**QUESTION-1—MCQ**

Which of the following used in compiler code optimization uses live variable analysis?

(a) strength reduction
(b) register assignment of variable
(c) Constant folding
(d) Run time function calling

**SOLUTION: (b)**

Register assignment of variable used in compiler code optimization uses live variable analysis.

**QUESTION-2—MCQ**

Consider the following recurrence relation

$T(n) = 2T(n–1) + n * 2n; n > 0; T(0) = 1$

The above recurrence relation is equivalent to

(a) (n2 2n)
(b) ((log n)2 2n)
(c) (n 2n)
(d) (4n)

**SOLUTION: (a)**

$T(n) = 2k\ T\ (n – k) + 2n\ [n + (n – 1) + (n – 2) + ... + (n – (k – 1))]$

$T(n) = 2k\ T(n – k) + \frac{n(n+)1}{2} \times 2n$

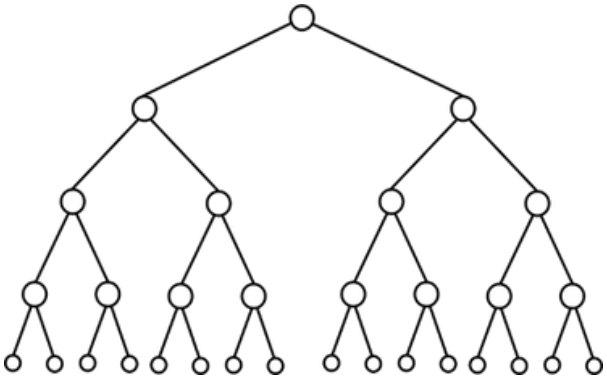
T(n) = (2n n2)

**QUESTION-3—NAT**

The height of any rooted tree is defined as the maximum number of edges in the path from root node to any leaf node.

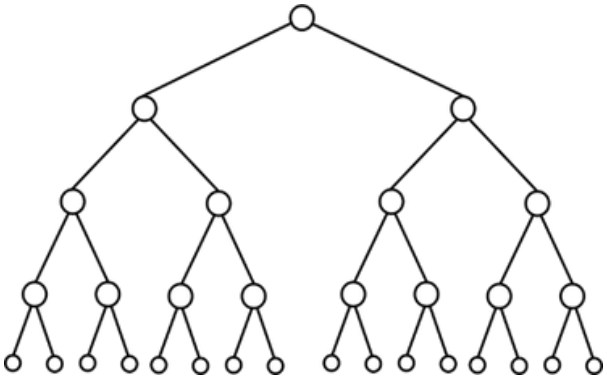
Suppose a min heap T stores 32 keys, the height of T is _____.

**SOLUTION: (5)**



No. of elements = 31; height = 4

If we add one more element then height will be 5.



**QUESTION-4—MCQ**

Consider the following grammar where S is start symbol, A, B are variables and {a, b} are terminals.
S → aaB | Abb; A → a|aA; B → b|bB
The language generated by above grammar (G) is:

(a) {an b2n | n ≥ 1} {a2n bn | n ≥ 1}

(b) {a2 bn | n ≥ 1} {an b2 | n ≥ 1}

(c) {an bn | n ≥ 1}

(d) {a2n b2n | n ≥ 1}

**SOLUTION: (b)**

S → aaB | Abb A → a|aA → a+ B →

b|bB → b+ S = {aab+ a+bb} =

{a2 bn | n ≥ 1}

{an b2 | n ≥ 1}

**QUESTION-5—MSQ**

A regular language L is accepted by a NFA with n states, then which of the following is/are correct?

(a) Every DFA that accepts L has > 2n states

(b) L may have an accepting NFA with < n states

(c) There exists a DFA with ≤ 2n states that accept L

(d) L may have an accepting DFA with < n states

**SOLUTION: (b, c, d)**

(a) Every DFA that accept L has> 2n states → False

(b) L may have an accepting NFA with < n states → True

(c) There exists a DFA with ≤ 2n states that accept L → True

(d) L may have an accepting DFA with < n states → True

**QUESTION-6—MSQ**

Which of the following is true about any binary search tree with n distinct elements?

(a) Finding an element take O(log n) time in worst case

(b) Every BST is also a min heap

(c) An inorder traversal always produce sorted sequence of elements

(d) The maximum length of a path from root to any other node is (n–1).

**SOLUTION: (c, d)**

(a) Finding an element take O(log n) time in worst case → False

(b) Every BST is also a min heap → False

(c) An inorder traversal always produce sorted sequence of elements → True

(d) The maximum length of a path from root to any other node is (n–1) → True

**QUESTION-7—MSQ**

Which of the following is/are correct about first and follow?

