Nitish Kumar Gupta
Course: GATE
Computer Science Engineering(CS)

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FULL SYLLABUS TEST-2 (BASIC LEVEL) GATE 2019 - REPORTS

OVERALL ANALYSIS   COMPARISON REPORT   SOLUTION REPORT

ALL(65)   CORRECT(27)   INCORRECT(10)   SKIPPED(28)

Q. 1

In this question, identify the pair out of given four options which has the same relationship as SYMPHONY : COMPOSER?

Solution Video | Have any Doubt ?

A   Jazz : Music

B   Fake : Ordinary

C   Fresco : Painter   Your answer is **Correct**

Solution :
(c)
As composer composes symphany, so painter paints fresco.

D   Foreigner : Immigrant

QUESTION ANALYTICS   +

Q. 2

Choose the option which is similar in meaning to HARBINGER.

Solution Video | Have any Doubt ?

A   subordinate

B   socialist

C   asylum

D   forerunner   Your answer is **Correct**

Solution :
(d)
Harbinger means 'to give a slight indication beforehand or a forerunner of something'.

QUESTION ANALYTICS   +

Q. 3

Choose the correct sequence of the parts of the sentence so as to make a meaningful sentence:
P : Lok Sabha ahead of
Q : walk out in
R : opposition stages
S : no-confidence motion

Solution Video | Have any Doubt ?

A   RQPS   Your answer is **Correct**

Solution :
(a)

B   RQSP

C   RSQP

D   RSPQ

QUESTION ANALYTICS   +

Q. 4

In right angled triangle ABC with angle $B = 90°$, lengths of the side $AB = 3$ cm and of $BC = 3\sqrt{3}$ cm. A point D is selected on side CA. What is ratio of $DC : AD$ such that BD is perpendicular to CA?

Solution Video | Have any Doubt ?
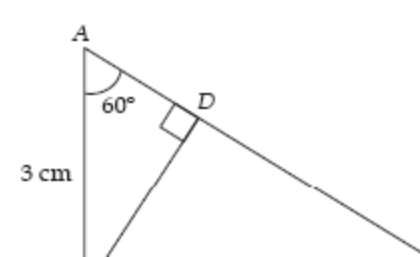
A   3 : 2
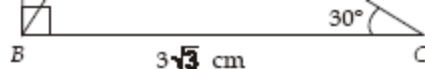
B   3 : 1   Correct Option

Solution :
(b)

In a right angled triangle if ratio of two perpendicular side is $1:\sqrt{3}$,

then the triangle is a 30° – 60° – 90° triangle

$\Rightarrow$ $\angle BAC = 60°$

$\angle BCA = 30°$

Given: $BD \perp AC$

$\Rightarrow$ $\angle DBC = 60°$

and $\angle DAB = 60°$ and $\angle DBA = 30°$

Right Δs BAD and CBD are also 30° – 60° – 90° triangles.

$\Rightarrow$ $AD : BD : AB = 1 :\sqrt{3} : 2$

and $BD : DC : BC = 1 :\sqrt{3} : 2$

Which enables us to compute

$$AD = \frac{AB}{2} = \frac{3}{2}$$

and $$CD = \frac{3\sqrt{3}}{2/\sqrt{3}} = \frac{9}{2}$$

$\Rightarrow$ $$DC : AD = \frac{9}{2} : \frac{3}{2} = 3 : 1$$

C $5 : 2$

D $2 : 1$

📊 QUESTION ANALYTICS +

Q. 5

If $\left(x^2 + \dfrac{1}{x^2} \right) = 167$, then what is the value of $\left(x^3 + \dfrac{1}{x^3} \right)$? (Given x > 0)

⊙ Solution Video | Have any Doubt ? | ▮

● 2158   Correct Option

Solution :
2158

$$\left(x^2 + \frac{1}{x^2} \right) = 167 \Rightarrow \left(x + \frac{1}{x} \right)^2 = \left(x^2 + \frac{1}{x^2} + 2 \right) = 169$$

Since x > 0,

$\therefore$ $$\left(x + \frac{1}{x} \right) = +\sqrt{169} = +13$$

$\therefore$ $$\left(x^3 + \frac{1}{x^3} \right) = \left(x + \frac{1}{x} \right)\left(x^2 + \frac{1}{x^2} - 1 \right) = 13 \times 166 = 2158$$

$[\because \quad a^3 + b^3 = (a + b)(a^2 - ab + b^2)]$

📊 QUESTION ANALYTICS +

Q. 6

A group of boys and girls know either French or Spanish. The number of boys and girls are in the ratio 1 : 4. 30% of the girls know Spanish and the rest of them know French. On the other hand, 50% of the boys know Spanish and the rest of them know French. A student is chosen at random from the group of students who knows Spanish. What is the probability that the chosen student is a girl?

⊙ Solution Video | Have any Doubt ? | ▮

A $\dfrac{2}{7}$

B $\dfrac{12}{17}$ Correct Option

Solution :
(b)

Let the number of students be 100. Since ratio of number of boys : girls is 1 : 4; it means number of boys is 20 and number of girls is 80.

30% of girls know Spanish $\Rightarrow$ number of girls who know Spanish = 30% of 80 = 24

50% of the boys know Spanish $\Rightarrow$ number of boys who know Spanish = 50% of 20 = 10

Total number of students who know Spanish = 24 + 10 = 34

Hence probability that a girl is chosen from the group of students who know English = $\dfrac{24}{34} = \dfrac{12}{17}$ i.e. (b).

C $\dfrac{20}{41}$

D $\dfrac{8}{13}$

📊 QUESTION ANALYTICS +

Q. 7

Gatimaan express departed from Delhi for Agra which is 200 km away. However, in order to cope up with the delay due to rainy season, it departed 40 minutes earlier than the scheduled time of departure. With the speed of the train reduced by 50 km/hour as compared to the original speed, the train reached Agra as per original schedule. The original speed of the train will be

⊙ Solution Video | Have any Doubt ? | ▮

A 120 km/hr

B 150 km/hr   Correct Option

Solution :
(b)

Let the original speed of the train be $'s'$ km/hour and the reduced speed will be $(s - 50)$ km/hr.

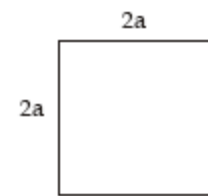As per the question, a distance of 200 km is covered in 40 minutes more than the regular time taken to complete the journey. We can write the equation as

$$\frac{200}{s-50} - \frac{200}{s} = \frac{2}{3} \text{ or } 300 \times 50 = s(s-50) = 150 \times 100$$

which leads us to get $s = 150$ i.e. the original speed of the train is 150 km/hr i.e. option (b).

C   170 km/hr

D   210 km/hr

📊 QUESTION ANALYTICS   **+**

Q. 8

$f(x)$ is a polynomial function of second degree such that $f(-4) = 8, f(1) = 8$ and $f(3) = 15$. What is the point at which the graph of this function intersects a line drawn parallel to y axis through $x = 2$?

⊙ Solution Video   Have any Doubt ?

