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Computer Science Engineering(CS)

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FULL SYLLABUS TEST-1 (BASIC LEVEL) GATE 2019 - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

ALL(65) | CORRECT(28) | INCORRECT(19) | SKIPPED(18)

Q. 1

Choose the best alternative which can be substituted for the given sentence": "A person difficult to please"

Solution Video | Have any Doubt ?

A indifferent

B sloppy

C imbecile

D fastidious — Correct Option

Solution :
(d)
'Fastidious' is someone who is excessively particular demanding or hard to please.

QUESTION ANALYTICS +

Q. 2

Choose the option which is opposite in meaning to RELINQUISH.

Solution Video | Have any Doubt ?

A weak

B divine

C possess — Your answer is **Correct**

Solution :
(c)
'Relinquish' refers to surrender or give up whereas 'possess' refers to have or own something.

D convert

QUESTION ANALYTICS +

Q. 3

In this question, out of the four alternatives, choose the option which is closest in meaning to FURORE.

Solution Video | Have any Doubt ?

A tranquility

B excitement — Your answer is **Correct**

Solution :
(b)
'Furore' refers to an outbreak of public anger or excitement.

C calm

D mixture

QUESTION ANALYTICS +

Q. 4

Interior angles of a polygon with 8 sides are in arithmetic progression. If the smallest interior angle measures 100° then find the largest interior angle?

Solution Video | Have any Doubt ?

A 140°

B 150°

C 160°

D 170° — Your answer is **Correct**

Solution :
(d)
If 100° is the smallest interior angle of the polygon i.e. Octagon, this gives the largest exterior angle = 180° – 100° = 80°
The sum of exterior angles of a convex polygon = 360°
Since the interior angles form an increasing arithmetic progression, the exterior angles will form

a decreasing arithmetic progression, let us say with common difference 'd'

360 = 80 + (80 + d) + (80 + 2d) .....8 terms = $\frac{8}{2}[2\times 80+(8-1)d]=360$ which gives d = –10

Using d = –10, we get the smallest exterior angle = 80° + (8 – 1) × (–10°) = 10° leading to the largest interior angle = 180° – 10° = 170°

Note: formula used for sum of terms of an *AP* is given by

$S_n=\frac{n}{2}[2a+(n-1)d]$ where 'a' is the first term and 'd' is the common difference.

Alternatively,

Sum of all the interior angles of a polygon = (n – 2)180°

$\Rightarrow$ $a + (a + d) + \ldots..$ 8 terms = (8 – 2)180°

$\Rightarrow$ $\frac{8}{2}(100\times 2+7d)$ = 1080

$\Rightarrow$ d = 10

$\therefore$ Largest angle = $a + 7d$

= 100 + 7(10) = 170°

QUESTION ANALYTICS +

Q. 5

Triangles *ABC* and *CDE* have a common vertex *C* with side *AB* of triangle *ABC* being parallel to side *DE* of triangle *CDE*. If length of side *AB* = 4 cm and length of side *DE* = 10 cm and perpendicular distance between sides *AB* and *DE* is 9.8 cm, then the sum of areas of triangle *ABC* and triangle *CDE* is _____ cm^2.

Solution Video | Have any Doubt ?

40.6 (40 - 41) — Correct Option

Solution :

40.6 (40 - 41)

Given $AB \,||\, DE$

$\Rightarrow$ $\angle B = \angle D$ (Alternate angles)

and $\angle A = \angle E$ (Alternate angles)

$\therefore$ $\Delta ABC \sim \Delta EDC$ (*AAA* similarity)

$\Rightarrow$ $\frac{h_1}{h_2}=\frac{AB}{DE}=\frac{4}{10}=\frac{2}{5}$

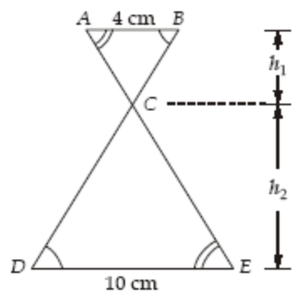
and $h_1 + h_2$ = 9.8 cm (given)

$\therefore$ h_1 = 2.8 cm and h_2 = 7 cm

Area of $\Delta ABC = \frac{1}{2}\times 4\times 2.8 = 5.6$ cm^2

Area of $\Delta EDC = \frac{1}{2}\times 10\times 7 = 35$ cm^2

$\therefore$ Sum of areas of ΔABC and ΔEDC = 40.6 cm^2



QUESTION ANALYTICS +

Q. 6

Find the pair of letters which will come in blank spaces marked as '?'.

V W X Y E D C B R S T ? ?

Solution Video | Have any Doubt ?

A G I

B U I — Your answer is **Correct**

Solution :

(b)

A careful look at the alphabets in the given series shows a pattern:

VWXY – EDCB RST? etc

V ↔ E; W ↔ D; X ↔ C; Y ↔ B; i.e. 5th from end corresponds to 5th from beginning etc. It is a cluster of 4 consecutive letters which is taken at a time. Therefore, the next 4 letters will be RSTU-IHGF etc.

Hence the last 2 letters will be U and I i.e. option (b).

C I U

D I G

QUESTION ANALYTICS +

Q. 7

Two solutions of alcohol A and B were mixed to obtain 20 litres of new solution C. Before they were mixed, the first solution A contained 1.6 litres of alcohol while the second solution B contained 1.2 litres of alcohol. Before mixing if the percentage of alcohol in the first solution A was twice that in the second B, what was the volume of the first solution A before mixing?

Solution Video | Have any Doubt ?

A 6 litres

B 6.4 litres

C 7.2 litres

D 8 litres — Correct Option

Solution :

(d)

Let the volume of the first solution A in the mixture be "x" litres, the volume of the second solution B in the mixture must be $(20 - x)$.

$$\% \text{ of alcohol in A} = \left(\frac{1.6}{x}\right)\times 100$$

$$\% \text{ of alcohol in B} = \left(\frac{1.2}{20-x}\right)\times 100$$

$$\left(\frac{1.6}{x}\right)\times 100 = 2\times\left(\frac{1.2}{(20-x)}\right)\times 100$$

$$16 - 0.8x = 1.2x$$

$$x = 8 \text{ litres}$$

QUESTION ANALYTICS +

Q. 8

Santosh's car gives 5 km more per litre of diesel when driven on the highway in comparison to city drive. On a recent trip, Santosh drove 30 km on the highway and 130 km in the city consuming a total of 15 litres of diesel in the process. How many km/litre does Santosh's car run in the city?

Solution Video | Have any Doubt ?

A 10 km/litre — Correct Option

Solution :

(a)

Let the mileage of Santosh's car be n km/litre of diesel when driven in the city and $(n + 5)$ km/litre when driven on the highway. Translating the given information in to an equation, we can write

$$\frac{30}{n+5}+\frac{130}{n} = 15$$

$$\Rightarrow \quad 3n^2 + 17n - 130 = 0 \qquad \text{which gives } n = 10 \text{ or } n = -13/3$$

Hence we can say that Santosh's car runs 10 km/litre in the city.