(a) For A → , is added to first(A)

(b) If there is any right end input marker it will be added to first (S), S is start symbol.

(c) If there is any right end input marker it will be added to follow (S), S is start symbol.

(d) For A → , is added to follow(A)

**SOLUTION: (a, c)**

(a) For A → , is added to first(A) → True

(b) If there is any right end input marker it will be added to first (S), S is start symbol → False

(c) If there is any right end input marker it will be added to follow (S), S is start symbol → True

(d) For A → , is added to follow(A) → False

**QUESTION-8—MCQ**

Let G(V, E) be an undirected and unweighted graph with 100 vertices. Let d (u, v) denote the edges in shortest path between u and v in V. Let the maximum value of d(u, v), u, v V, such that u v be 30. Let T be any BFS tree of G. Which of the following is correct?

(a) The height of T exactly 30

(b) The height of T atleast 15

(c) The height of T exactly 15

(d) The height of T atleast 30

**SOLUTION: (b)**

(a) The height of T exactly 30 X - Incorrect. BFS ensures that the tree height is at most half the diameter in the worst case.

(b) The height of T at least 15 Correct. The height of BFS tree is at least 15, depending on the

(c) structure.

(d) The height of T exactly 15 × - Incorrect. While 15 is a reasonable height, it is not always exact

**QUESTION-9—MCQ**

The height of T at least 30 × Incorrect. The BFS tree cannot have a height more than the diameter.

Consider the following languages

L 1= { | {a, b}+ and {a, b}+ }

L2 = { | {a}+ and {a, b}+}

Which of the following is correct?

(a) L1 CFL and L2 Regular

(b) L1 is regular and L2 is CFL

(c) L1 is Regular and L2 Regular

(d) None of these

**SOLUTION: (a)**

L1 = { | {a, b}+ and {a, b}+}

L2 = { | {a}+ and {a, b}+}

L1 CFL and L2 Regular

**QUESTION-10—NAT**

$A = \begin{matrix} 1 & 1 \\ 1 & -1 \end{matrix}$ ; then find the eigen value of A13.

**SOLUTION:** ±(64 2)

$$A = \begin{matrix} 1 & 1 \\ 1 & -1 \end{matrix}$$

$$(2 - 0 +)(= -2$$

$$= \begin{matrix} 2 & 0 \\ & \end{matrix}$$

eigen value of $( )^{13}$

$$= A^{13}$$

$$2^2$$

64

**QUESTION-11—NAT**

```
int gate (int n) {
    int d, t, newnum, turn;
    newnum = turn = 0; t = 1;
    while (n >= t) t *= 10;
    t /= 10;
    while (t > 0) {
            d = n/t;
            n = n % t;
            t /= 10;
            if (turn)
              newnum = 10 * newnum + d;
            turn = (turn + 1) % 2;
    }
    return newnum;
}
int main() {
    printf("%d"; gate (1 4 3 6 2));
    return 0;
}
```

The value printed by the given C-prog is _____. (answer should be in integer)

**SOLUTION: (46)**

Program defines a function gate that processes the digits of an integer alternately based on the turn variable. Initially, turn is set to 0, and the function processes each digit of the number starting from the most significant one. If turn is 1, the digit is added to the result newnum, otherwise, it is skipped. For the number 14362, the program adds digits 4 and 6 to newnum (when turn is 1) and skips the other digits (1, 3, and 2). After processing all the digits, the final value of newnum is 46. The function returns this value, and it is printed by the main function. Thus, the value printed by the program is 46.

In double hashing scheme, h1(k) = k mod 11 and h2(k) = 1+(k mod 7) are the auxiliary hash functions. The size of the hash table is 11. The hash function for the ith probe in the open address table is

[h1 (k) + i h2 (k)] mod m. The following keys are inserted in the given order 63, 50, 25, 79, 67, 24.

The slot at which key 24 gets stored is _____(Answer should be in integer).