A   (2, 8)

B   (2, 10)

C   (2, –11)

D   (2, 11)   Correct Option

Solution :
(d)

$$\begin{aligned}
\text{Let, } f(x) &= ax^2 + bx + c \\
f(-4) &= 16a - 4b + c = 8 \\
f(1) &= a + b + c = 8 \\
f(3) &= 9a + 3b + c = 15
\end{aligned}$$

Solving, we get $a = \frac{1}{2}, b = \frac{3}{2}, c = 6$

This gives $f(x) = \frac{x^2}{2} + \frac{3x}{2} + 6$. We have to find the value of $f(x)$ at $x = 2$.

We can compute it as $f(2) = \frac{4}{2} + \frac{6}{2} + 6 = 11$ which leads us to get the desired point as (2, 11)

i.e. (d).

📊 QUESTION ANALYTICS   **+**

Q. 9

Sanjay and Mahesh are playing a game of bowling. Probability of Sanjay hitting the strike is 0.5 whereas Mahesh hitting the strike is 0.4. Sanjay wins if he hits the strike and Mahesh does not whereas Mahesh wins if he hits the strike and Sanjay does not. In the absence of these two happenings, the game ends in a tie. What is the probability on the tie?

⊙ Solution Video   Have any Doubt ?

A   0.40

B   0.45

C   0.50   Correct Option

Solution :
(c)

Probability of Sanjay hitting the strike, $P(S) = 0.5$ gives probability of Sanjay NOT hitting the strike $= P(\bar{S}) = 1 - P(S) = 0.5$.

Similarly, Probability of Mahesh hitting the strike, $P(M) = 0.4$ gives probability of Mahesh NOT hitting the strike $= P(\bar{M}) = 1 - P(M) = 0.6$

In case of tie, Sanjay as well as Mahesh hit the strike OR both DO NOT hit the strike.

Required probability $= P(S) \times P(M) + P(\bar{S}) \times P(\bar{M}) = 0.5 \times 0.4 + 0.5 \times 0.6 = 0.5$

D   0.55

📊 QUESTION ANALYTICS   **+**

Q. 10

A square and a regular octagon have identical perimeter. The ratio of the areas of the square and the octagon is _____.

⊙ Solution Video   Have any Doubt ?

🟢   0.828 (0.827 - 0.829)   Correct Option

Solution :
0.828 (0.827 - 0.829)

Sum of all of the interior angles of a polygon $= (n-2)180° = (8-2)180° = 1080°$

Therefore, Interior angle of a regular octagon $= \frac{1080}{8} = 135°$

$$z = a \times a = a^2$$

$$x = \frac{1}{2} \frac{a}{\sqrt{2}} \frac{a}{\sqrt{2}} = \frac{a^2}{4}$$

$$y = a \cdot \frac{a}{\sqrt{2}}$$

Total area of octagon is $z + 4x + 4y$

$$= a^2 + a^2 + \frac{4a^2}{\sqrt{2}}$$

$$= \left(2 + 2\sqrt{2}\right)a^2 = 4.828\,a^2$$

Area of square $= 4a^2$

$$\frac{\text{Area of square}}{\text{Area of octagon}} = \frac{4a^2}{4.828a^2} = 0.828$$

Alternatively,

The area of octagon can also be calculated be adding the area of two trapeziums and the rectangle as shown.
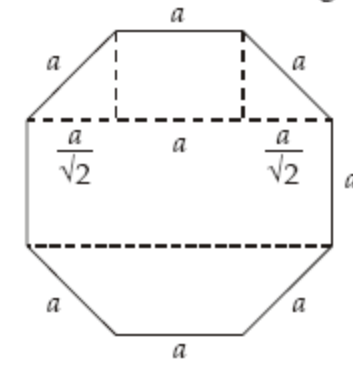
$$\text{Area of 2 trapeziums} = 2\left[\frac{1}{2} \times \left(a + \sqrt{2}a + a\right) \times \frac{a}{\sqrt{2}}\right]$$

$$= \left(2a + \sqrt{2}a\right) \times \frac{a}{\sqrt{2}} = a^2 + \sqrt{2}a^2$$

$$\text{Area of rectangle} = a \times \left(a + \sqrt{2}a\right) = a^2 + \sqrt{2}a^2$$

$$\therefore \quad \text{Total} = 2\sqrt{2}a^2 + 2a^2 = 2a^2\left(1 + \sqrt{2}\right)$$

$$\therefore \quad \text{Ratio} = \frac{4a^2}{2a^2\left(1 + \sqrt{2}\right)} = 0.828$$

QUESTION ANALYTICS   +

Q. 11

In a 4-bit binary ripple counter, for every input clock pulse

Have any Doubt ?

A — All the flip-flops get clocked simultaneously.

B — Only one flip-flop get clocked at a time.   Your answer is **Wrong**

C — Two of the flip-flops get clocked at a time.

D — All the above statements are false.   Correct Option

Solution :
(d)
The clock pulse for the flip-flops in ripple counter depends on the previous flop-flops output. So, it is not defined how many will change at a time.

QUESTION ANALYTICS   +

Q. 12

Which of the following is not a valid description of the input alphabet set Γ?

Have any Doubt ?

A — $\Gamma = \{0, 1\}$

B — $\Gamma = \{00, 11\}$

C — $\Gamma = \{01, 110, \in\}$ Your answer is **Correct**

Solution :
(c)
Input alphabet cannot contain $\in$, therefore (c) is the appropriate choice.

D — $\Gamma = \{1\}$

QUESTION ANALYTICS   +

Q. 13

Consider the following statement given below:
S_1 : Processes can run in parallel on different processors in multiprocessor system, but not Kernel threads of a process.
S_2 : All types of thread scheduling is done by thread library.
Which of the above statements are incorrect?

Have any Doubt ?

A — Both S_1 and S_2 Correct Option

Solution :
(a)
S_1 : Processes and Kernel threads both can run in parallel on different processors in multiprocessor system. S_1 incorrect.
S_2 : Kernel thread scheduling is done by the operating system. S_2 incorrect.

B — Only S_1

C — Only S_2

D   None of the above

Q. 14

Which of the following addressing modes (AM's) is good example for writing position independent codes?

Have any Doubt ?

A   Indirect AM

B   Base Register AM   Your answer is **Correct**

Solution :
(b)
Base register AM best example to write position independent codes.

C   Absolute AM

D   Register AM

Q. 15

Assertion (A): LRU (Least Recently Used) replacement policy is not applicable to direct mapped caches.
Reason (R): Every memory block is associated with fixed cache line in direct mapped caches.

Have any Doubt ?

A   Both A and R are true and R is the correct explanation of A   Correct Option

Solution :
(a)

B   Both A and R are true but R is NOT the correct explanation of A

C   A is true but R is false

D   A is false but R is true   Your answer is **Wrong**

Q. 16

Consider the following statements given below:
S_1 : A pattern is a description of the form that the lexemes of a token may take.
S_2 : Panic mode is a recovery strategy used in compiler.
S_3 : The error entries in the table of SLR(1) and LALR(1) may be different.
Which of the following statements is/are correct?