B 12 km/litre

C 13 km/litre

D 14 km/litre

QUESTION ANALYTICS +

Q. 9

Based on the given statements, select the most appropriate option to solve the question.
Sheetal wants to sell her bicycle at either a profit of K% or a loss of K%. What is the value of K?

Statement 1: Difference between the amount Sheetal gets in the 2 cases is ₹2560.
Statement 2: If Sheetal's profit is Rs K, her profit in percentage is 7.5%.

Solution Video | Have any Doubt ?

A Statement 1 alone is sufficient, but statement 2 alone is NOT sufficient.

B Statement 2 alone is sufficient, but statement 1 alone is NOT sufficient.

C Both statements together are sufficient, but neither statement alone is sufficient. — Correct Option

Solution :

(c)

Let us assume $k = \frac{K}{100}$ and the cost price = C

Based on S1, we can write $C\times\left(1+\frac{K}{100}\right)-C\times\left(1-\frac{K}{100}\right)=2560$

i.e. $\frac{2CK}{100} = 2560$ or $Ck = 1280$ which does not give the value of k or K. Hence Statement 1 is NOT sufficient.

Based on S2, $C \times 0.075 = K$ which gives $C = 40K/3 = 4000k/3$ which will NOT give the value of k or K.

When we combine the information given in both the statements, we will be able to find C as well as k or K. Hence option (c) is the correct option.

D Statement 1 and 2 together are NOT sufficient.

QUESTION ANALYTICS +

Q. 10

We are given a square of side 22 cm. A circle of maximum possible diameter is inscribed in this square. If a point is chosen at random inside the square, then the probability that it will lie inside the circle is _____.

Solution Video | Have any Doubt ?

0.785 (0.784 - 0.786) — Correct Option

Solution :

0.785 (0.784 - 0.786)

$$\text{Required probability} = \frac{\text{Area of the circle}}{\text{Area of the square}}$$

Biggest possible circle that can be inscribed in the given square would be touching all the four sides of the square internally implying that the diameter of this circle = side of the square = 22 cm

$$\text{Required probability} = \frac{\text{Area of the circle}}{\text{Area of the square}} = \frac{\pi(11\times 11)}{(22\times 22)} = \frac{\pi}{4} = 0.785$$

Your Answer is .045

QUESTION ANALYTICS

Q. 11

Consider the following statement given below:
S_1 : RACE condition arises when mutual exclusion is not satisfied.
S_2 : Deadlock avoidance is more restrictive than deadlock prevention.
Which of the above statements are incorrect?

Have any Doubt ?

A Both S_1 and S_2

B Only S_2 — Correct Option

Solution :
(b)
S_1 : RACE condition arises when mutual exclusion is not satisfied. S_1 is correct
S_2 : Deadlock prevention is more restrictive than deadlock avoidance. S_2 is incorrect

C Only S_1

D None of the above

QUESTION ANALYTICS

Q. 12

Consider the grammar defined by the following production rules:
$S \rightarrow A * C$
$A \rightarrow B + A \mid B$
$B \rightarrow A - B \mid A$
$A \rightarrow id$
$B \rightarrow id$
$C \rightarrow id$
Which of the following is true?

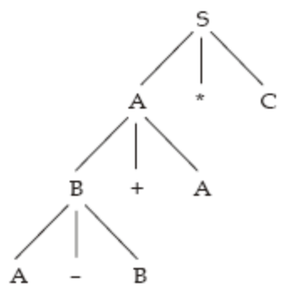
Have any Doubt ?

A + is left associative and has higher precedence than –

B + is right associative and – is left associative

C + is right associative and has higher precedence than * — Your answer is **Correct**

Solution :
(c)



+ and – are both right associative and + has higher precedence than *.
So correct option is (c).

D Both + and – are left associative

QUESTION ANALYTICS

Q. 13

Consider the following relation R(A, B, C, D, E, F, G) and set of functional dependencies.
$F = \{BCD \rightarrow A, BC \rightarrow E, A \rightarrow F, F \rightarrow G, C \rightarrow D, A \rightarrow G\}$
Which of the following is minimal cover of F?

Have any Doubt ?

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

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

C $\{BC \rightarrow A, BC \rightarrow E, A \rightarrow F, F \rightarrow G, C \rightarrow D\}$ — Your answer is **Correct**

Solution :
(c)
(1) RHS contain single attribute

$A \rightarrow F$ ...(1)
$F \rightarrow G$ ...(2)
$A \rightarrow G$ ...(3)

Hence FD′ (3) is redundant.
Now consider

$BCD \rightarrow A$
$(BC)^+ = BCEDAFG$

It contain attribute D, D is redundant.
Minimal cover is $\{BC \rightarrow A, BC \rightarrow E, A \rightarrow F, F \rightarrow G, C \rightarrow D\}$
So option (c) is correct.

D {BC → A, BC → E, A → F, C → D}

QUESTION ANALYTICS +

Q. 14

Consider the following statements regarding alphabet and language inequalities.

$S_1 : \Sigma^* - \{\epsilon\} = \Sigma^+$

$S_2 : L^* - \{\epsilon\} = L^+$

Which of the above statements are always true?

FAQ | Have any Doubt ?

A Both S_1 and S_2

B Only S_1 Correct Option

Solution :

(b)

Only S_1 holds true. The problem in S_2 is that, if "ϵ" belongs to L, RHS will contain ϵ, but LHS won't, so the equality will not hold. Therefore S_2 will be false.

C Only S_2 Your answer is **Wrong**

D None of these

QUESTION ANALYTICS +

Q. 15

Consider two languages, L_1 and L_2:

$L_1 = \{a^n \mid n >= 0\}$ and $L_2 = \{b^n \mid n >= 0\}$

Which of the following correctly represents $L_1 \cdot L_2$, where '$\cdot$' is the concatenation operation?

FAQ | Have any Doubt ?

A $\{a^n\, b^n \mid n \geq 0\}$

B $\{(ab)^n \mid n \geq 0\}$

C $\{a^m\, b^n \mid m = n,\ n \geq 0\}$

D $\{a^n\, b^m \mid m, n \geq 0\}$ Your answer is **Correct**

Solution :

(d)

$L_1 \cdot L_2$ will be equal to $\{a^n\, b^m \mid m, n \geq 0\}$.

QUESTION ANALYTICS +

Q. 16

The number of substrings (both trivial and nontrivial included) for a string containing n distinct characters is

Have any Doubt ?

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

B $\frac{n(n-1)}{2}$

C $\left(\frac{n(n-1)}{2}\right)+1$

D $\left(\frac{n(n+1)}{2}\right)+1$ Your answer is **Correct**

Solution :

(d)

This is how we derive the number of substrings in a string of n characters.