**SOLUTION: (10)**

h1(k) = kmod 11

h2(k) = 1 + k mod7

m = 11

$h_1(k) + i * h_2(k) \quad \% m$

(1) 63 % 11 =

(2) 8 50 % 11

(3) = 6 25 %

(4) 11 = 3 79

(5) % 11 = 2

(6) 67 % 11 =

h2(24) =1 12 +4 2%4% 1 17

= 21 + 3 = 4

2 + 1 × 4 = 6

2 + 2 × 4

| | |
|---|---|
| | 0 |
| 67 | 1 |
| 79 | 2 |
| 25 | 3 4 |
| | 5 |
| | 6 |
| 50 | 7 |
| | 8 |
| 63 | 9 |
| | 10 |
| 24 | |

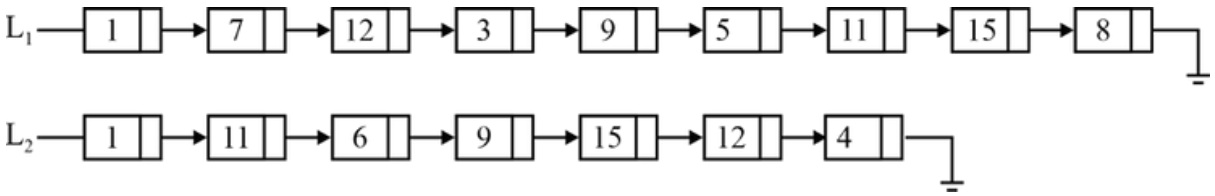
**QUESTION-13—NAT**

Let LIST be a datatype for an implementation of linked list defined as follows:

```
typedef struct list {
    int data;
    struct list *next;
} LIST;
```

Suppose a program has created '2' linked-lists L1 & L2, whose contents are given in the figure below (code for creating L1 & L2 is not provided here). L1 contains 9 nodes and L2 contains 7 nodes.

Consider the following C-prog segment that modifies the list L1. The number of nodes that will be there in L1 after execution of the code sequence is _____.




```
int find (int query, LIST *list) {
    while (list != NULL) {
            if (list → data == query) return 1;
            list = list → next;
    }
    return 0;
}
int main (){
    List ptr1 = L1; ptr2 = L2;
    while (ptr1 → next! = NULL) {
            query = ptr1 → next → data;
            if ((find(query, L2))
              ptr1 → next = ptr1 → next → next;
            else
              ptr1 = ptr1 → next;
    }
    return 0;
}
```

**SOLUTION: (5)**

The given problem involves two linked lists, L1 and L2, where L1 initially contains 9 nodes, and L2 contains 7 nodes. The C program iterates through L1, checking if each node's next value exists in L2 using the find function. If a match is found, that node is removed by skipping it; otherwise, traversal continues. The deletions occur systematically, removing nodes with values 11, 12, 9, 11, and 15 from L1. After executing the program, the remaining nodes in L1 are 7, 3, 5, 6, and 8. The crucial point is that 6 is retained in L1, leading to a total of 5 remaining nodes. The process ensures that only non- matching elements persist, maintaining the linked list's structure. Thus, after execution, the number of nodes left in L1 is 5.

**QUESTION-14—NAT**

Let $f(x)=\begin{matrix} ax+b, & x\ 1 \\ x3 + x2 + 1, & x \quad 1 \end{matrix}$

If f is differentiable at every point then value of b?

**SOLUTION: (–2)**

f(x) is differentiable so will continuous also.

$$f(x)=\begin{matrix} ax + b, & x\ 1 \\ x^3 + x^2 + 1x, & x\ 1 \end{matrix}$$

$$f'(x)=\begin{matrix} a & x\ 1 \\ 3x^2 + 2x + 1 & x \end{matrix}$$

At, x = 1,

LHL=RHL = f(1) & LHD = RHD

a + b = 3 a = 3 + 2

b = 3 – 5 = –2 a = 6

**QUESTION-15—**

Which of the following is False?

(a) Symbol table is responsible for keeping track of scope of
(b) variable Symbol table is created during lexical analysis.
(c) Symbol table can be implemented using a BST Symbol table
(d) is not required after the parsing phase.

**SOLUTION: (d)**

(a) Symbol table is responsible for keeping track of scope of variable → True
(b) Symbol table is created during lexical analysis → True
(c) Symbol table can be implemented using a BST → True
(d) Symbol table is not required after the parsing phase → False

**QUESTION-16—NAT**

Let S be the ternary string over alphabets (a, b, c) All strings in S contain at least one occurrence of two consecutive symbol that is aa, bb or cc. Such strings of length 5 that are possible is ____

**SOLUTION: (195)**

3 × 3 × 3 × 3 × 3 – 3×2×2×2×2

(3)5 – 48

= 243 – 48

= 195

**QUESTION-17—MCQ**

Let G be any undirected graph with positive weight and T be a MST of G for any two vertices u, v Let d1 (u, v) and d2 (u, v) be the sortest distance between u and v in G and T respectively.

