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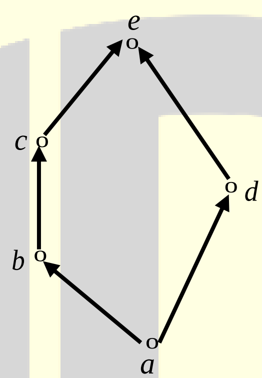
COMPUTER SCIENCE ENGINEERING

Q. No. 1 – 25 Carry One Mark Each

1. Consider the set $X = \{a, b, c, d, e\}$ under the partial ordering

$R = \{(a,a),(a,b),(a,c),(a,d),(a,e),(b,b),(b,c),(b,e),(c,c),(c,e),(d,d),(d,e),(e,e)\}$.

The Hasse diagram of the partial order (X, R) is shown below.



The minimum number of ordered pairs that need to be added to R to make (X, R) a lattice is ________.

Answer: (0) **Click here to watch video explanation**

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2. Which of the following statements about parser is/are CORRECT?

I. Canonical LR is more powerful than SLR.

II. SLR is more powerful than LALR

III. SLR is more powerful than Canonical LR.

(A) I only (B) II only (C) III only (D) II and III only

Answer: (A) **Click here to watch video explanation**

3. Match the following:

P.	static char var;	**i.**	Sequence of memory locations to store addresses
Q.	m= malloc (10); m = NULL;	**ii.**	A variable located in data section of memory
R.	char * ptr [10]	**iii.**	Request to allocate a CPU register to store data
S.	register int var1;	**iv.**	A lost memory which cannot be freed

(A) P-(ii), Q-(iv), R-(i), S-(iii)
(B) P-(ii), Q-(i), R-(iv), S-(iii)
(C) P-(ii), Q-(iv), R-(iii), S-(i)
(D) P-(iii), Q-(iv), R-(i), S-(ii)

Answer: (A) **Click here to watch video explanation**

4. Let L_1, L_2 be any two context free languages and R be any regular language. Then which of the following is/are CORRECT ?

I. $L_1 \cup L_2$ is context – free

II. $\overline{L_1}$ is context – free

III. $L_1 - R$ is context – free

IV. $L_1 \cap L_2$ is context – free

(A) I, II and IV only
(B) I and III only
(C) II and IV only
(D) I only

Answer: (B) **Click here to watch video explanation**

5. G is undirected graph with *n* vertices and 25 edges such that each vertex of G has degree at least 3. Then the maximum possible value of *n* is ___________.

Answer: (16) **Click here to watch video explanation**

6. Let p, q, r denote the statements *"It is raining ," It is cold", and " It is pleasant,"* respectively. Then the statement *"It is not raining and it is pleasant, and it is not pleasant only if it is raining and it is cold"* is represented by

(A) $(\neg p \wedge r) \wedge (\neg r \rightarrow (p \wedge q))$ (B) $(\neg p \wedge r) \wedge ((p \wedge q) \rightarrow \neg r)$

(C) $(\neg p \wedge r) \vee ((p \wedge q) \rightarrow \neg r)$ (D) $(\neg p \wedge r) \vee (r \rightarrow (p \wedge q))$

Answer: (A) **Click here to watch video explanation**

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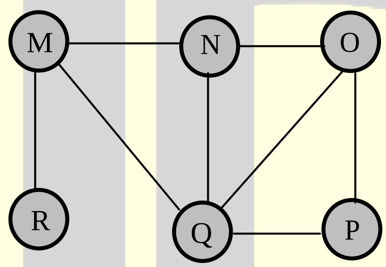
7. The Breadth First Search (BFS) algorithm has been implemented using the queue data structure. Which one of the following is a possible order of visiting the nodes in the graph below?



(A) MNOPQR (B) NQMPOR (C) QMNROP (D) POQNMR

Answer: (D) **Click here to watch video explanation**

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8. Let $P = \begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$ and $Q = \begin{bmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{bmatrix}$ be two matrices.