Substrings containing 0 letters = 1 (ϵ)

1 letters = n

2 letters = $n - 1$

3 letters = $n - 2$

(n – 1) letters = 2

n letters = 1

Add them up, $1 + (n + n - 1 + n - 2 + \ldots\ldots + 3 + 2 + 1)$

$$= 1 + \left[\frac{n(n+1)}{2}\right]$$

Hence (d) is the most appropriate choice.

QUESTION ANALYTICS +

Q. 17

The sorting algorithm which requires least number of swaps in the worst case is

The sorting algorithm which requires least number of swaps in the worst case is

Have any Doubt ?

A Insertion sort

B Bubble Sort

C Selection Sort — Correct Option

Solution :
(c)

$$\text{Insertion Sort} \Rightarrow O(n^2)$$
$$\text{Selection Sort} \Rightarrow O(n)$$
$$\text{Bubble Sort} \Rightarrow O(n^2)$$
$$\text{Quick Sort} \Rightarrow O(n^2)$$

Amongst all these algorithms, selection sort requires least number of swaps.

D Quick Sort

QUESTION ANALYTICS +

Q. 18

The number of one-one functions possible from a set having n elements to a set having m elements is

Have any Doubt ?

A ${}^nC_m \cdot m!$

B n^m

C ${}^mC_n$

D ${}^mC_n \cdot n!$ — Your answer is **Correct**

Solution :
(d)
The number of one-one functions from n element set to m element set = ${}^mP_n$ which is same as ${}^mC_n \cdot n!$
Hence option (d) is correct.

QUESTION ANALYTICS +

Q. 19

A user has been assigned an IP address 110.10.32.68/27. Which of the following IP addresses can be assigned for directed broadcasting in the same network.

Have any Doubt ?

A 110.10.32.255

B 110.10.32.127

C 110.10.32.95 — Your answer is **Correct**

Solution :
(c)

$$\begin{aligned} \text{IP} &: 110.10.32.68 \\ \text{Subnet mask} &: 255.255.255.224 \\ \text{Net ID} &: 110.10.32.64 \end{aligned}$$

We have 5 bits for host ID. When all bits of host Id is 1 then it is direct broadcasting address.
So,

$$\underbrace{110.10.32.010}_{\text{Network bit}}\ \underbrace{11111}_{\text{Host bit}}$$

$$= 110.10.32.95$$

So, option (c) is correct.

D 110.10.32.0

QUESTION ANALYTICS +

Q. 20

An Internet Service Provider (ISP) has a block 219.50.0.0/16. There are 3 groups, Group1 has 128 customers and each requires 64 IP addresses. Group2 has 64 customers and each requires 256 IP addresses. Group3 has x customers and each requires y IP addresses. After successfully completed customer requests only 38K IP address left with ISP. What can be the possible value of x and y respectively.

Have any Doubt ?

A 64, 128

B 32, 16

C 32, 128

D 64, 32 — Correct Option

Solution :
(d)

$$
\begin{aligned}
38 \times 2^{10} &= [2^{16} - [\text{Group1} + \text{Group2} + \text{Group3}]] \\
38 \times 2^{10} &= [2^{16} - [2^7 \times 2^6 + 2^6 \times 2^8 + 2^m \times 2^n]] \\
2^x \times 2^y &= 2^{16} - 2^{13} - 2^{14} - 38 \times 2^{10} \\
&= 2^{10}[2^6 - 2^3 - 2^4 - 38] \\
&= 2^{10}[64 - 8 - 16 - 38] \\
&= 2^{10} \times 2^1 \\
2^x \times 2^y &= 2^{11}
\end{aligned}
$$

Option (d), which $2^6 \times 2^5 = 2^{11}$

QUESTION ANALYTICS +

Q. 21

A 4-bit preset table UP counter has preset input 0111. The preset operation takes place as soon as the counter becomes maximum, i.e. 1111. The modulus of this counter is

Have any Doubt ?

A 15

B 5

C 7

D 8 — Correct Option

Solution :
(d)

CP	0111
1	1000
2	1001
3	1010
4	1011
5	1100
6	1101
7	1110
8	1111
	0111

Preset → 8 clock pulses, it is repeating.
So mod 8.

QUESTION ANALYTICS +

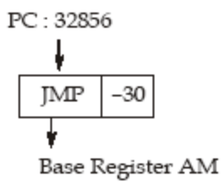
Q. 22

Assume the base register contains 32856. The program counter is currently at 25687 memory location. What is the branch address if address field of jump instruction contain –30 in address field and the instruction is designed with the base register addressing modes?

Have any Doubt ?

A 32826 — Your answer is **Correct**

Solution :
(a)



$$
\begin{aligned}
\text{Effective Address [EA]} &= [\text{Base register}] + \text{Relative value} \\
&= 32856 + (-30) = 32826 \\
\text{PC} &= 32826
\end{aligned}
$$

Branch address will be 32826.

B 25657

C 32886

D 25717

QUESTION ANALYTICS +

Q. 23

The incorrect match (when $n > 1$) is

Have any Doubt ?

A SISD model of computer : 1 control unit and 1 ALU

B SIMD model of computer : 1 control unit and n ALUs

C MISD model of computer : n control units and n ALUs — Your answer is **Wrong**

D MIMD model of computer : n control units and 1 ALU — Correct Option

Solution :
(d)
MIMD model has n-control units and since in multiprocessing, it requires n ALU units also.

QUESTION ANALYTICS +

Q. 24

The speed gained by an 'n' segment pipeline executing 'm' tasks is

Have any Doubt ?

A $\frac{(n+m-1)}{mn}$

B $\frac{mn}{(n+m-1)}$ Your answer is **Correct**

Solution :
(b)
Tasks $\rightarrow m$
Stages in pipeline $= n$
Without pipelining number of cycles required to execute m tasks = $n\ m$.
($\because$ each task required n cycle)
When we pipeline the tasks for Ist task it requires n cycles and for next $(m - 1)$ 1 cycle for each $(m - 1)$ tasks.
So total cycles required with pipelining

$$= n + (m - 1) \times 1$$
$$= (n + m - 1)$$

$$\therefore \quad \text{Speed gained by pipeline} = \frac{\text{Number of cycles without pipelining}}{\text{Number of cycles with pipeline}}$$
$$= \frac{nm}{(n+m-1)}$$

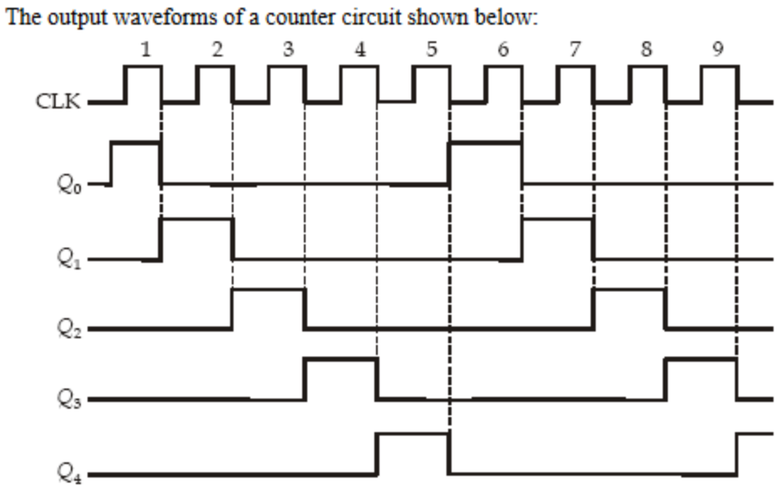
C $\frac{n+m}{(mn-1)}$

D $\frac{n+m}{(mn+1)}$

QUESTION ANALYTICS +

Q. 25

The output waveforms of a counter circuit shown below:



The counter is

Have any Doubt ?