(a) d1 (u, v) = d2 (u, v)
(b) d1 (u, v) d2 (u, v)
(c) d1 (u, v) ≥ d2 (u, v)
(d) d1 (u, v) ≤ d2 (u, v)

**SOLUTION: (d)**

d1 (u, v) always ≤ d2 (u, v)

**QUESTION-18—MCQ**

Consider the following languages L1 and L2

L 1= {am bm cm+ | nm, n ≥ 1}

L 2= {am bn cm+ |n m, n ≥ 1}

Which of the following is correct?

(a) L1 CFL and L2 Regular
(b) L1 and L2 both are CFL
(c) L1 is non-CFL and L2 CFL
(d) L1 CSL and L2 is Regular

**SOLUTION: (c)**

L1 = {am bm cm+n | m, n ≥ 1}

L 2= {am bn cm+ |n m, n ≥ 1}

- L1 is CSL
- L2 is CFL

**QUESTION-19—NAT**

Consider three address code segment. How many basic blocks are needed?

100 i = 1 j = 1 t1 = 10 ×
1 i t2 = t1 + j t3 = 8
100 ×t2 t4 = t3 – 88
2 a [t4] = 0.0 j = j + 1
100 if j 10 go to 1003
3 i = i + 1
100 if i 10 go to 1002
4 i = i
100
5
100
6
100
7
100
8
100
9
101

1013 t5 = i –1

1014 t6 = 88 ×t5

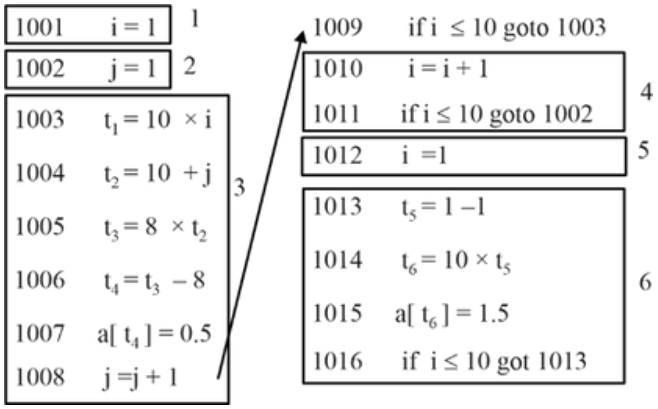
1015 a[t6] = 1.0

1016 i = i + 1

1017 if i 1 10 go to 1013

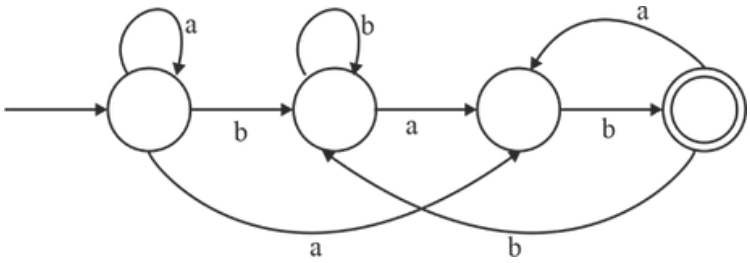
**SOLUTION: (6)**

No. of blocks = 6




**QUESTION-20—MCQ**

Consider the following DFA




Which of the following is/are correct?

(a) Set of all string contains the pattern bab

(b) Set of all string contains n even number of b's

(c) Set of all string contains ending with bab.

(d) Set of all string containing string aba

**SOLUTION: (c)**

(a) Set of all string contains the pattern bab → False
(b) Set of all string contains n even number of b's → False
(c) Set of all string contains ending with bab.→ True
(d) Set of all string containing string aba → False

**QUESTION-21—MCQ**

A dice is thrown thrice find the probability of getting exactly one 6?

(a) 75/216 (b) 64/216

(c) 70/216 (d) None of these

**SOLUTION: (a)**

Required probability $= \frac{1}{6}\cdot\frac{5}{6}\cdot\frac{5}{6} + \frac{5}{6}\cdot\frac{1}{6}\cdot\frac{5}{6} + \frac{5}{6}\cdot\frac{5}{6}\cdot\frac{1}{6} = \frac{75}{216}$

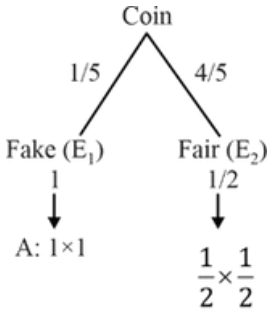
**QUESTION-22—**

A box contains 5 coins 4 are real 1 is fake always head giving. if 1 coin is removed and tossed twice the outcome is H and H what is the probability the coin was fake one

(a) 1/2 (b) 2/3

(c) 3/4 (d) None of these

**SOLUTION: (a)**




$$P(E1/A) = \frac{1}{5}\cdot 1 = \frac{1}{1\cdot 1 + \frac{4}{5}\cdot\frac{1}{2}\cdot\frac{1}{2}} = \frac{1}{\frac{1}{2}}$$