Then the rank of P +Q is _____________.

Answer: (2) **Click here to watch video explanation**

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9. Consider socket API on a Linux machine that supports connected UDP sockets. A connected UDP socket is a UDP socket on which **connect** function has already been called. Which of the following statements is/are CORRECT ?

I. A connected UDP socket can be used to communicate with multiple peers simultaneously.

II. A process can successfully call **connect** function again for an already connected UDP socket.

(A) I only (B) II only (C) Both I and II (D) Neither I nor IIs

Answer: (B) **Click here to watch video explanation**

10. The minimum possible number of states of a deterministic automaton that accepts the regular language

$L = \{w_1 a w_2 \mid w_1, w_2 \in \{a,b\}^*, |w_1| = 2, |w_2| \geq 3\}$ is ____________.

Answer: (8) **Click here to watch video explanation**

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11. Consider the following tables T1 and T2.

P	Q
2	2
3	8
7	3
5	8
6	9
8	5
9	8

R	S
2	2
8	3
3	2
9	7
5	7
7	2

In table T1, **P** is the primary key and **Q** is the foreign key referencing **R** in table T2 with on-delete cascade and on-update cascade. In table T2, **R** is the primary key and **S** is the foreign key referencing **P** in table T1 on-delete set NULL and on-update cascade. In order to delete record $\langle 3,8 \rangle$ from table T1, the number of additional records that need to be deleted from table T1 is ______________.

Answer: (0) **Click here to watch video explanation**

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12. Which of the following is/are shared by all the threads in a process ?

I. Program counter **II.** Stack

III. Address space **IV.** Registers

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

Answer: (B) **Click here to watch video explanation**

13. A circular queue has been implemented using a single linked list where each node consists of a value and a single pointer pointing to the next node. We maintain exactly two external pointers **FRONT** and **REAR** pointing to the front node and the rear node of the queue, respectively. Which of the following statements is/are **CORRECT** for such a circular queue, so that insertion and deletion operation can be performed in O (1) time ?

I. Next pointer of front node points to the rear node.

II. Next pointer of rear node points to the front node.

(A) I only (B) II only (C) Both I and II (D) Neither I nor II

Answer: (B) **Click here to watch video explanation**

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14. Given the following binary number in 32-bit (single precision) IEEE-754 format:

00111110011011010000000000000000

The decimal value closest to this floating- point number is

(A) 1.45×10^{1} (B) 1.45×10^{-1} (C) 2.27×10^{-1} (D) 2.27×10^{1}

Answer: (C) **Click here to watch video explanation**

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15. An ER model of a database consists of entity types A and B. These are connected by a relationship R which does not have its own attribute. Under which one of the following conditions, can the relational table for R be merged with that of A?

(A) Relationship R is one-to-many and the participation of A in R is total

(B) Relationship R is one-to-many and the participation of A in R is partial

(C) Relationship R is many-to one and the participation of A in R is total

(D) Relationship R is many-to one and the participation of A in R is partial

Answer: (C) **Click here to watch video explanation**

16. Match the algorithms with their time complexities:

Algorithm		Time complexity	
P.	Towers of Hanoi with *n* disks	i.	$\theta(n^2)$
Q.	Binary search given *n* sorted numbers	ii.	$\theta(n \log n)$
R.	Heap sort given *n* numbers at the worst case	iii.	$\theta(2^n)$
S.	Addition of two $n \times n$ matrices	iv.	$\theta(\log n)$

(A) P-(iii),Q-(iv), R-(i), S-(ii)

(B) P-(iv),Q-(iii), R-(i), S-(ii)

(C) P-(iii),Q-(iv), R-(ii), S-(i)

(D) P-(iv),Q-(iii), R-(ii), S-(i)

Answer: (C) **Click here to watch video explanation**

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17. Match the following according to input (from the left column) to the complier phase (in the right column) that processes it.