Have any Doubt ?

A S_1 and S_2 only

B S_1 and S_3 only

C S_2 and S_3 only

D S_1, S_2 and S_3 Correct Option

Solution :
(d)
    S_1: A pattern is a description of the form that the lexemes of a token may take. S_1 correct
    S_2: Panic mode is a recovery strategy. S_2 correct
    S_3: In SLR(1) and LALR(1) reduced entries may be different so error entries may be different. S_3 correct
    So correct option is (d).

Q. 17

Assume a new cache design is proposed by a student. But he later discovered design has too many conflict misses and to resolve this issue he increases the associativity in the design. Which of the following implication will occur in the new design?

Have any Doubt ?

A   Tag directory size   Correct Option

Solution :
(a)

B   Index bit increases   Your answer is **Wrong**

C   No implications in the design

D   Block size needs to reduce in order to make the design stable

Q. 18

Assertion (A): The DMA technique is more efficient than the Interrupt-driven technique for high volume I/O data transfer.
Reason (R): The DMA technique does not make use of the Interrupt mechanism.

Have any Doubt ?

A Both A and R are true and R is the correct explanation of A — Correct Option

Solution :
(a)
The DMA technique does not make use of the interrupt mechanism, that's why it is more efficient than the interrupt-driven technique for high volume I/O data transfer.

B Both A and R are true but R is NOT the correct explanation of A

C A is true but R is false — Your answer is **Wrong**

D A is false but R is true

Q. 19

Consider the following first order logic statements:
I. $\forall x\ \forall y\ P(x, y)$
II. $\forall x\ \exists y\ P(x, y)$
III. $\exists y\ \exists x\ P(x, y)$
IV. $\exists y\ \forall x\ P(x, y)$
Which of the following is not true about I, II, III and IV?

Have any Doubt ?

A If I is true, then II, III and IV are true

B If II is true, then III and IV are true — Correct Option

Solution :
(b)
Options (a) and (c) are correct, but option (b) is not correct.
If II is true, then III will surely be true, however IV need not be. Because, if II is true, then it means "for every x, there is some y which makes $P(x, y)$ true", which means that y may vary with respect to x. But IV states "There is some x, such that for every y, $P(x, y)$ is true", which means that x is a constant, in the sense that it doesn't depend on y.
Actually II is a **subset condition** of IV. So II being true does not mean that IV will also hold true. However, the converse of this implication is surely true, as IV is a superset of II.
$$\exists x\,\forall y\ P(x, y)\ =\ \forall y\,\exists x\ P(x, y)$$

C If IV is true, then II and III are true

D None of these

Q. 20

Consider the following statements given below:
S_1: There exist an bottom up parser which can parse some ambiguous grammar.
S_2: If a grammar is SLR(1) then it must be LL(1).
Which of the following statements is correct?

Have any Doubt ?

A Both S_1 and S_2

B Only S_1 — Your answer is **Correct**

Solution :
(b)
S_1: Operator precedence parser is bottom up parser which can parse some ambiguous grammar.
S_1 correct
S_2: It not always true that if a grammar is in SLR(1) then it must be in LL(1). S_2 incorrect
So option (b) is correct.

C Only S_2

D None of the above

Q. 21

Which of the following is not true about the Merge Sort Algorithm?

Have any Doubt ?

A Merge sort takes O($n \log n$) time on both array and linked list

B Merge sort on both array and linked list is an out-place algorithm. — Correct Option

Solution :
(b)
Merge sort on linked list is an in-place algorithm, but option (b) says otherwise; therefore option (b) is the appropriate choice.

C   Merge procedure takes O($m + n$) time to merge two sorted arrays of size m and n.

D   Merge sort on linked list is an in-place algorithm.

Q. 22

Let PRE, IN, POST, LVL denote the preorder, postorder, inorder and level order traversal respectively. Then which of the following combinations of traversals is not sufficient to uniquely construct a binary tree?

Have any Doubt ?

A   (PRE, IN)

B   (POST, IN)

C   (LVL, IN)

D   (POST, PRE)   Your answer is **Correct**

Solution :
(d)
PRE and POST are not sufficient, as we need one of them to determine the ROOT, and the other is supposed to determine the left subtree and the right subtree respectively, but in case of PRE and POST, both give the information only about the root. So the correct choice is (d).

Q. 23

Consider the following statements regarding relations:
S_1 : Every asymmetric relation is irreflexive.
S_2: Every asymmetric relation is antisymmetric.
S_3: There are some relations which are neither reflexive nor irreflexive.
Which of the above statements are true?

Have any Doubt ?

A S_1, S_2 and S_3 Correct Option

Solution :
(a)
For S_1 and S_2: If a relation is asymmetric, then it has to be both irreflexive and antisymmetric. Therefore S_1 and S_2 are correct.
For S_3: It is true that there are some relations which are **neither irreflexive (contain at least one self loop) nor reflexive (don't contain all self loops)**.
So all the statements are correct.

B S_1, S_3 but not S_2 Your answer is **Wrong**

C S_2 only

D   None of these

Q. 24

Consider the following problems, P_1 and P_2:
P_1: Checking whether a regular grammar is unambiguous.
P_2: Checking whether a given context free grammar is ambiguous.
Which of the above problems is (are) decidable?

Have any Doubt ?

A   Both P_1 and P_2

B   Only P_1 Your answer is **Correct**

Solution :
(b)
Regular grammar ambiguity is decidable, and therefore checking if regular grammar is unambiguous is also decidable.
However in case of CFGs, ambiguity is undecidable, and therefore the correct option is (b).

C   Only P_2

D   Neither P_1 nor P_2

Q. 25

An Internet Service Provider (ISP) has assigned a address block to a user in which 4096 host can be assigned IP addresses. Which of the following can be the network id for this block?

Have any Doubt ?

A   168.72.90.0/20   Your answer is **Wrong**

Solution :
(b)
Address: 168.72.99.64/20

$$4096 \text{ hosts} = 2^{12}$$
$$= 2^4 \times 2^8$$
$$= 16 \times 2^8$$

It means 2nd octet from left side should be divisible by 16.
Option (c) is wrong because they are asking for network id.
Hence option (b) is correct.
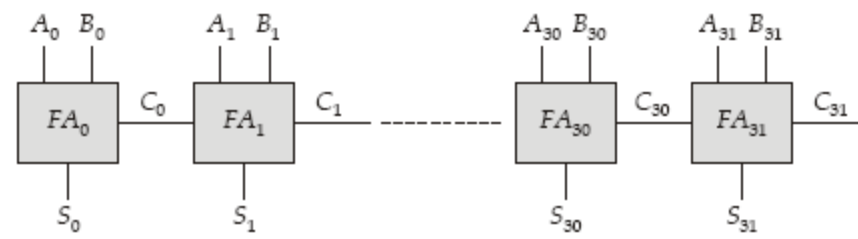
C 168.72.64.64/20

D 168.64.64.0/24

📊 QUESTION ANALYTICS   +

Q. 26

A 32-bit ripple carry adder is realized using 32 identical full adders (FA) as shown in the below figure:

The carry propagation delay of each FA is 6 ns and the sum propagation delay of each FA is 14 ns.
The worst case delay (in ns) of this 32-bit adder will be _____.