**QUESTION-23—MCQ**

In a max out B tree if an element is added what will happen

(a) nodes will never split (b) h of tree will increase

(c) at least 1 node will split (d) none of these

**SOLUTION: (c)**

**QUESTION-24—MSQ**

If -6 in 2's compliment is represented as 1010 in 4 bits. Then -6 is represented in 2's compliment as

(a) 1111 1010 in 8 bits
(b) 1111 1111 1111 1010 in 16 bits
(c) 11110101 in 8 bits
(d) 1111 1111 1111 0101 in 16 bits

**SOLUTION: (a, b)**

To write (–6)10 is 2's compliment representation we need minimum 4 bits and the representation is

(–6)10 = (1010)2 = –8 × 1 + 0 × 4 + 1 × 2 + 0 × 1 = (–6)10

we (–6)10 is 8 bit is = (1111 = 1010)2 (MSB is copied here)

(–6)10 is 16 bit

= (111111111111 1010) (MSB is copied here).

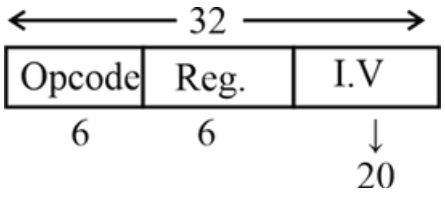
**QUESTION-25—MCQ**

Consider a computer system having 64 registers and 50 distinct instructions. The instruction size is 32 bits. How many bits will be required for the immediate value field in the below instructions?

ADD R1, #200 R1 ← R1 + 200

(a) 20
(b) 21
(c) 22
(d) 23

**SOLUTION: (a)**




Required operand = 6 bits(log250)

Required = 64

Number of instructions = 50 place

Instruction length = 32 bit

Instruction ADD RI , #200

opcodeopcodeImmedate value

Number of bits in immediate value filed = 20 bits

**QUESTION-26—MCQ**

Mother(y, x) means y is mother of x

Noteq(x, y) mean x and y are not same people the correct expression for the statement every one has exactly one mother is?

**SOLUTION: (*)**

Every has exactly one mother

Mother (*y*, *x*) = y is mother of

*x* Note q (*y*, *x*) = y not equal to

$$^{x}{}_{x\,y}\ (\text{Mothexr},\ y\ )\sim \text{Mz(other}(z\ ,x)\ \text{Not}\ \text{eqz}(\ y,$$

$$\sim\sim \text{Mzo ther}(z,\ x)\ \sim \text{Note}(\text{zq}),y$$

$$\sim \text{Noteqz}(y\ ),\ \sim \text{Mothezr}(x\ ),$$

$$\text{Noteqz}(,y-)\ \sim \text{Mothze,r}x()$$

**QUESTION-27—NAT**

```
void foo (int*p , int x)
{
    *p = x
}
    int main ( )
       {
            int * z;
            int a = 20, b = 25;
            z = & a;
            foo(z, b);
            printf("%d", a)
            return 0;
       }
```

Output is (answer should be in integer)

**SOLUTION: (25)**

a function foo is defined, which takes a pointer and an integer as arguments. Inside the function, *p = x; assigns the value of x to the memory location pointed to by p. In main(), two integer variables a and b are initialized with values 20 and 25, respectively. A pointer z is declared and assigned the address of a using z = &a;. The function foo(z, b); is then called, passing the address of a and the value of b. Inside

foo, *p = x; effectively updates a to 25. When printf("%d", a); executes, it prints 25 because a was modified through the pointer. Thus, the output of this program is 25.

**QUESTION-28—NAT**

The pseudocode of fun ( ) is given below:

```
fun (int A [0,....., n-1]){
    for (i = 0 to n–2)
        for (j = 0 to n –i–2)
            if (A [j] > A [j + 1])
            then swap A[j] and A [j + 1]
```

} Let A[0,....., 29] be an array storing 30 distinct integer in descending order. The number of swap
operation that will be performed, if the function fun() is called with A [0,.....,29] as argume(natn issw er should be in integer).

**SOLUTION: (465)**

The given array is initially in descending order, the algorithm will perform the maximum number of swaps to arrange it in ascending order. In Bubble Sort, for an array of size n, the number of swaps in the worst case is given by the formula:

$$\sum_{i=0}^{n-2} (n - i - 1)$$

For the given array of size n = 30, the number of swaps will be:

$$\sum_{i=0}^{28} (30 - i - 1) = (30 - 1) + (30 - 2) + (30 - 3) + \ldots + (30 - 29)$$

This represents the sum of the first 29 natural numbers, which can be computed using the formula:

$$\frac{n(n+1)}{2}$$

Substituting n = 29

$$\frac{29 \cdot 30}{2} = 435$$

Thus, the total number of swap operations performed when the function is called with an array of 30 elements in descending order is 435.