A Decade counter

B As asynchronous counter Your answer is **Wrong**

C Johnson counter

D Ring counter Correct Option

Solution :
(d)
The waveform is of the ring counter because in one clock period only one flip-flop output active and the same is repeating.

QUESTION ANALYTICS +

Q. 26

Consider a system which has 28 instances of a resource P such that 4 + n processes share them, 4 process request 5 instances of 'P'. If n processes request 5 instances of same resources what is the maximum value of n such that system is in safe state _____.

Have any Doubt ?

2 Correct Option

Solution :
2

$$28 > 4 \times (5 - 1) + (5 - 1) \times n$$
$$28 > 20 - 4 + 5n - n$$
$$28 > 16 + 4n$$
$$12 > 4n$$
$$3 > n$$

Maximum value of n is 3 – 1 = 2

Your Answer is 20

QUESTION ANALYTICS

Q. 27

Consider the following set of processes that need to be scheduled on a single CPU operating system uses preemptive shortest remaining time first algorithm.
(Ties are broken on first come first serve basis)

Process	Arrival Time	Execution Time
P_0	5	6
P_1	2	3
P_2	1	4
P_3	6	2
P_4	8	5

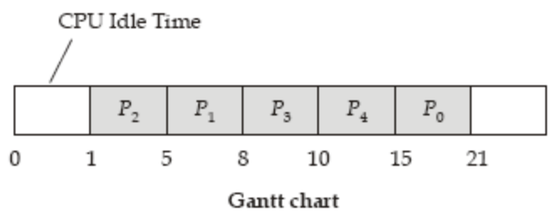
(All time in milliseconds)

The average waiting time of these processes are _____ (in milliseconds). (Upto 1 decimal place)

Have any Doubt ?

3.4 (3.4 - 3.4) — Correct Option

Solution :
3.4 (3.4 - 3.4)



Gantt chart

$$\text{Waiting Time} = \text{Turn Around Time} - \text{Execution (burst) time}$$

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

$$= \frac{10+3+0+2+2}{5} = \frac{17}{5} = 3.4 \text{ ms}$$

Your Answer is 2.6

QUESTION ANALYTICS

Q. 28

Let A be matrix such that, $A = \begin{bmatrix} 2 \\ -4 \\ 7 \end{bmatrix} [1 \quad 9 \quad 5]$.

Let x, y and z be the eigen value of A. Then the product xyz is equal to _____.

Have any Doubt ?

0 — Your answer is **Correct**0

Solution :
0

Product of eigen values of a matrix A = Determinant of A
Upon evaluating, we see that $|A| = 0$
$\Rightarrow \quad x \cdot y \cdot z = |A| = 0$
Hence 0 is the answer.

QUESTION ANALYTICS

Q. 29

Assume that the time complexity of the most efficient algorithm to find the median in a list of n characters is $\theta(n \log n)$. It is experimentally found that, when this algorithm is made to run on a list of 16 elements, it takes 256 units of time respectively. Then the time taken by this algorithm when the input list contains 64 elements is _____.

Have any Doubt ?

1536 — 1536
Your answer is **Correct**

Solution :
1536

Given, $T(n) = \theta(n \log n) = c.n\log n$
Now, $T(16) = 256$ units
Therefore, $c.16.\log(16) = 256$
$\Rightarrow \quad c = 4$
Now we have to find T(64).
$T(64) = 64.c.\log(64)$
Substitute the value of c and solve the equation to get
$T(64) = 1536$ units

QUESTION ANALYTICS

Q. 30

Consider the following statements regarding degree of the vertex in graph G.
S_1: The number of odd degree vertices is always even in every graph G.
S_2: If there are exactly 2 vertices x and y of odd degree in a graph G, then there must be a path between x and y.
S_3: Every planar graph can be coloured with at most 4 colours.
The number of true statements are _____.

Have any Doubt ?

3 — Your answer is **Correct**3

Solution :
3

S_1 is quite popular and easy to understand.

S_2 "If there are 2 vertices x and y of odd degree in a graph G, then there must be a path between x and y".

Statement S_2 is also true. We can also say that if there are exactly 2 vertices x and y of odd degree in a graph G, then they have to be in the same connected component.

S_3 is also true and is popularly known as the Four Colour Theorem.

QUESTION ANALYTICS +

Q. 31

Following is a table of an incomplete binary operation '*'.

*	p	q	r	s
p	p	r	X	q
q	Y	q	p	Z
r	s	p	r	p
s	q	r	W	s

Consider the following ways of filling the entries in place of X, Y, Z, W:

I. $X \to s, Y \to r, Z \to p, W \to p$

II. $X \to s, Y \to r, Z \to p, W \to q$

III. $X \to s, Y \to r, Z \to q, W \to p$

IV. $X \to s, Y \to r, Z \to r, W \to p$

The correct way of filling the entries so that in the table obtained, '*' is found to be commutative will be (for example if II is correct then answer should be filled as 2) _____.

Have any Doubt ?

4 — Your answer is **Correct**4

Solution :
4

For commutativity, the upper Δ should be same as lower Δ. So if the assignment is done as in choice IV, '*' will retain its commutativity.

QUESTION ANALYTICS +

Q. 32

Consider a very large network of 10000 routers. Two host A and B are connected with this network. Host A sends data to host B and after some unit of time host A receives ICMP time exceeded message for the same data packet. The maximum number of routers that can be travelled by packets when ICMP message reaches back to host A is _____.

Have any Doubt ?

509 — Correct Option

Solution :
509

ICMP message sends time exceeded message when TTL value becomes zero. TTL uses 8-bit in IP header which can travel maximum of 255 routers.

Total routers travelled = 255 (packet going forward) + 254 (ICMP time exceeded message coming back)

= 509

Your Answer is 9999

QUESTION ANALYTICS +

Q. 33

A traffic signal cycles from RED to YELLOW, YELLOW to GREEN, GREEN to RED. In each cycle RED is turned on for 100 seconds, YELLOW is turned on for 40 seconds and GREEN is turned on for 80 seconds. The traffic signal has to be implemented using Finite State Machine (FSM). The only input to this FSM is a clock of 10 second period. The minimum number flip-flops required to implement this FSM is _____.