Have any Doubt ? 🔖

● 200   Your answer is **Correct** 200

Solution :
200
Given,

$$\text{Carry propagation delay} = 6 \text{ ns}$$
$$\text{Sum propagation delay} = 14 \text{ ns}$$

Initially at FA_0 there will be no delay due to carry because of LSB bit, but from FA_1 to FA_{31} there may be delay because of carry in worst case.
So, in 32-bit ripple carry adder, worst case delay of this 32-bit adder will be

$$= (31 \times 6) \text{ ns} + 14 \text{ ns}$$
$$= 200 \text{ ns}$$

📊 QUESTION ANALYTICS   +

Q. 27

A hypothetical DMA controller is designed to transfer the data from I/O device to main memory under burst mode. The count register size is 32 bit and gets the control of the system buses 3 times then the maximum size of the data transferred by the controller in Giga bytes is _____.

Have any Doubt ? 🔖

● 12   Correct Option

Solution :
12

$$\text{Count register size} = 32 \text{ bit}$$

So, it can transfer of 2^{32} byte of data in 1 time.

$$\therefore \quad \text{Total data transferred in 3 times} = 3 \times 2^{32}$$
$$= 3 \times 2^2 \times 2^{30}$$
$$= 12 \text{ GB}$$

📊 QUESTION ANALYTICS   +

Q. 28

Consider the following set of processes that need to be scheduled on a single CPU operating system uses Round Robin (time quantum = 2) algorithm to schedule the processes.

Process	Arrival Time	Execution Time
P_0	0	4
P_1	5	3
P_2	3	1
P_3	8	5
P_4	9	6

(All time in milliseconds)

The Average Turn Around Time of these processes are _____ (ms). (Upto 1 decimal place)

Have any Doubt ? 🔖

● 5.6 (5.5 - 5.7)   Correct Option

Solution :
5.6 (5.5 - 5.7)

Gantt chart

$$\text{Turn Around Time} = \text{Completion Time} - \text{Arrival Time}$$

Process	Turn Around Time
P_0	4
P_1	3
P_2	2

P_3	9
P_4	10

$$\text{Average Turn Around Time} = \frac{\sum_{i=0}^{n} \text{Turn Around Time of } P_i}{\text{Total number of process}}$$

$$= \frac{4+3+2+9+10}{5} = \frac{28}{5} = 5.6 \text{ ms}$$

●   Your Answer is 5.4

📊 QUESTION ANALYTICS   +

Q. 29

The number of permutations of the string "MADEEASY" in which not all vowels are together are _____.

Have any Doubt ? 🚩

● 9360   Correct Option

Solution :
9360
  Let's do complimentary counting

$$N(\text{not all vowels are together}) = \frac{8!}{2!\,2!} - N(\text{all vowels together})$$

$$N(\text{all vowels together}) = (1+4)! \times \frac{4!}{2!\,2!}$$

$$= \frac{5! \times 4!}{2! \times 2!} = 720$$

$$N(\text{not all vowels together}) = (10080 - 720)$$
$$= 9360$$

●   Your Answer is 8640

📊 QUESTION ANALYTICS   +

Q. 30

If (G, *) is a cyclic group of order 97, then the number of generators of G is equal to _____.

Have any Doubt ? 🚩

● 96   Your answer is **Correct96**

Solution :
96
Since O(G) = 97 which is a prime number, the number of generators = (97 − 1) = 96.

📊 QUESTION ANALYTICS   +

Q. 31

Let a_n be a recurrence relation which satisfies, $a_n = 4(a_{n-1} - a_{n-2})$, with $a_1 = 2$ and $a_2 = 8$. Then let X correspond to the value of a_{17}. Then the value of $\log_2(|X|)$ will be (where |X| represents the absolute value of X) _____.

Have any Doubt ? 🚩

● 21   Your answer is **Correct21**

Solution :
21
  Characteristic equation:
$$t^2 - 4t + 4 = 0$$
$$(t - 2)^2 = 0$$
$$t = 2, 2$$
  Hence solution will be,
$$a_n = (c_1 + c_2 n)2^n$$
  Now use the values of a_1 and a_2 to get $c_1 = 1$ and $c_2 = -1$
$$a_n = (1 - n)2^n$$
$$X = a_{17} = -(2)^{21}$$
$$\log(|X|) = 21$$

📊 QUESTION ANALYTICS   +

Q. 32

Given a sorted array of distinct integers A[1, 2, 3.... n], the tightest upper bound to check the existence of any index i for which A[i] = i is equal to O(n^a $\log^b n$). Then $a + 10b$ is equal to

FAQ   Have any Doubt ? 🚩

● 10   Correct Option

Solution :
10
  We can apply binary search, so time complexity = O(log n)
  Therefore $a = 0, b = 1$
  So $(a + 10b) = 10$

📊 QUESTION ANALYTICS   +

Q. 33

The number of perfect matchings in K_{1023}, where K_n denotes the complete graph with n vertices is equal to _____.

Have any Doubt ?

● 0   Correct Option

Solution :
0

When n is odd, K_n does not have any perfect matching.
So the number of perfect matchings will be equal to 0.

📊 QUESTION ANALYTICS   +

Q. 34

The value of $\lim\limits_{x \to 0}\left(\dfrac{1 - \cos x}{x^2}\right)$ will be _____. (Upto 2 decimal value)

Have any Doubt ?

● 0.50 (0.50 - 0.50)   0.50
Your answer is **Correct**

Solution :
0.50 (0.50 - 0.50)

$$\lim\limits_{x \to 0}\left(\dfrac{1 - \cos x}{x^2}\right)\left[\dfrac{0}{0}\text{ form}\right]$$

Applying L'Hospital rule, $\lim\limits_{x \to 0}\left(\dfrac{\sin x}{2x}\right)$

$$= \dfrac{1}{2}\lim\limits_{x \to 0}\left(\dfrac{\sin x}{x}\right)$$

$$= \dfrac{1}{2}(1)\left(\because \lim\limits_{x \to 0}\dfrac{\sin x}{x} = 1\right) = \dfrac{1}{2}$$

📊 QUESTION ANALYTICS   +

Q. 35

Consider the following statements given below:
S_1: B trees are for primary index and B$^+$ trees are for secondary indexes.
S_2: An SQL query will not work if there are no index on the relation.
The number of statements false are _____.

Have any Doubt ?