**QUESTION-29—NAT**

```
int foo (int S[], int size) {
    if (size == 0) return 0; if (size == 1) return
    1; if (S[0] != S[1]) return 1 + foo (s +1,
    size–1) return foo (S+1, size–1) ;

}
int main (){
    int A [] = { 0, 1, 2, 2, 2, 0, 0, 1, 1})
    printf ("%d", foo (A, 9));
    return 0;
}
```

The value printed is .

**SOLUTION: (5)**

The foo function recursively compares adjacent elements in the array, counting how many times consecutive elements are different. If two elements are different, it adds 1 to the count and continues with the subarray starting from the next element. If the elements are the same, it proceeds without incrementing the count. Given the array A[] = { 0, 1, 2, 2, 2, 0, 0, 1, 1 }, the function will check each pair and return the final count. After completing all recursive calls, the function returns a value of 5, which is the result printed by the program.

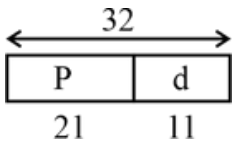
**QUESTION-30—NAT**

L.A = 32 bit P.A = 20 bit P.S = 2048 B Maximum number of entries in page table is _____.

**SOLUTION: (221)**

Logical address = 32 bits

Physical address = 20 bits




Page size = 2 KB = 211 or 2048 bytes

Max. no. of PT entries = No. of pages =2 21

**QUESTION-31—NAT**

R1(x) W1(y) R2(x) R2(Y) R3(Y) abort (T1)

Which transactions will roll back along with T1?

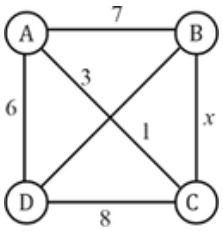
Both T1 T3

**SOLUTION: (*)**

T2 and T3 will roll back

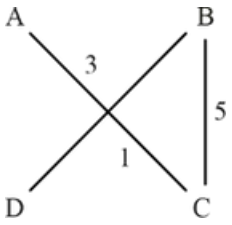
**QUESTION-32—NAT**

The Maximum value of x such that key between BC is included in every MST of given-




**SOLUTION: (5)**

**Graph (G)**




The maximum weight of x will be 5.

In a computer system, there are two processors M1 and M2. There are four processes P1, P2, P3, and P4 that arrives at the same time with burst time 20, 16, 25, and 10 respectively. Any process that is ready to be scheduled must be scheduled immediately in the processor that is currently available. Both the processors are using non-preemptive priority based scheduling algorithm with the following priority order:

M1 = P1> P3 > P2 > P4 (P1 has highest priority and P4 has lowest priority)

M2 = P2 > P5 > P4 > P1 (P2 has highest priority and P1 has lowest priority)

The average waiting time is ____.

(a) 7.50 (b) 9.00

(c) 6.50 (d) 8.70

**SOLUTION: (b)**

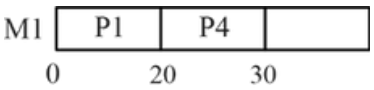
2 Processor: M1, M2

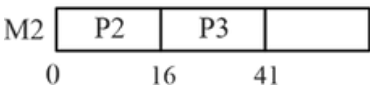
| | AT | BT |
|---|---|---|
| P1 | 0 | 20 |
| P2 | 0 | 16 |
| P3 | 0 | 25 |
| P4 | 0 | 10 |

M1: P1 > P3 > P2 > P4

M2: P2 > P3 > P4 > P1

| | WT |
|---|---|
| P1 | 0 |
| P2 | 0 |
| P3 | 16 |
| P4 | 20 |




Average WT = $\frac{36}{4} = 9.0$

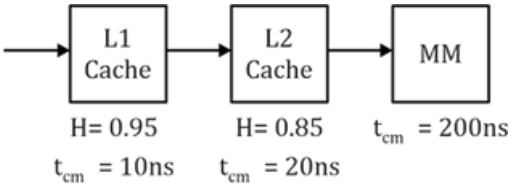
**QUESTION-34—MCQ**

Match the following

| Layer | Function/Services |
|---|---|
| Data link | Framing and Error Control |
| Network layer | Packet Routing |
| Transport layer | Host to Host Communication |

**SOLUTION: (*)**

Cache Memory




Asked average member access -time =?