Have any Doubt ?

5 — Correct Option

Solution :
5

YELLOW → 40 seconds → 4 clock cycle

GREEN → 80 seconds → 8 clock cycle

RED → 100 seconds → 10 clock cycle

Total number of unique states required = 4 + 8 + 10 = 22

Minimum number of flip-flops required is

$\lceil \log_2(22) \rceil = 5$

QUESTION ANALYTICS +

Q. 34

A hypothetical processor contains 25 registers and 110 opcodes. Each instruction of the processor has four field namely opcode, 2 register operands and 1 for direct addressing. The number of bits is used to represent direct addressing field when 30 bit of word size used is _____.

Have any Doubt ?

13 — Your answer is **Correct**13

Solution :
13

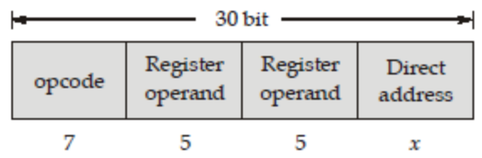
Number of register = 25

Number of bits required = $\lceil \log_2 25 \rceil = 5$

Number of opcodes = 110

Number of bits required to denote opcode = $\lceil \log_2 110 \rceil = 7$

Instruction representation:



$30 = 7 + 5 + 5 + x$

$x = 13$ bit

QUESTION ANALYTICS

Q. 35

The minimum number of comparisons required in order to find the maximum and minimum of 64 numbers using divide and conquer is equal to _____.

Have any Doubt ?

94 — Correct Option

Solution :

94

$\left(\frac{3n}{2} - 2\right) = \frac{3(64)}{2} - 2 = 94$

QUESTION ANALYTICS

Q. 36

Consider the following synchronization construct used by two process P_0 and P_1 which need to access a critical section:

```
P0 :
while (true) {
turn_0 = true;
while (turn_1 = = true)
        turn_0 = false;
CRITICAL SECTION
}
/*Remainder section*/
P1 :
while (true) {
turn_1 = true;
while (turn_0 = = true)
        turn_1 = false;
CRITICAL SECTION
}
/*Remainder section*/
```

Here, turn_0 and turn_1 are shared variables, which are initialized to false. Which of the following statement is true about the above construct?

Have any Doubt ?

A It ensure mutual exclusion and prevent deadlock.

B It requires that processes enter the critical section in strict alternation. — Your answer is **Wrong**

C It does not ensure mutual exclusion. — Correct Option

Solution :

(c)

When both process P_0 and P_1 executing concurrently. P_0 and P_1 make turn_0 = true and turn_1 = true, process P_0 execute while loop before executing turn_0 = false it preempted and P_1 start executing it make turn_1 = false and preempted. P_0 make turn_0 = false, both process enter into critical section. It does not ensure mutual exclusion.

D It ensure mutual exclusion but can not prevent dead lock.

QUESTION ANALYTICS

Q. 37

Consider the following grammar:

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow e$

Which of the following is correct about above grammar?

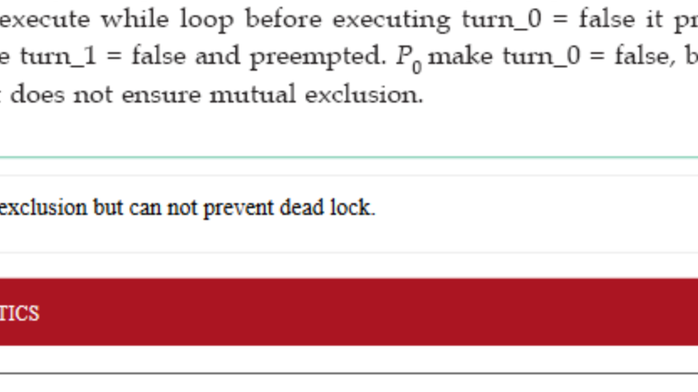
Have any Doubt ?

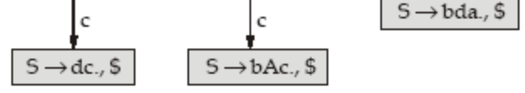
A LALR(1) but not SLR(1)

B SLR(1) and CLR(1) — Correct Option

Solution :

(b)





There is no conflict in any of the state so it SLR, LALR(1), CLR(1).
For LL(1)

$$\text{First (S)} = \text{First (Aa)} \cap \text{First (bAc)} \cap \text{First (dc)} \cap \text{First (bda)}$$
$$= \{e\} \cap \{b\} \cap \{d\} \cap \{b\} \neq \phi$$

Not LL(1).

C LL(1) and LALR(1)

D Only CLR(1)

QUESTION ANALYTICS +

Q. 38

Consider the following statements given below:
S_1: There is always possible a lossless, dependency preserving BCNF decomposition.
S_2: Any relation with two attribute is in BCNF.
S_3: For two relation R(A, B) with functional dependency F = {A → B} and S(B, C) with functional dependency F = {B → C}, natural join of R ⋈ S is in BCNF.
Which of the following statements are true?

Have any Doubt ?

A S_1 and S_2 only

B S_2 and S_3 only — Your answer is **Wrong**

C S_1, S_2 and S_3

D None of the above — Correct Option

Solution :
(d)
S_1: Lossless dependency preserving BCNF decomposition is not always possible. S_1 false
S_2: With two attribute a relation is always in BCNF. S_2 true
R(A, B)
A → B, B → A
Both A and B are key for R.
S_3: The natural join of R and S will have functional dependencies A → B and B → C, which is not in BCNF. S_3 false
So option (d) is correct.

QUESTION ANALYTICS +

Q. 39

Consider the following schedules involving three transaction:
S_1: $W_2(x), W_1(x), R_3(x), W_2(y), R_3(y), R_3(z), R_2(x), R_1(y)$
S_2: $R_3(z), W_2(x), W_2(y), R_1(x), R_3(x), R_2(z), R_3(y), W_1(x)$
Which of the above schedules are conflict serializable?

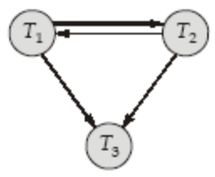
Have any Doubt ?

A Both S_1 and S_2

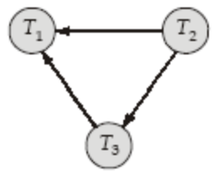
B Only S_1

C Only S_2 — Your answer is **Correct**

Solution :
(c)
A schedule is serializable if the precedence graph does not contain any cycle.

S_1: 

It contain cycle so not serializable.

S_2: 

It contain no cycle so serializable.
So option (c) is correct.