Column-1		Column-2	
P.	Syntax tree	i.	Code generator
Q.	Character stream	ii.	Syntax analyzer
R.	Intermediate representation	iii.	Semantic analyzer
S.	Token stream	iv.	Lexical analyzer

(A) P-(ii), Q-(iii), R-(iv), S-(i)

(B) P-(ii), Q-(i), R-(iii), S-(iv)

(C) P-(iii), Q-(iv), R-(i), S-(ii)

(D) P-(i), Q-(iv), R-(ii), S-(iii)

Answer: (C) **Click here to watch video explanation**

18. Consider the following statements about the routing protocols, Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) in an IPv4 network.

I. RIP uses distance vector routing

II. RIP packets are sent using UDP

III. OSPF packets are sent using TCP

IV. OSPF operation is based on link-state routing

Which of the statements above are CORRECT?

(A) I and IV only (B) I, II and III only

(C) I, II and IV only (D) II, III and IV only

Answer: (C) **Click here to watch video explanation**

19. If $f(x) = R\sin\left(\frac{\pi x}{2}\right) + S, f'\left(\frac{1}{2}\right) = \sqrt{2}$ and $\int_0^1 f(x)dx = \frac{2R}{\pi}$, then the constants R and S are, respectively

(A) $\frac{2}{\pi}$ and $\frac{16}{\pi}$ (B) $\frac{2}{\pi}$ and 0 (C) $\frac{4}{\pi}$ and 0 (D) $\frac{4}{\pi}$ and $\frac{16}{\pi}$

Answer: (C) **Click here to watch video explanation**

20. In a file allocation system, which of the following allocation schemes(s) can be used if no external fragmentation is allowed?

I. Contiguous

II. Linked

III. Indexed

(A) I and III only (B) II only (C) III only (D) II and III only

Answer: (D) **Click here to watch video explanation**

21. Consider a quadratic equation $x^2 - 13x + 36 = 0$ with coefficients in a base b. The solutions of this equation in the same base b are x = 5 and x = 6. Then b = ____________.

Answer: (8) **Click here to watch video explanation**

22. Identify the language generated by the following grammar, where S is start variable.

$S \rightarrow XY$

$X \rightarrow aX | a$

$Y \rightarrow aYb | \in$

(A) $\{a^m b^n | m \geq n, n > 0\}$ (B) $\{a^m b^n | m \geq n, n \geq 0\}$

(C) $\{a^m b^n | m > n, n \geq 0\}$ (D) $\{a^m b^n | m > n, n > 0\}$

Answer: (C) **Click here to watch video explanation**

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23. The representation of the value of a 16-bit unsigned integer X in hexadecimal number system is BCA9. The representation of the value of X in octal number system is

(A) 571244 (B) 736251 (C) 571247 (D) 136251

Answer: (D) **Click here to watch video explanation**

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24. Consider the following function implemented in C:

```
void print xy (int x, int y) {
int *ptr ;
x = 0;
ptr = &x;
y = * ptr;
* ptr = l;
printf (“%d, %d,” x,y);
}
```

The output of invoking print xy (l, l) is

(A) 0, 0 (B) 0, 1 (C) 1, 0 (D) 1, 1

Answer: (C) **Click here to watch video explanation**

25. The maximum number of IPv4 router addresses that can be listed in the record route (RR) option field of an IPv4 header is _________.

Answer: (9) Click here to watch video explanation

Q. No. 26 – 55 Carry Two Marks Each

26. Consider a binary code that consists of only four valid code words as given below:

00000,01011,10101,11110

Let the minimum Hamming distance of the code be p and the maximum number of erroneous bits that can be corrected by the code be q. Then the values of p and q are

(A) p = 3 and q = 1
(B) p = 3 and q = 2
(C) p = 4 and q = 1
(D) p = 4 and q = 2

Answer: (A) Click here to watch video explanation

27. A system shares 9 tape drives. The current allocation and maximum requirement of tape drives for three processes are shown below:

Process	Current Allocation	Maximum Requirement
P1	3	7
P2	1	6
P3	3	5

Which of the following best describes current state of the system ?