**SOLUTION: (11.85ns)**

.95 ×10 + 0.5 × 0.85 × 20 + 0.05 × 0.15 × 200

= 11.85

**QUESTION-36—MCQ**

In question said it is non-pipeline processor. But not about pipeline.

When interrupt come in between of a program execution

(i) CPU completes current instant

(ii) CPU save values to program counter (PC)

(iii) Loads ISR value of PC to service interrupt.

(a) (i), (ii), (iii)
(b) (i), (iii), (ii)
(c) (ii), (i), (iii)
(d) (iii), (ii), (i)

**SOLUTION: (a)**

Hence option (a) is correct.

**QUESTION-37— MCQ**

MM adds. = 20 bits

Direct = 1MB

MM size = 1 MB

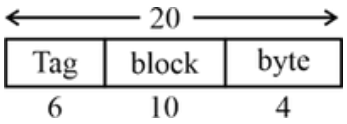
Cache member = 16 KB

Block size = 16 bytes

Total bits to store entire Tag bits?

(a) 8× 210
(b) 6 ×10
(c) 10 × 210
(d) $2^{410}$ × 2

**SOLUTION: (b)**




mm size = 1MB  add = 20 bits

cm size = 16 kB = 214 B

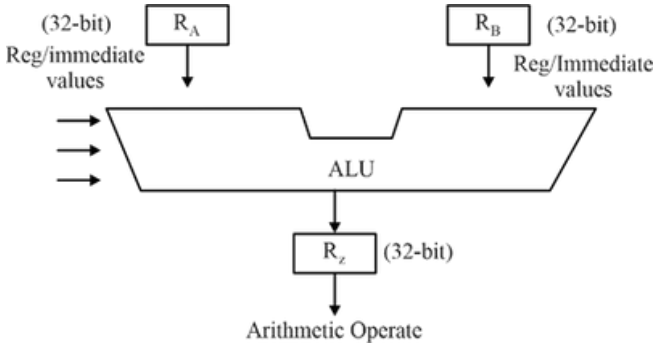
Direct mapping

block = 16 bytes = 24 B

Total tag mem size = 6 × 210 byte

**QUESTION-38 — MCQ**

Question on Data path




What RA and RB can contain?

(a) Reg & Zmm value

(b) Reg & Reg Arithmetic operation

(c) Only Reg & Reg Arithmetic operation

(d) Imme. & Imm. value Arithmetic operation

**SOLUTION: (*)**

**QUESTION-39—MCQ**

P1: content of pcb are stored jaisa

P2: load interrupt service onto program counter

P3: complete current instruction execution

What will be the sequence

(a) P1, P3, P2

(b) P1, P3, P2

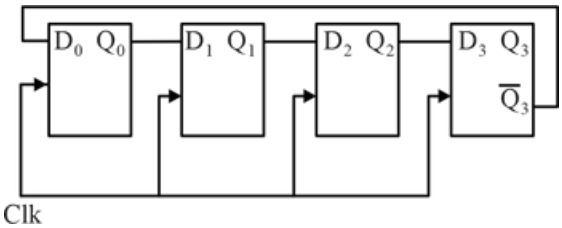
(c) P2, P1, P3

(d) P2, P1, P3

**SOLUTION: (a)**

Interrupt: If any interrupt occurs P1: Content of PC stand on stack P2: Load interrupt source address onto program code P3: Complete current code execution correct sequence: P3, P1, P2

**QUESTION-40— MCQ**




How many different states will be there in above counter:

**SOLUTION: (8)**

Given, counter is Johnson counter designed with n = 4 F Fs

Therefore, MOD no.

M = 2n = 2 × 4 = 8

**QUESTION-41—NAT**

(f) $f(x) = \begin{cases} cx3, & 0 \ x \ 4 \\ 0, & otherwise \end{cases}$ then P(2 < x < 3) = ?

**SOLUTION: (65/256)**

$$\int_4 cx3dx=1$$

$$4c44$$

$$= 1$$

$$c=164,$$

$$f(x) = \begin{cases} 6x^3, & 0 \ x \ 4 \\ 0, & otherwise \end{cases}$$

$$p(2 \le x \le 3) = \int_{3}^{3} 2(x)\,dx$$

$$= \frac{1}{64} \times 4^4 = \frac{81-16}{64\,4}$$

$$= \frac{65}{256}$$

**QUESTION-42—NAT**

If 5-bit are transmitted & probability of flipping the bit is 0.01, then what is the probability that the message received is error free?