D Neither S_1 nor S_2

QUESTION ANALYTICS +

Q. 40

Let $M(x) = \dfrac{x^{2018}}{(1-x)^{2019}}$.

We define $M(x) = \sum_{r=0}^{\infty} a_r x^r$. Then a_r is equal to

Have any Doubt ?

A $^{r}C_{2019}$

B $^{r}C_{r\,+\,2018}$

C $^{r}C_{2019\,-\,r}$

D $^{r}C_{r\,-\,2018}$ Correct Option

Solution :
(d)
We know,

$$\frac{1}{(1-x)^{2019}} \Rightarrow {}^{r\,+\,2019\,-1}C_{r} \quad \left(\frac{1}{(1-x)^{n}} \rightarrow {}^{n+r-1}C_{r}\right)$$
$$= {}^{r\,+\,2018}C_{r}$$
$$= {}^{r\,+\,2018}C_{2018}$$

$[{}^{n}C_{r} = {}^{n}C_{n\,-\,r}]$

Now $x^{2018}\cdot\left[\left(\frac{1}{(1-x)^{2019}}\right)\right] \xrightarrow[\text{shifting property}]{r \rightarrow r-2018} {}^{(r-2018)+2018}C_{2018} = {}^{r}C_{2018}$

Which is same as, $^{r}C_{r\,-\,2018}$ $[{}^{n}C_{r} = {}^{n}C_{n\,-\,r}]$

Hence correct answer is (d).

QUESTION ANALYTICS +

Q. 41

Which of the given choices is the correct time complexity of the following code?

```
for (k = 1; k < (n + 1); k++)
    for (m = 1; m < (n + 1); m + = k)
    x = x + 1;
```

Have any Doubt ?

A $\theta(\log n)$

B $\theta(n \log n)$ Your answer is **Correct**

Solution :
(b)

$k=1$	$k=2$	$k=3$	.....	$k=n$
n times	$\frac{n}{2}$ times	$\frac{n}{3}$ times		1 times

Hence time complexity $T(n)$

$$= n+\frac{n}{2}+\frac{n}{3}+.....+1$$
$$= n\left(1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{n}\right)$$
$$= n(\log n)$$
$$= \theta(n\ \log n)$$

C $\theta(n)$

D $\theta(n^2)$

QUESTION ANALYTICS +

Q. 42

Consider the following regular expressions over the alphabet {0, 1}.
I. 1* 0(0 + 1)*
II. (0 + 1)* 01*
III. 1* 0(1 + 0)* + (0 + 1)* 01*
Which of the above regular expressions are equivalent?

Have any Doubt ?

A I and III only

B I and II only

C II and III only Your answer is **Wrong**

D I, II and III Correct Option

Solution :
(d)
I and II are quite easy to understand - both denote strings containing at least one 0. III is actually the union of I and II, but III is again denoting strings containing at least one 0, as both regular expressions (i.e. I and II) are equivalent, so union won't make any difference.
Hence all 3 regular expressions are equivalent.

QUESTION ANALYTICS +

Q. 43

Let G be a directed graph whose vertex set contains numbers from 1 to 1024. There is an edge from a vertex i to a vertex j iff either $j = i + 1$ or $j = 3i$. The minimum number of edges in the path from vertex 1 to vertex 100 is

Have any Doubt ?

A 13

B 4

C 6

D 7 — Correct Option

Solution :
(d)
The shortest path between 1 and 100 is $1 \rightarrow 3 \rightarrow 9 \rightarrow 10 \rightarrow 11 \rightarrow 33 \rightarrow 99 \rightarrow 100$
And the number of edges in this path = 7
Hence the answer is option (d).

QUESTION ANALYTICS +

Q. 44

A 3×3 matrix P has 3 eigenvalues –1, 0.5, 3. What will be the eigen values of $P^2 + 2P + I$?

Have any Doubt ?

A $0, \frac{9}{4}, 16$ — Your answer is **Correct**

Solution :
(a)
Eigen Values of P are (–1, 0.5, 3)
Eigen Values of $P^2 + 2P + I$ are,
$[(-1)^2 + 2(-1) + 1, 0.5^2 + 2 \times 0.5 + 1, 3^2 + 2 \times 3 + 1]$
On solving we get,

$$= (0, 2.25, 16) = (0, \frac{9}{4}, 16)$$

Hence (a) is the most appropriate choice.

B $1, \frac{1}{4}, 9$

C $2, \frac{9}{2}, 4$

D $2, \frac{3}{2}, -2$

QUESTION ANALYTICS +

Q. 45

Let R be a relation on the set A = {1, 2, 3}, such that R = {(1,1), (2,2), (3,3), (1,2)}. Now consider the following relations.
I. {(1,1), (2,2), (3,3)}
II. {(1,1), (2,2)}
III. {(1,1), (2,2), (3,3), (1,2)}
Which of the above correctly represent(s) the reflexive closure of R?

Have any Doubt ?

A Both I and III

B Only I — Your answer is **Wrong**

C Only III — Correct Option

Solution :
(c)
The common mistake here is to pick both I and III as the answer, which is wrong. Why? Because first of all in order for a relation T (say) to be reflexive closure of a relation R, then firstly T must be a superset of R, and only then we think about reflexivity. So I is actually a subset of R and thus cannot be the reflexive closure of R. II does not contain (3,3) and therefore is not reflexive.
So the correct answer is choice (c).

D None of these

QUESTION ANALYTICS +

Q. 46

A computer uses polynomials for error detecting and uses generator $G(x)$ as the generator polynomials to generate the check bits. $G(x)$ and message $M(x)$ that are to be transmitted is given below:

$G(x) : x^4 + x^3 + 1$
$M(x) : x^6 + x^4 + x$

Which of the following remainder bits will be added while transmitting the message $M(x)$?

Have any Doubt ?

A 0110

B 1100 — Your answer is **Wrong**

C 0111

D 1111 — Correct Option

Solution :
(d)

Given, $G(x) = x^4 + x^3 + 1$
$= 11001$
$M(x) = x^6 + x^4 + x$
$= 1010010$

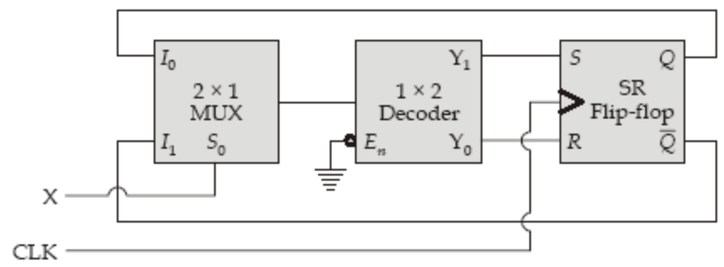
```
11001 | 1010010 0000 | 1100111
        11001
        -----
        11011
        11001
        -----
        00100
        00000
        -----
        01000
        00000
        -----
        10000
        11001
        -----
        10010
        11001
        -----
        10110
        11001
        -----
        1111   ⟶ Remainder
```

Transmitted frame = 10100101111

QUESTION ANALYTICS +

Q. 47

Consider the circuit shown in the figure below:



The circuit can work as

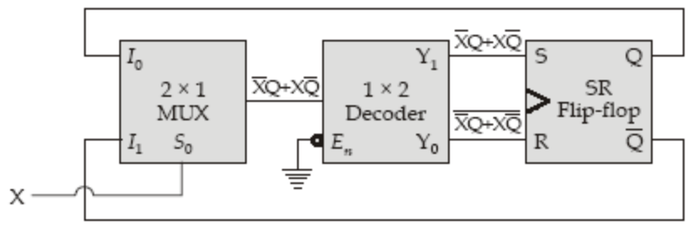
Have any Doubt ?