(A) Safe, Deadlocked
(B) Safe, Not Deadlocked
(C) Not Safe, Deadlocked
(D) Not Safe, Not deadlocked

Answer: (B) Click here to watch video explanation


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28. Two transactions T_1 and T_2 are given as:

$$T_1 : r_1(X)w_1(X)r_1(Y)w_1(Y)$$
$$T_2 : r_2(Y)w_2(Y)r_2(Z)w_2(Z)$$

where $r_i(V)$ denotes a read operation by transaction T_i on a variable V and $w_i(V)$ denotes a *write* operations by transaction T_i on a variable V. The total number of conflict serializable schedules that can be formed by T_1 and T_2 is _____________.

Answer: (54) **Click here to watch video explanation**

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29. If w, x, y, z are Boolean variables, then which one of the following is INCORRECT ?

(A) $wx + w(x+y) + x(x+y) = x + wy$

(B) $\overline{w\bar{x}\left(y+\bar{z}\right)} + \overline{wx} = \bar{w} + x + \bar{y}z$

(C) $\left(w\bar{x}\left(y + x\bar{z}\right) + \bar{w}\bar{x}\right)y = x\bar{y}$

(D) $(w+y)(wxy+wyz) = wxy + wyz$

Answer: (C) **Click here to watch video explanation**

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30. Consider the following C Program.

```
# include <stdio.h>
#include<string.h>
#int main ( ){
     char*  c = "GATECSIT2017";
     char*  p = c;
printf("%d", (int) strlen (c+2[p]-6[p]-1));
return 0;
}
```

The output of the program is _______________.

Answer: (2) **Click here to watch video explanation**

31. P and Q are considering to apply for a job. The probability that P applies for the job is $\frac{1}{4}$. The probability that P applies for the job given that Q applies for the job is $\frac{1}{2}$, and the probability that Q applies for the job given that P applies for the job $\frac{1}{3}$. Then the probability that P does not apply for the job given that Q does not apply for the job is

(A) $\frac{4}{5}$ (B) $\frac{5}{6}$ (C) $\frac{7}{8}$ (D) $\frac{11}{12}$

Answer: (A) **Click here to watch video explanation**

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32. If the characteristics polynomial of 3×3 matrix M over R (the set of real numbers) is $\lambda^3 - 4\lambda^2 + a\lambda + 30, a \in R$, and one eigen value of M is 2, then the largest among the absolute values of the eigen values of M is ________.

Answer: (5) **Click here to watch video explanation**

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33. Consider the following expression grammar G:

$$E \to E - T \mid T$$
$$T \to T + F \mid F$$
$$F \to (E) \mid id$$

Which of the following grammars is not left recursive, but is equivalent to G?

(A)
$$E \to E - T \mid T$$
$$T \to T + F \mid F$$
$$F \to (E) \mid id$$

(B)
$$E \to TE'$$
$$E' \to -TE' \mid \in$$
$$T \to T + F \mid F$$
$$F \to (E) \mid id$$

(C)
$$E \to TX$$
$$X \to -TX \mid \in$$
$$T \to FY$$
$$Y \to +FY \mid \in$$
$$F \to (E) \mid id$$

(D)
$$E \to TX \mid (TX)$$
$$X \to -TX \mid +TX \mid \in$$
$$T \to id$$

Answer: (C) **Click here to watch video explanation**

34. In a two-level cache system, the access times of L_1 and L_2 caches are 1 and 8 clock cycles, respectively. The miss penalty from L_2 cache to main memory is 18 clock cycles . The miss rate of L_1 cache is twice that of L_2. The average memory access time (AMAT) of this cache system is 2 cycles. This miss rates of L_1 and L_2 respectively are :