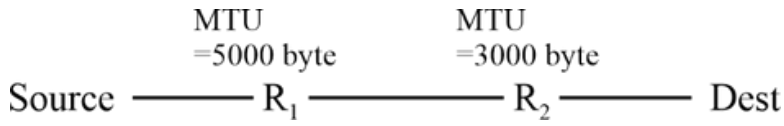
**SOLUTION: (0.951)**

Pb = Probability that a bit is corrupted = 0.01

Packet size/length (L) = 5

Ans. = $(1 - P_b) \times (1 - Pb) \times \ldots (1 - P)\ b = (1 - P)^L$

= $(1 - 0.01)5 = 0.95099 \approx 0.950$ or 0.951

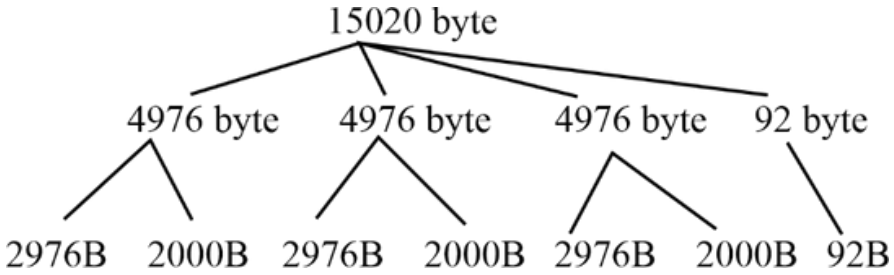



Message = 15000 byte

Segment = (20 + 15000) byte = 15020 bytes

IPv4 header = 20 byte

**SOLUTION: (7)**




No. of IPv4 fragments reaches destination = 7

**QUESTION-44—MCQ**

f(b3, b2, b1, b0) = (0, 2, 4, 8, 10, 11, 12)

b3 is a most significant bit and b0 is the least significant bit. Then what will be the SOP(some of product) of given Boolean function?

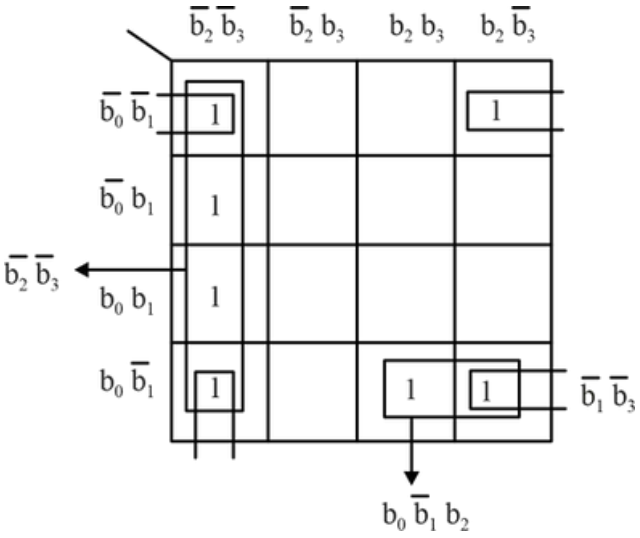
(a) b1b3+b2b3+b0b1b2

(b) b0b1+b2b3+b0b1b2

(c) b0b1+b2b3+b0b1

(d) None of these

**SOLUTION: (a)**




= b1b3+b2b3+b0b1b2

**QUESTION-45—MCQ**

Classless Routing Table

| Addresses | Next Hop |
|---|---|
| 146.136.0.0/16 | E1 |
| 146.136.128.0/17 | E2 |
| 146.136.64.0/18 | E3 |
| 146.136.255.0/24 | E4 |
| Default | E5 |

Dest. IP add → 146.136.109.27

(a) E1

(b) E2

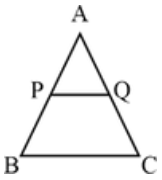
(c) E3

(d) E5

**SOLUTION: (c)**

**QUESTION-46—NAT**

In the given figure, find the ratio of area of a triangle is to area of trapezium if PQ || BC and height of triangle is twice the height of trapezium.




**SOLUTION: (4/3)**

If height of trapezium = h

height of triangle = 3h

PQ || BC, thus ABC ~ APQ

$\because \frac{\text{height triangle}}{\text{height of trapezium}} = \frac{2}{1}$

$\frac{BC}{PQ} = \frac{2}{1}$ $PQ = \frac{1}{2}BC$

$$\text{Area of Area of trapezium} = \frac{\frac{1}{2} BC \cdot 2h}{\frac{1}{2}(BC + BC) \cdot h}$$

$$= \frac{2BC}{\frac{2BC + BC}{2}} = \frac{2BC}{3BC} = \frac{2}{3} = 4$$