● 2   Correct Option

Solution :
2

S_1: B trees are for primary index and B$^+$ trees are for secondary indexes that is not true. S_1 false
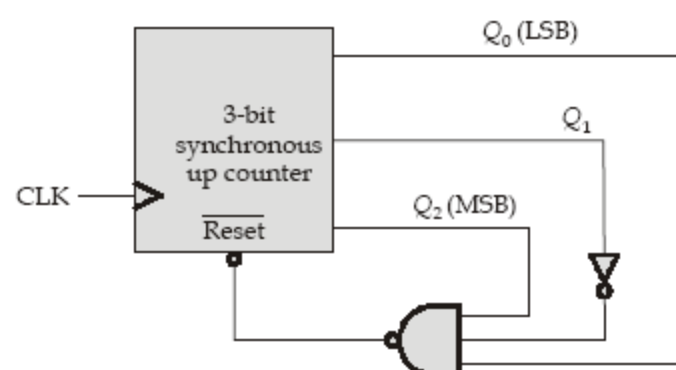S_2: It is not necessary to have a index on relation. SQL query will work without index on relation.
S_2 false

📊 QUESTION ANALYTICS   +

Q. 36

Consider the below circuit:

The delay of NAND, NOT gate is 3 ns, 1 ns respectively and that of the counter is assumed to be zero.
If the clock frequency is 500 MHz, then the counter behaves as a

Have any Doubt ?

A   mod-5 counter

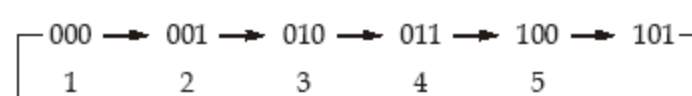B   mod-6 counter

C   mod-7 counter   Correct Option

Solution :
(c)
The counter will reset whenever
$$(Q_2 Q_1 Q_0) = 101$$
If the propagation delay of the gates were 0 ns, then circuit would have behaved as mod-5 counter
as shown below:

$$000 \to 001 \to 010 \to 011 \to 100 \to 101$$
$$\quad 1 \qquad 2 \qquad 3 \qquad 4 \qquad 5$$

Clock frequency = 500 MHz
Clock time period = 2 ns
However, the delay of NAND + NOT gate is 4 ns. During this time, two more clock pulses would
reach the counter before reset the counter and it would count two more states.
Hence it act as mod 7 counter.

D. mod 6 counter

Q. 37

Match List-I (Characteristic) with List-II (Processor Architecture) and select the correct answer using the code given below the lists:

List-I	List-II
A. Write through protocol	1. Direct cache
B. Write back protocol	2. Inclusion
C. Thrashing	3. Coherence
D. Expand opcode technique	4. Fixed length instruction

Codes:

	A	B	C	D
(a)	2	4	1	3
(b)	1	3	2	4
(c)	2	3	1	4
(d)	1	4	2	3

Have any Doubt ? 🚩

A. a

B. b

C. c   Correct Option

Solution :
(c)

D. d

Q. 38

Consider the following relations given below:
Animals (ID, Name, Type)
Adoption (AniID, Adopt Date)
What does the following SQL query returns?

    SELECT DISTINCT Type FROM Animals WHERE
    NOT EXISTS (SELECT * FROM Adoption
      WHERE Adoption.AniID = Animals.ID)

Have any Doubt ? 🚩

A.   Distinct Types of animals who have maximum adoption.

B.   Distinct Types of animals who have any adoption.

C.   Distinct Types of animals who have not had any adoption.   Your answer is **Correct**

Solution :
(c)
NOT EXISTS return true if sub query will not give any row in the output. If there is any adoption for a particular type of animal some row will be return and NOT EXISTS will return false.
The SQL query return distinct types of animals who have not had any adoption. So option (c) is correct.

D.   None of the above

Q. 39

Consider a relation $R(A, B, C, D, E)$ and functional dependencies:
$F = (AC \rightarrow B, C \rightarrow D, A \rightarrow E, C \rightarrow B)$
Relation R is decomposed into $R_1(A, B, C)$ and $R_2(C, D)$ then which of the following is correct about this decomposition?

Have any Doubt ? 🚩

A.   Lossless and dependency preserving

B.   Lossy and dependency preserving

C.   Lossless but not dependency preserving   Your answer is **Wrong**

D.   Not lossless and not dependency preserving   Correct Option

Solution :
(d)
$R(A, B, C, D, E)$ and $R_1(A, B, C)$, $R_2(C, D)$
$$R_1 \cup R_2 \neq R$$
attiribute E is not preserve so it is not lossless.
$A \rightarrow E$ is not present so not dependency preserving.
So option (d) is correct.

Q. 40

AVL tree is constructed by inserting the keys 2, 6, 1, 5, 3, 4, 7 in the given order. (Assume the true is initially empty).
Then the level order traversal of the above binary tree will be

Have any Doubt ? 🚩

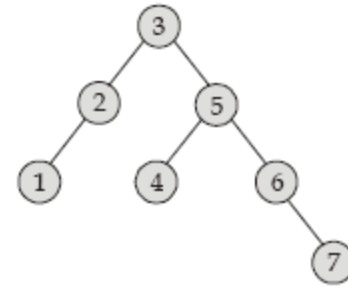(B) 3, 2, 5, 1, 6, 4, 7

(C) 2, 1, 3, 4, 5, 6, 7

(D) 3, 2, 5, 1, 4, 6, 7   Your answer is **Correct**

Solution :
(d)
After inserting, the tree will be as follows:

Level order traversal will be 3, 2, 5, 1, 4, 6, 7
Therefore option (d) is correct.

📊 QUESTION ANALYTICS   +

Q. 41

If a matrix M has eigen values (3, 4, 5), then the determinant of M^{-1} will be

Have any Doubt ? 🔖

(A) $\dfrac{1}{120}$

(B) $\dfrac{1}{60}$ Your answer is **Correct**

Solution :
(b)
Eigenvalues of M : (3, 4, 5)

Eigenvalues of M^{-1} : $\left(\dfrac{1}{3}, \dfrac{1}{4}, \dfrac{1}{5}\right)$

Determinant of M^{-1} = Product of eigenvalues = $\dfrac{1}{(3.4.5)} = \dfrac{1}{60}$

(C) $\dfrac{1}{30}$

(D) $\dfrac{1}{15}$

📊 QUESTION ANALYTICS   +

Q. 42

Consider two languages L_1 and L_2 on the unary alphabet {0}, such that $L_1 = \epsilon + 00^*$ and $L_2 = \{0^k | k$ is prime$\}$. Then $L_1 \cup L_2$ is

Have any Doubt ? 🔖

(A) Regular   Correct Option

Solution :
(a)
The common mistake observed in this question is that, the students new to the subject use closure properties even when the languages are fully specified. According to closure properties, the answer is CFL, but the answer is 'weak'.
L_1 is actually Σ^*. We already know that Σ^* is self contained, and union of any language with Σ^* will be Σ^* only. Which means the union will be regular.
So the 'strongest' answer is the union is regular.

(B) CFL but not regular

(C) CSL but not CFL

(D) None of these

📊 QUESTION ANALYTICS   +

Q. 43

Consider the following context-free grammar with the following productions, where S is the start symbol, R is a non-terminal and '(' and ')' are terminals.
S → (S | R
R → (R |) R (| RR | ε
Which of the following string(s) is generated by the grammar above?