(A) 0.111 and 0.056 (B) 0.056 and 0.111

(C) 0.0892 and 0.1784 (D) 0.1784 and 0.0892

Answer: (A) **Click here to watch video explanation**

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35. Consider two hosts X and Y, connected by a single direct link of rate 10^6 bits/sec . The distance between the two hosts is 10,000km and the propagation speed along the link is 2×10^8 m/sec . Host X sends a file of 50,000 bytes as one large message to host Y continuously. Let the transmission and propagation delays be *p* milliseconds and *q* milliseconds, respectively . Then the values of *p* and *q* are

(A) p = 50 and q = 100 (B) p = 50 and q = 400

(C) p = 100 and q = 50 (D) p = 400 and q = 50

Answer: (D) **Click here to watch video explanation**

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36. Consider the recurrence function

$$T(n)=\begin{cases}2T\left(\sqrt{n}\right)+1, & n>2\\ 2, & 0<n\le 2\end{cases}$$

Then T(n) in terms of θ notation is

(A) $\theta(\log\log n)$ (B) $\theta(\log n)$ (C) $\theta\left(\sqrt{n}\right)$ (D) $\theta(n)$

Answer: (B) **Click here to watch video explanation**

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37. If a random variable X has a Poisson distribution with mean 5, then the expectation

$E\left[(X+2)^2\right]$ equals ______________.

Answer: (54) **Click here to watch video explanation**

38. Consider the following C function

```
int fun (int n) {
     int i, j;
      for (i = 1; i< = n; i++)     {
                for (j = 1 ; j < n ; j+=i)    {
    printf ("%d %d ,i, j ) ;
                 }
    }    }
```

Time complexity of fun in terms of θ notation is

(A) $\theta\left(n\sqrt{n}\right)$ (B) $\theta\left(n^2\right)$ (C) $\theta\left(n\log n\right)$ (D) $\theta\left(n^2\log n\right)$

Answer: (C) **Click here to watch video explanation**

39. The pre-order transversal of a binary search tree is given by 12, 8, 6, 2, 7, 9, 10, 16, 15, 19, 17, 20. Then the post-order traversal of this tree is:

(A) 2,6,7,8,9,10,12,15,16,17,19,20 (B) 2,7,6,10,9,8,15,17,20,19,16,12

(C) 7,2,6,8,9,10,20,17,19,15,16,12 (D) 7,6,2,10,9,8,15,16,17,20,19,12

Answer: (B) **Click here to watch video explanation**

40. Consider the C program fragment below which is meant to divide x by y using repeated subtractions. The variables x, y, q and r are all unsigned int.

```
while (r >= y)   {
r = r – y;
q = q +1;
}
```

Which of the following conditions on the variables x, y, q and r before the execution of the fragment will ensure that the loop terminates in a state satisfying the condition x = = (y*q+r)?

(A) (q = = r) && (r = =0) (B) (x > 0) && (r = =x) && (y > 0)

(C) (q = = 0) && (r = = x) && (y > 0) (D) (q = = 0) && (y > 0)

Answer: (C) **Click here to watch video explanation**

41. A message is made up entirely of characters from the set X= {P,Q,R,S,T}. The table of probabilities for each of the characters is shown below:

Character	Probability
P	0.22
Q	0.34
R	0.17
S	0.19
T	0.08
Total	1.00

If a message of 100 characters over X is encoded using Huffman coding, then the expected length of the encoded message in bits is_________

Answer: (225) **Click here to watch video explanation**

42. The next state table of a 2-bit saturating up-counter is given below.

Q_1	Q_0	Q_1^+	Q_0^+
0	0	0	1
0	1	1	0
1	0	1	1
1	1	1	1

The counter is built as a synchronous sequential circuit using T flip-flops. The expression for T_1 and T_0 are

(A) $T_1 = Q_1Q_0,\qquad T_0 = \overline{Q}_1\overline{Q}_0$

(B) $T_1 = \overline{Q}_1Q_0,\qquad T_0 = \overline{Q}_1 + \overline{Q}_0$

(C) $T_1 = Q_1 + Q_0,\qquad T_0 = \overline{Q}_1 + \overline{Q}_0$

(D) $T_1 = \overline{Q}_1Q_0,\qquad T_0 = Q_1 + Q_0$

Answer: (B) **Click here to watch video explanation**

43. Consider the set of processes with arrival time (in milliseconds). CPU burst time (in milliseconds), and priority (0 is the highest priority) shown below. None of the processes have I/O burst time.