A D flip-flop — Your answer is **Wrong**

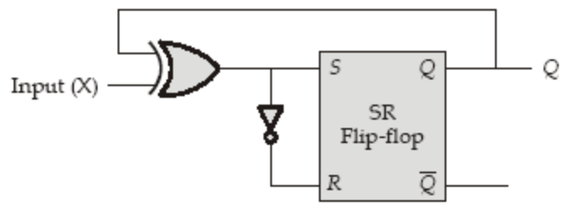
B T flip-flop — Correct Option

Solution :
(b)

The 2 × 1 MUX in the circuit is working as an Ex-OR gate and 1 × 2 decoder as NOT gate.



Now the resulting figure can be drawn as shown below:



$S = X \oplus Q_n$

$R = \overline{X \oplus Q_n}$

For SR flip-flop,

$Q_{n+1} = S + \overline{R}Q_n$

$= (X \oplus Q_n) + \overline{\overline{X \oplus Q_n}}\, Q_n$

$= (X \oplus Q_n)(1 + Q_n)$

$Q_{n+1} = X \oplus Q_n$

Q_{n+1} is excitation equation for T flip-flop. Thus, the circuit will function as T flip-flop.

C Sequence detector

D 2-bit counter

QUESTION ANALYTICS +

Q. 48

A 4-way set associative cache has lines of 32 byte and a total cache size of 16 KB. Which of the following main memory block is mapped on to the set '13' of the cache memory when 16 MB of main memory is used?

Have any Doubt ?

A A295DO

B FCED9D

C 2FAODO

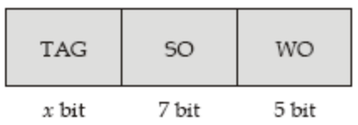
D FOA1B5 Your answer is **Correct**

Solution :
(d)

$$\text{Number of lines} = \frac{16K}{32} = \frac{2^{14}}{2^5} = 2^9$$

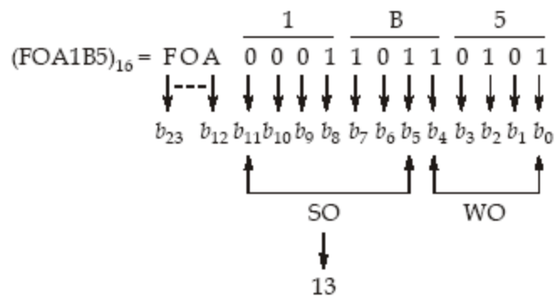
$$\text{Number of sets} = \frac{2^9}{2^2} = 2^7$$

Cache representation



Physical address size = 16 MB = 24 bit
$24 = x + 7 + 5$
$x = 12$ bit

Now, to map physical memory at 13th set bit ($b_{11}\, b_{10}\, b_9\, b_8\, b_7\, b_6\, b_5$) MM address should be 13.
In option (d)



Hence option (d) is correct.

QUESTION ANALYTICS +

Q. 49

Consider the array A = < 4, 1, 3, 2, 16, 9, 10, 14, 8, 7 >. After building max heap from the array A, the height (the longest path from root to the leaf) of the heap and the sum of elements present in the root's right subtree are equal to _____ and _____. (Root is at level 0)

Have any Doubt ?

A 3, 16

B 4, 19

C 3, 22 Your answer is **Correct**

Solution :
(c)
We can apply build max heap and the resultant max heap will have height equal to 3, and the elements present in the right subtree will be 10, 3, 9.
Therefore the sum will be equal to 10 + 3 + 9 = 22.

D 5, 25

QUESTION ANALYTICS +

Q. 50

Consider the following function, to which a pointer to the root node of the binary tree T is passed.

```
int MadeEasy(Struct Node * root)
{
int a = 0, b = 0, c = 0;
if(root == NULL) return 0;
if(root → left == NULL && root → right == NULL) return 1;
a = MadeEasy(root → left);
b = MadeEasy(root → right);
c = 1 + max(a, b);
return c;
}
```

The above program computes,

Have any Doubt ?

A The number of edges in the longest path from root to leaf in T

B The number of nodes in the longest path from root to leaf in T Correct Option

Solution :
(b)
The above program computes the number of levels in T. Option (b) is actually the definition of the number of levels (or depth) of a tree. For example, if the tree T has only one node, it returns 1. So options (a) and (c) are eliminated, as if (a) was supposed to be true, it should have returned 0. Now the only dilemma is between (b) and (d), which can also be handled easily, as the line $c = 1 + \max(a, b)$ should have been $c = 1 + a + b$ instead, but that's not the case and therefore it only computes the number of levels in T. All this explanation is given to help you solve the question in the exam quickly, but with a lot of practice, just by looking at the code you will be able to tell what the function can do and cannot do.

C Number of leaves in T Your answer is **Wrong**

D Total number of nodes in T

QUESTION ANALYTICS +

Q. 51

Let (G, *) be a group such that O(G) = 8, where O(G) denotes the order of the group G. Which of the following is true?

FAQ | Have any Doubt ?

A There exists no element a in G whose order is 6. Your answer is **Correct**

Solution :
(a)
Theorem: If a is an element of G, then O(a) must divide O(G).
Therefore (a) is true, as O(a) = 6 and 6 doesn't divide 8.
However the converse of the above theorem need not be true, therefore (b) is false.
(c) says there are at least two elements in G with order 1, however this violates the fact that every group can have only one identity element. So (c) is also wrong. So the appropriate choice is (d).

B There exists an element a in G whose order is 4.

C There exists more than one element a in G such that O(a) = 1.

D None of these

QUESTION ANALYTICS +

Q. 52

A binary operation $\odot$ on a set of integers is defined as $x \odot y = x^2+y^2 + 2xy$. Which one of the following statements is true about $\odot$?

Have any Doubt ?