Have any Doubt ? 🔖

(A) (( )( )))

(B) (( )))

C ()()(())

D (())(()   Your answer is **Correct**

Solution :
(d)
  R will generate balanced parenthesis; S → (S|R will insert zero or more "(" on the left.
  Therefore option (d) is the only string generated by the grammar.
  Hence option (d) is the correct choice.

📊 QUESTION ANALYTICS   **+**

Q. 44

Consider a complete binary tree in the form of array such that the left and the right subtree of the root follows min heap property. However, the value of the root node is found to be larger compared to its left and right subtrees. Then the time complexity to convert this array into a min heap is

Have any Doubt ? 🔖

A $O(n)$

B $O(\log n)$ Correct Option

Solution :
(b)
By applying heapify operation on the root, we can do this in $O(\log n)$ time. Hence option (b) is the answer.

C $O(n \log n)$

D None of these

📊 QUESTION ANALYTICS   **+**

Q. 45

A program attempts to generate as many permutations as possible of the string, '$xyzw$' by pushing the characters x, y, z, w in the same order onto a stack, but it may pop off the top character at any time. Which one of the following strings CANNOT be generated using this program?

Have any Doubt ? 🔖

A $xyzw$

B $wzyx$

C $zyxw$

D $zxyw$ Your answer is **Correct**

Solution :
(d)
  For option (a): Push x, pop x, push y, pop y, push z, pop z, push w, pop w.
  For option (b): Push all of x, y, z, w first; and then pop them at once.
  For option (c): Push x, y, z; now pop all of these, and now push w and pop w at the very next moment.
  But option (d) is clearly not possible because first x, y, z is pushed; then once z is popped, y has to be at the top of stack, and so x cannot come in the output before y in a situation like this because pushing has to be done in the order already specified in the question.
  So option (d) is not possible.

📊 QUESTION ANALYTICS   **+**

Q. 46

Consider a network (A, B, C, D, E, F) where distance vector routing is used. Router C has received the following vectors from B(3, 0, 6, 8, 4, 2), D(12, 13, 5, 0, 8, 10) and F(8, 9, 7, 4, 4, 0). Assume the cost of the links from C to B, D and F are 3, 2 and 1 respectively. Which of the following will be C's routing table?

Have any Doubt ? 🔖

A (3, 2, 0, 4, 1, 3) via (B, B, —, D, F, F)

B (6, 3, 0, 2, 5, 1) via (B, B, —, D, F, F)   Your answer is **Correct**

Solution :
(b)
  Router C has received routing table from B, D and F.
  Going via B gives (3 + 3, 0 + 3, 6 + 3, 8 + 3, 4 + 3, 2 + 3) = (6, 3, 9, 11, 7, 5)
  Going via D gives (12 + 2, 13 + 2 + 2, 5 + 2, 0 + 2, 8 + 2, 10 + 2) = (14, 15, 7, 2, 10, 12)
  Going via F gives (8 + 1, 9 + 1, 7 + 1, 4 +1, 4 +1, 0 + 1) = (9, 10, 8, 5, 5, 1)
  Taking the minimum for each destination (A, B, C, D, E, F) except for C is (6, 3, 0, 2, 5, 1) via (B, B, —, D, F, F).
  Hence (b) is the correct option.

C (6, 3, 0, 2, 4, 1) via (B, B, —, D, D, F)

D (3, 2, 0, 8, 4, 1) via (B, B, —, D, F, F)

📊 QUESTION ANALYTICS   **+**

In a RSA cryptosystem, a participant uses two prime numbers p and q is 19 and 13 respectively. If the public key is 7 then what is the private key in this cryptosystem?

Have any Doubt ?

A   29

B   31   Your answer is **Correct**

Solution :
(b)

$$
\begin{aligned}
p &= 19 \\
q &= 13 \\
n &= p \times q \\
&= 19 \times 13 = 247 \\
\phi(n) &= (p-1) \times (q-1) \\
&= 18 \times 12 = 216 \\
e &= 7 \\
d &= e^{-1} \bmod \phi(n) \\
&= 7^{-1} \bmod \phi(n) \\
&= 31
\end{aligned}
$$

C   37

D   41

📊 QUESTION ANALYTICS   +

Q. 48

We are given log m sorted lists, each of size log n/log m. The time complexity of merging the lists into a single sorted list using merge sort is equal to

Have any Doubt ?

A   O(log n.log log m)   Correct Option

Solution :
(a)
First let's find the height of the tree (say h).

$$\frac{(\log m)}{2^h} = 1$$

$$h = O(\log \log m)$$

The time to merge from level i to level $i + 1 = O(\log n)$
So the total time to merge log m sorted lists into a single list of log n elements

$$= O(\log n.\log \log m)$$

B   O(log m.log log n)

C   O(log m.log n)

D   O($m$log log n)

📊 QUESTION ANALYTICS   +

Q. 49

Let A[1 .... n] be an boolean array of 0's and 1's. Let $f(m)$ be a function whose time complexity is $\Theta(m)$. Consider the following piece of code written in C language:

```
counter = 0;
for (i = 1; i <= n; i++)
{
    if (a[i] == 1) counter++;
    else
    {
        f(counter); counter = 0;
    }
}
```
The complexity of this program fragment is

Have any Doubt ?

A $\Omega(n^2)$

B $\Omega(n\log n)$ and O(n^2)

C $\Theta(n)$ Correct Option

Solution :
(c)
The answer to this will be option (c), as irrespective of the arrangement of the numbers in the array, the time spent will always be proportional to n.

D   O(n)

📊 QUESTION ANALYTICS   +

Q. 50

Let S_1 and S_2 be two algebraic structures as described below:
$S_1 : (\{0, 1, 2, 3, 4 ....., m-1\}, +_{m-1})$
$S_2 : (\{0, 1, 2, 3, 4 ....., m-2\}, +_{m-1})$
Where $+_m$ is a binary operation defined as $(a +_m b) = (a + b) \bmod m$. Which of the above two are groups?

A   Both S_1 and S_2

B   Only S_1

C   Only S_2 Correct Option

Solution :
(c)
S_2 is a well known standard group. However S_1 is not a monoid. This is because of this - the only candidate to be an identity element is 0, but if 0 was to be an identity element, then $(0 +_{m-1} m-1)$ should be equal to $m-1$, but here it is equal to 0.
Therefore S_1 is not a group.

D   None of these

📊 QUESTION ANALYTICS   +

Q. 51

Consider the following C code:

```c
#include <stdio.h>
int f(int *p, int n)
{
    if (n <= 1) return 0;
    int m = p[1] – p[0];
    int r = f(p + 1, n – 1);
    int x = max(m, r);
    return x;
}
int main(void)
{
    int a[ ] = {7, 3, 8, 1, 2, 9};
    printf("%d", f(a, 6));
    return 0;
}
```

The output of the above program will be

A   10

B   11

C   9

D   7   Your answer is **Correct**

Solution :
(d)
The program finds the maximum difference between two adjacent pairs in the array. So out of all adjacent pairs in the array, $8 – 1 = 7$ will give the maximum difference.

📊 QUESTION ANALYTICS   +

Q. 52

How many ways the numbers $2^1, 2^2, 2^3, 2^4, 2^5, 2^6, 2^7$ can be inserted in an empty binary search tree, such that the resulting tree has height equal to 6?