Process	Arrival Time	Burst Time	Priority
P_1	0	11	2
P_2	5	28	0
P_3	12	2	3
P_4	2	10	1
P_5	9	16	4

The average waiting time (in milliseconds) of all the processes using preemptive priority scheduling algorithm is __________

Answer: (29) **Click here to watch video explanation**

44. For any discrete random variable X, with probability mass function

$P(X=j)=p_j, p_j \geq 0, j \in \{0,.....N\}$ and $\sum_{j=0}^{N} p_j = 1,$ define the polynomial function

$g_x(z)=\sum_{j=0}^{N} p_j z^j$ For a certain discrete random variable Y, there exists a scalar $\beta \in [0,1]$ such that $g_Y(z)=(1-\beta+\beta z)^N$. The expectation of Y is

(A) $N\beta(1-\beta)$

(B) $N\beta$

(C) $N(1-\beta)$

(D) Not expressible in terms of N and β alone

Answer: (B) **Click here to watch video explanation**

45. The read access times and the hit ratios for different caches in a memory hierarchy are as given below.

Cache	Read access time (in nanoseconds)	Hit ratio
I-cache	2	0.8
D-cache	2	0.9
L2-cache	8	0.9

The read access time of main memory is 90 nanoseconds. Assume that the caches use the referred word-first read policy and the write back policy. Assume that all the caches are direct mapped caches. Assume that the dirty bit is always 0 for all the blocks in the caches. In execution of a program, 60% of memory reads are for instruction fetch and 40% are for memory operand fetch. The average read access time in nanoseconds (up to 2 decimal places) is__________.

Answer: (4.72) **Click here to watch video explanation**

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46. If the ordinary generating function of a sequence $\{a_n\}_{n=0}^{\infty}$ is $\frac{1+z}{(1-z)^3}$, then $a_3 - a_0$ is equal to ______.

Answer: (15) **Click here to watch video explanation**

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47. Consider the following snippet of a C program. Assume that swap (&x, &y) exchanges the contents of x and y.

```
int main ( )     {
int array[]={3,5,1,4,6,2};
int done =0 ;
inti ;
while (done = = 0)    {
     done = 1;
     for (i = 0; i<=4; i ++)    {
     if (array [i] < array [i +1])    {
     swap (& array [i], &array [i+1]);
          done = 0;
```

```
        }
    }
    for (i = 5 ;i> =1; i --)    {
    if (array [i] >array [ i-1])   {
    swap ( & array [i] , &array [i-1]);
    done = 0;
    }
        }
    }
    printf( " %d " , array [3] );
    }
```

The output of the program is ____________.

Answer: (3) **Click here to watch video explanation**

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48. Consider the following C program.

```
# include <stdio.h>
int main ( ){
     int m = 10;
     int n, n1;
     n = ++m;
     n1 = m++;
n--;
     --n1;
     n -=n1;
printf ("%d", n) ;
     return 0;
}
```

The output of the program is ______________.

Answer: (0) **Click here to watch video explanation**

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49. Consider the following database table named *top _scorer*.

top _scorer.

