ii), (c)–(iv), (d)–(iii)		(D) (a)–(ii), (b)–(i), (c)–(iii), (d)–(iv)

35. Which regex pattern correctly describes an identifier starting with a letter and followed by any number of letters or digits?

- | | |
|--------------------------|---------------------|
| (A) [a-zA-Z][a-zA-Z0-9]* | (B) [0-9]+[a-zA-Z]* |
| (C) [a-zA-Z]+ | (D) [a-zA-Z0-9]+ |

36. Which of the following statements is true for LR parsers compared to LL parsers?

- (A) LR parsers can handle a more extensive class of grammars
- (B) LL parsers are more general and can handle all grammars that LR parsers can
- (C) LR parsers are easier to implement
- (D) LL parsers are faster

37. Which of the following is a benefit of loop unrolling?

- | | |
|---|---|
| (A) Increased loop overhead | (B) Decreased register pressure |
| (C) Improved use of instruction pipelines | (D) Simplification of dependency graphs |

38. Constant folding is an optimization that :
- (A) Replaces a variable that is used multiple times with a constant
 - (B) Precomputes constant expressions at compile time
 - (C) Converts floating-point calculations to integer calculations
 - (D) Reduces the number of function calls in a program
39. Machine-independent optimization is performed at which stage of the compilation process?
- (A) During lexical analysis
 - (B) After parsing but before code generation
 - (C) During intermediate code generation
 - (D) After final code generation

40. Match List-I and List-II and select the correct answer from the codes given below :

List-I	List-II
(Rule of Reference)	(Symbolic Representation)
P. Modus Ponens	1. $((p \rightarrow q) \wedge (q \rightarrow r) \rightarrow (p \rightarrow r))$
Q. Modus Tollens	2. $(\neg p \wedge (p \vee q)) \rightarrow q$
R. Disjunctive Syllogism	3. $(p \wedge (p \rightarrow q)) \rightarrow q$
S. Hypothetical Syllogism	4. $(\neg q \wedge (p \rightarrow q)) \rightarrow \neg p$

Codes :

	P	Q	R	S
(A)	1	2	3	4
(B)	2	4	1	3
(C)	4	2	1	3
(D)	3	4	2	1

41. The granting and revoking of roles by the user may cause some confusions when that user role is revoked. To overcome the above situation _____.
- (A) The privilege must be granted only by roles
 - (B) The privilege is granted by roles and users
 - (C) The user role cannot be removed once given
 - (D) By restricting the user access to the roles
42. Effective software project management focuses on the four P's. What are those four P's?
- (A) People, Product, Process, Project
 - (B) People, Product, Performance, Project
 - (C) People, Payment, Process, Project
 - (D) None of the above
43. What is the worst case time complexity for search, insert and delete operations in splay tree?
- (A) $O(n)$ in all the cases
 - (B) $O(\log n)$ for all
 - (C) $O(\log n)$ for search & insert, $O(n)$ for delete
 - (D) $O(\log n)$ for search and $O(n)$ for insert & delete
44. What is the McCabe's Cyclomatic Complexity for the below pseudo code :
- ```
void method1(int arr[50])
{
 inti, j;
 for(i = 0 to 50)
 for(j = 0 to 50)
 if(arr[i] > arr[j])
 swap arr[i] and arr[j]
}
```
- (A) 4
  - (B) 3
  - (C) 6
  - (D) 2

45. If the number of modules in the software is 75 in current year, and in previous year, 5 new modules were added and 10 modules were modified, then the software maturity index (SMI) is \_\_\_\_\_.
- (A) 1 (B) 0.75  
(C) 0.8 (D) 1.2

46. Which of the following sets represent five stages defined by Capability Maturity Model (CMM) in increasing order of maturity?
- (A) Initial, Defined, Repeatable, Managed, Optimized  
(B) Initial, Repeatable, Defined, Managed, Optimized  
(C) Initial, Defined, Managed, Repeatable, Optimized  
(D) Initial, Repeatable, Managed, Defined, Optimized

47. Match List-I and List-II and select the correct answer from the codes given below :

| <b>List-I</b>                     | <b>List-II</b>                                                                                                      |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>(ATTACK)</b>                   | <b>(DESCRIPTIONS)</b>                                                                                               |
| P Phishing                        | 1 An attack where an attacker intercepts and alters communication between two parties without their knowledge.      |
| Q Denial of Service (DoS)         | 2 An attack that floods a network or server with excessive traffic, making it unavailable to legitimate users.      |
| R Man-in-the-Middle (MitM) Attack | 3 A technique used to trick users into revealing sensitive information by posing as a trustworthy entity.           |
| S SQL Injection                   | 4 An attack that exploits vulnerabilities in a web application's database query system to access unauthorized data. |

**Codes :**

- (A) (P)-(3), (Q)-(1), (R)-(2), (S)-(4) (B) (P)-(3), (Q)-(2), (R)-(1), (S)-(4)  
(C) (P)-(4), (Q)-(5), (R)-(2), (S)-(1) (D) (P)-(2), (B)-(3), (C)-(4), (S)-(1)





## ROUGH WORK