A   32

B   48

C   64   Correct Option

Solution :
(c)
In order to make sure that the tree has height equal to 6, it means that we need maximum height with 7 nodes. This is possible if at every level we are able to manage with only one node. So if we resort to choosing numbers which are at extreme positions (either minimum or maximum like 2^1 and 2^7), we will get height 6. For root we have 2 choices ($2^1, 2^7$); similarly for the next level we have 2 choices and so on upto 6th level also we have 2 choices, but for 7th level we have only 1 choice. So number of ways = $2.2.2.2.2.2.1 = 2^6 = 64$.

D   128

📊 QUESTION ANALYTICS   +

Q. 53

The following C function takes two ASCII strings and determines whether one is an anagram of the other. An anagram of a string s is a string obtained by permuting the letters in s.

```c
int anagram (char *a, char *b)
{
    int count [128], j;
    for (j = 0; j < 128; j++) count[j] = 0;
    j = 0;
    while (a[j] && b[j]) {
        X;
        Y;
```

```
    }
    for (j = 0; j < 128; j++) if (count [j]) return 0;
    return 1;
}
```

Choose the correct alternative for statements X and Y.

Have any Doubt ?

A X: count $[a[j]]$++ and Y: count$[b[j]]$−−

B X: count $[a[j]]$++ and Y: count$[b[j]]$++

C X: count $[a[j$++$]]$++ and Y: count$[b[j]]$−−

D X: count $[a[j]]$++ and Y: count$[b[j$++$]]$−−   Correct Option

Solution :
(d)

📊 QUESTION ANALYTICS   +

Q. 54

Consider the following two function P and Q which share two common variable A and B:

P( )	Q( )
{	{
A = A + 5;	A = B + 6;
B = A − 3;	B = A − 2;
}	}

If P and Q executing concurrently, initial value of A = 2 and B = 3 than sum of all different final values B can take _____. (Do not count B = 3)

Have any Doubt ?

44   Correct Option

Solution :
44
If P and Q execute serially

A = A + 5 (7)	A = B + 6 (9)
B = A − 3 (4)	B = A − 2 (7)
A = B + 6 (10)	A = A + 5 (14)
B = A − 2 (8)	B = A − 3 (11)
B can take values 8	B can take values 11

If P and Q executing concurrently.

A = A + 5 (7)	A = A + 5 (7)	A = B + 6 (9)	A = B + 6 (9)
A = B + 6 (9)	A = B + 6 (9)	A = A + 5 (14)	A = A + 5 (14)
B = A − 2 (7)	B = A − 3 (6)	B = A − 3 (11)	B = A − 2 (12)
B = A − 3 (6)	B = A − 2 (7)	B = A − 2 (12)	B = A − 3 (11)
B can take values 6	B can take values 7	B can take values 12	B can take values 11

B can takes values 6, 7, 8, 11, 12.
Sum = 6 + 7 + 8 + 11 + 12 = 44

● Your Answer is 30

📊 QUESTION ANALYTICS   +

Q. 55

Consider the following page reference string:
1, 2, 3, 4, 5, 1, 3, 2, 5, 1, 4, 2, 1, 6
How many page faults would occur for Least Recently Used (LRU) page replacement algorithm with 3 available frame in main memory _____.

Have any Doubt ?

13   Your answer is **Correct**13

Solution :
13
LRU replace the page which is least recently used.

1	2	3	4	5	1	3	2	5	1	4	2	1	6
1	1	1	4	4	4	3	3	3	1	1	1	1	1
	2	2	2	5	5	5	2	2	2	4	4	4	6
		3	3	3	1	1	1	5	5	5	2	2	2
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫		⑬

Total 13 page fault.

📊 QUESTION ANALYTICS   +

Q. 56

Consider the following program codes:

	Meaning
I_1 : LOAD r_1, (r_0)	$r_1 \leftarrow M[[r_0]]$
I_2 : ADD r_1, r_2	$r_1 \leftarrow r_1 + r_2$
I_3 : ADD r_3, r_4	$r_3 \leftarrow r_3 + r_4$
I_4 : LOAD (r_0) r_3	$M[[r_0]] \leftarrow r_3$
I_5 : SUB r_1, r_3	$r_1 \leftarrow r_1 - r_3$
I_6 : HALT	Halts
I_7 : ADD r_2, r_1	$r_2 \leftarrow r_1 + r_2$

The data transfer instruction size is 64 bit, ALU operation instruction size is 32 bit and branch instructions size is 16 bit.

Assume program has been loaded in the memory starting from the location 3000 decimal onwards.
If an interrupt occurs during the execution of I_6, the return address pushed on to the stack is _____.

Have any Doubt ?

● 3028   Correct Option

Solution :
3028

I_1 : 3000 – 3007
I_2 : 3008 – 3011
I_3 : 3012 – 3015
I_4 : 3016 – 3023
I_5 : 3024 – 3027
→ I_6 : 3028 – 3029 → interrupt
I_7 : 3030 – 3033

Return address 3028 pushed on to the stack due to HALT instructions.

📊 QUESTION ANALYTICS   +

Q. 57

Consider a system with 48 bit virtual address and page size is 16 KB. Operating system uses multi level paging. Page table entry size is 4B. What is number of entries in last level page table such that last level page table will fit into one page _____.

Have any Doubt ?

● 1024   1024
                                                              Your answer is **Correct**

Solution :
1024

Virtual address = 48 bit

1st level page table size = $\dfrac{\text{Virtual address}}{\text{Page size}} \times e$

$= \dfrac{2^{48}}{2^{14}} \times 4B = 2^{36}B$

2nd level page table size = $\dfrac{2^{36}}{2^{14}} \times 4B = 2^{24}B$

3rd level page table size = $\dfrac{2^{24}}{2^{14}} \times 4B = 2^{12}B$

It will fit in one page so total 3 levels of paging.

3rd level page table entries = $\dfrac{2^{24}}{2^{14}} = 2^{10} = 1024$

📊 QUESTION ANALYTICS   +

Q. 58

Consider the following CFG:
$S \rightarrow Aa \,|\, ca$
$A \rightarrow c \,|\, d$

(Where S, A are nonterminal and a, c, d are terminals)
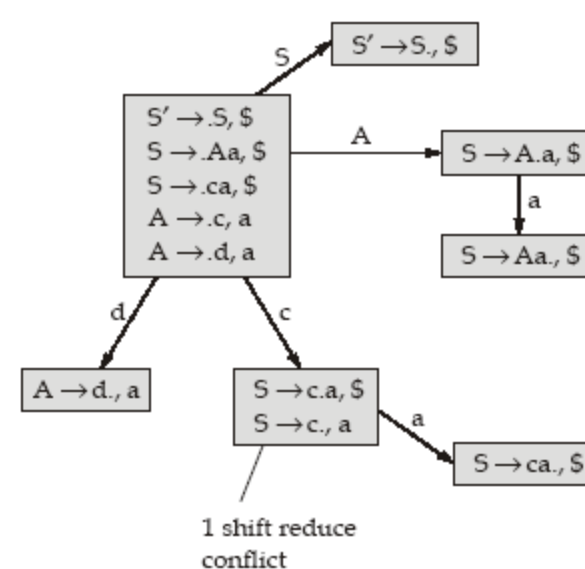How many conflict occur (both shift reduce and reduce-reduce) in CLR(1) parsing construction _____.