Player	Country	Goals
Klose	Germany	16
Ronald	Brazil	15
G Muller	Germany	14
Fontaine	France	13
Pele	Brazil	12
Klinsmann	Germany	11
Kocsis	Hungary	11
Batistuta	Argentina	10
Cubillas	Peru	10
Lato	Poland	10
Lineker	England	10
T Miller	Germany	10
Rahn	Germany	10

Consider the following SQL query:

```
SELECTta.playerFROM top _scorer AS ta
WHERE ta.goals> ALL (SELECT tb. goals
                            FROM top _ scorer AS tb
                            WHERE tb.country = 'Spain')
AND ta.goals> ANY ( SELECT tc. goals
                 FROM top_ scorer AS tc
                 WHERE tc.country = 'Germany')
```

The number of tuples returned by the above SQL query is ___________.

Answer: (7) **Click here to watch video explanation**

50. Given f (w,x,y,z) $=\sum_m$ (0,1,2,3,7,8,10) $+\sum_d$ (5,6,11,15), where *d* represents the don't care condition in Karnaugh maps. Which of the following is a minimum product-of-sums (POS) form of f(w,x,y,z) ?

(A) $f=\left(\overline{w}+\overline{z}\right)\left(\overline{x}+z\right)$ (B) $f=\left(\overline{w}+z\right)\left(x+z\right)$

(C) $f=\left(w+z\right)\left(\overline{x}+z\right)$ (D) $f=\left(w+\overline{z}\right)\left(\overline{x}+z\right)$

Answer: (A) **Click here to watch video explanation**

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51. In a B^+ tree, if the search –key value is 8 bytes long, the block size is 512bytes and the block pointer size is 2 bytes, then maximum order of the B^+ tree is _______________.

Answer: (52) **Click here to watch video explanation**

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52. Let L(R) be the language represented by regular expression R. Let L(G) be the language generated by a context free grammar G. Let L (M) be the language accepted by a Turning machine M. Which of the following decision problems are undecidable ?

I. Given a regular expression R and a string w, is $w\in L(R)$?

II. Given a context-free grammar G, $L(G)=\varnothing$?

III. Given a context-free grammar G, is $L(G)=\sum^*$ for some alphabet $\sum$?

IV. Given a Turning machine M and a string w, is $w\in L(M)$?

(A) I and IV only (B) II and III only

(C) II, III and IV only (D) III and IV only

Answer: (D) **Click here to watch video explanation**

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53. Consider a machine with a byte addressable main memory of 2^{32}bytes divided into blocks of size 32 bytes. Assume that a direct mapped cache having 512 cache lines is used with this machine. The size of the tag field in bits is ______.

Answer: (18) **Click here to watch video explanation**

54. Let δ denote that transition function and $\hat{\delta}$ denote the extended transition function of the $\in -$ NFA whose transition table is given below:

δ	$\in$	a	b
$\rightarrow q_0$	$\{q_2\}$	$\{q_1\}$	$\{q_0\}$
q_1	$\{q_2\}$	$\{q_2\}$	$\{q_3\}$
q_2	$\{q_0\}$	$\varnothing$	$\varnothing$
q_3	$\varnothing$	$\varnothing$	$\{q_2\}$

Then $\hat{\delta}(q_2, aba)$ is

(A) $\varnothing$ (B) $\{q_0, q_1, q_3\}$ (C) $\{q_0, q_1, q_2\}$ (D) $\{q_0, q_2, q_3\}$

Answer: (C) **Click here to watch video explanation**

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55. Consider the following languages.

$L_1 = \{a^P \mid p \text{ is a prime number}\}$

$L_2 = \{a^n b^m c^{2m} \mid n \geq 0, m \geq 0\}$

$L_3 = \{a^n b^n c^{2n} \geq 0\}$

$L_4 = \{a^n b^n \mid n \geq 1\}$

Which of the following are CORRECT ?

I. L_1 is context-free but not regular.

II. L_2 is not context-free.

III. L_3 is not context-free but recursive.

IV. L_4 is deterministic context-free.

(A) I ,II and IV only (B) II and III only (C) I and IV only (D) III and IV only

Answer: (D) **Click here to watch video explanation**


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