Have any Doubt ?

● 1   Correct Option

Solution :
1

1 shift reduce conflict

There is one shift reduce conflict.

📊 QUESTION ANALYTICS   +

Q. 59

Consider the following three concurrent processes:

Process 0	Process 1	Process 2
while (1)	while (1)	while (1)
{	{	{
P(B);	P(A);	P(A);
printf("1");	printf("0");	printf("2");
V(A);	V(A);	}
}	P(A);	
	}	

A and B are two counting semaphore variable and P and V are usual semaphore operation if A = 0, B = 4 what is the minimum number of 0's printed by the execution of the above processes _____.

Have any Doubt ?

● 0   Your answer is **Correct**0

Solution :

0

(i) A = 0, B = 4

Process 0 execute 4 times and blocked, now value of A = 4.

(ii) A = 4, B = 0

Process P_2 execute 4 time and blocked, now value of A = 0, B = 0.

(iii) Process 1 execute P(A) and blocked, number of times 0 is printed is 0.

Q. 60

Consider the basic block given below:

$a \rightarrow a * b$

$c \rightarrow a + c$

$e \rightarrow c/e$

$a \rightarrow c + e$

Minimum number of nodes and edges present in DAG representation of the above block is x and y respectively value of $x + y$ is _____.

Have any Doubt ?

● 16   Your answer is **Correct**16

Solution :
16

$\left. \begin{array}{l} a = a * b \\ c = a + c \end{array} \right\} c = (a * b) + c$

$\left. \begin{array}{l} e = c/e \\ a = c + e \end{array} \right\} a = c + (c/e)$
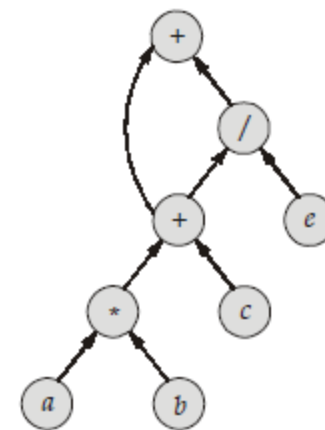
DAG representation

Total 8 nodes and 8 edge

$x + y = 8 + 8 = 16$

Q. 61

Consider a relation R(A, B, C, D, E, F, G) and set of functional dependencies F.

F = {BCD → A, BC → E, A → F, F → G, C → D, A → G}

Number of tables required to decompose R into BCNF is _____.

Have any Doubt ?

● 4   Correct Option

Solution :
4

R(A, B, C, D, E, F, G)

Closure of $(BC)^+$ = BCEDAFG

{BC} is a key of R

Minimal cover of F is F′

$F' = \{BC \rightarrow A, BC \rightarrow E, A \rightarrow F, F \rightarrow G, C \rightarrow D\}$

Now decompose into BCNF.

R_1(B, C, A, E), R_2(A, F), R_3(F, G), R_4(C, D)

So total 4 tables required.

Q. 62

A channel has a bit rate of 8 Kbps and a propagation delay of 15 msec. The minimum frame size in stop and wait protocol that gives an efficiency of atleast 50% is _____. (in bits)

Have any Doubt ?

● 240   Your answer is **Correct**240

Solution :
240

Propagation time = 15 msec

Round Trip Time (R.T.T.) = 2 × 15 msec = 30 msec

8 KB .... 1 sec

? .... 1 msec

In   1 msec = $\dfrac{8 \times 10^3 \text{bits}}{10^3}$ = 8 bits

So, in 1 RTT,   30 msec = 30 × 8 bit = 240 bit

To get efficiency of atleast 50%, user should transmit data atleast of 240 bit.

Q. 63

Given, $A(x) = \dfrac{1+x}{(1-x)^3}$; and $A(x) = \sum_{r=0}^{\infty} a_r x^r$.

The value of $(a_3 - a_0)$ will be _____.

● 15

Your answer is **Correct**15

Solution :
15

Rewriting, $\dfrac{1+x}{(1-x)^3} = \dfrac{1}{(1-x)^3} + \dfrac{x}{(1-x)^3}$

We know, $\left(\dfrac{1}{(1-x)^3}\right)$ corresponds to

$$a_r = {}^{3-1+r}C_r$$
$$= {}^{2+r}C_r = {}^{2+r}C_2$$

Now
$$\dfrac{1}{(1-x)^3} + x \cdot \dfrac{1}{(1-x)^3}$$
$$\Downarrow \qquad\qquad \Downarrow$$

$$\text{using } (r \to r-1)$$
$$a_r = ({}^{r+2}C_2 + {}^{r+1}C_2)$$
$$a_3 = {}^{5}C_2 + {}^{4}C_2$$
$$a_0 = {}^{2}C_2 + {}^{1}C_2$$
_____
$$(a_3 - a_0) = ({}^{5}C_2 + {}^{4}C_2 - {}^{2}C_2)$$
$$= 15$$

📊 QUESTION ANALYTICS +

Q. 64

The number of states in the minimal DFA of the set of strings over {0, 1} which start with 000 or 111 is _____.

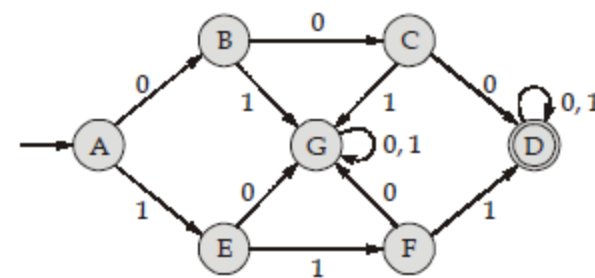● 7

Your answer is **Correct**7

Solution :
7

The minimal DFA has 7 states, so 7 is the answer.

📊 QUESTION ANALYTICS +

Q. 65

Recall that a list of elements is called a binary min-heap if in its tree representation, the root is the smallest in magnitude compared to its left and right subtrees. Out of all the possible permutations of {1, 2, 3, 4, 5, 6, 7}, a permutation is picked at random. The probability that the permutation satisfies the min-heap property is _____. (Upto 3 decimal places)

● 0.015 (0.015 - 0.016)

Correct Option

Solution :
0.015 (0.015 - 0.016)

In order to find the required probability, let's find the number of minheaps possible with {1, 2, 3, 4, 5, 6, 7}.

Number of min heaps $= 1 \times {}^{6}C_3 \times 2! \times {}^{3}C_3 \times 2! = 80$

Total number of permutations $= 7! = 5040$

Therefore the required probability $= \dfrac{80}{5040} = 0.0158$ (can be rounded to 0.016 or 0.015 whichever

suits the user).

📊 QUESTION ANALYTICS +