A Commutative but not associative Your answer is **Correct**

Solution :
(a)
1. Check for commutative:

$$(x \odot y) = (y \odot x)$$
$$x^2 + y^2 + 2xy = y^2 + x^2 + 2yx$$

Since LHS = RHS
So $\odot$ is commutative.
2. Check for associative:

$$(x \odot y) \odot z = x \odot (y \odot z)$$
$$(x^2 + y^2 + 2xy) \odot z = x \odot (y^2 + z^2 + 2yz)$$
$$x^4 + y^4 + 4x^2y^2 + 2x^2y^2 + 4xy^3 + 4x^3y + z^2 + 2x^2z + 2y^2z + 4xyz$$
$$\neq x^2 + y^4 + z^4 + 4y^2z^2 + 2y^2z^2 + 4y^3z + 4yz^3 + 2xy^2 + 2xz^2 + 4xyz$$

So $\odot$ is not associative.

B Both commutative and associative

C Associative but not commutative

D Neither commutative nor associative

QUESTION ANALYTICS +

Q. 53

We are given an array A in which every element is either 0 or 1. The time complexity of the most efficient algorithm which sorts A in descending order is equal to

Have any Doubt ?

A O(n) Correct Option

Solution :
(a)
The simplest way is to scan the entire array once, and maintain a count of the number of 0's (zero_count) and 1's in the array (one_count) - for every 0 encountered, increment the zero_count and similarly do the same for the 1's also.
And then overwrite the array by first filling the array with 1's - the number of 1's being equal to one_count value, and do the same for 0's also.
All this will take O(n) time and (a) is the answer.

B O(n^2)

C O($n$log n) Your answer is **Wrong**

D O(n(log n)^2)

QUESTION ANALYTICS +

Q. 54

Consider a computer system with 32 bit virtual addressing and 44 bit physical addressing and page size is 4 KB. Each page table entry contain 2 valid bit 3 protection bit and 2 permission bit. The approximate size of the page table when virtual memory uses single level paging _____ (MB).

Have any Doubt ?

5 Your answer is **Correct**5

Solution :
5

$$\text{Number of pages} = \frac{\text{Virtual address space}}{\text{Page size}}$$

$$= \frac{2^{32}}{2^{12}} = 2^{20}$$

$$\text{Number of frame} = \frac{2^{44}}{2^{12}} = 2^{32}$$

Number of bits in page table entry = 32 + 2 valid bit + 3 protection bit + 2 permission bit
= 39 bit = 5 B

Page table size = $2^{20} \times 5$ B
= 5 MB

QUESTION ANALYTICS

Q. 55

Consider the following relations, SQL query and given instances of relations: (where keys are underlined)
Student (snum, sname)
Enroll (snum, cname)

```
SELECT S.name FROM Student S WHERE
    S.snum NOT IN (SELECT E.snum FROM Enroll E)
```

snum	sname
1	X
2	Y
5	Z
8	A
10	X
15	Y
18	X
19	E
22	F

Student

snum	cname
1	DS
2	Algo
8	C
5	DS
2	DS
15	TOC
19	TOC
15	DS
22	C

Enroll

Number of tuples returned by the SQL query is _____.

Have any Doubt ?

2 — Correct Option

Solution :
2

```
SELECT S.name FROM Student S WHERE
    S.snum NOT IN (SELECT E.snum FROM Enroll E)
```

↓

It return snum of all student who is enrolled in any course.

Query return the sname of student who is not enrolled in any course.
SQL does not eliminates duplicate so relation given by SQL query is

sname
X
X

Total 2 tuple returns.

Your Answer is 1

QUESTION ANALYTICS

Q. 56

What is the minimum level of B tree index required for storing 7500 key and order of B tree is 6. (Order is maximum child pointer a node can have)
_____.

Have any Doubt ?

5 — Your answer is **Correct**5

Solution :
5

Order of B tree = 6
Maximum key in one node = 5
1st level – 5 key
2nd level – 6×5 key
3rd level – $6 \times 6 \times 5$ key
4th level – $6 \times 6 \times 6 \times 5$ key
5th level – $6 \times 6 \times 6 \times 6 \times 5$ key
Total keys in five level = 5 + 30 + 180 + 1080 + 6480
= 7775

Total 5 level required.

QUESTION ANALYTICS

Q. 57

Consider the following sentence:
"There is exactly one God"
Let $\text{God}(x)$: x is a God
Now consider the following predicate logic statements.

I. $\exists x\ \text{God}(x)$

II. $\exists x\ (\text{God}(x) \wedge \forall y\ (\text{God}(y) \Rightarrow x = y))$

III. $\exists x \forall y\ (\text{God}(x) \wedge (\sim \text{God}(y) \vee x = y)))$

The number of statements which are equivalent to the above sentence is _____.

Have any Doubt ?

2 — Correct Option

Solution :
2

- I is not correct because it says "at least one God" instead of "exactly one God".

- II is clearly the correct statement.
- III is same as II and can be obtained using,

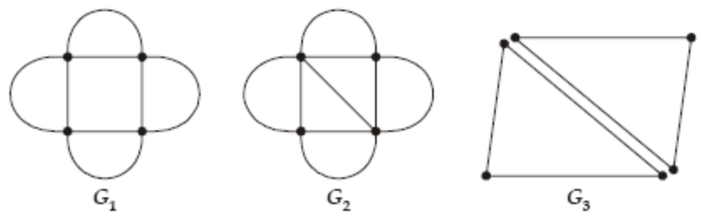
$$p \Rightarrow q \equiv \sim p \vee q$$

$$(\text{God}(y) \Rightarrow (x = y)) \equiv (\sim \text{God}(y) \vee (x = y))$$

QUESTION ANALYTICS

Q. 58

Consider the following graphs:



The number of graphs which are Euler _____.

Have any Doubt ?

1 — Correct Option

Solution :
1

For a graph to be Euler, it must obeys the following conditions:

1. Every vertex of G must have even degree.
2. G should be connected.

G_1 is Euler, as it is connected and all vertices in G_1 have even degree.
G_2 has 2 vertices with odd degree $\Rightarrow$ G_2 is not Euler.
G_3 is not connected $\Rightarrow$ G_3 is not Euler.

Your Answer is 2

QUESTION ANALYTICS

Q. 59

Out of all possible three digit numbers, a number is picked at random. The probability that the number does not contain the digit 6 is _____.

Have any Doubt ?

0.72 (0.70 - 0.74) — Correct Option

Solution :
0.72 (0.70 - 0.74)

Total number of 3 digit numbers = 900 (Digits from 100 to 999)

At first place, 0 and 6 aren't allowed so 8 choices for filling first place; for second and third place, all digits are allowed except the digit 6, hence 9 choices for filling second and third place.

$n(\text{Not containing the digit 6}) = (8 \times 9 \times 9)$

$$\text{P(Not containing the digit 6)} = \frac{n(\text{not containing the digit 6})}{900}$$

$$= \frac{(8 \times 9 \times 9)}{900}$$

Solve this to get, 0.72 as the answer.

Your Answer is 0.8

QUESTION ANALYTICS

Q. 60

Consider the following C function:

```
void foo(int n)
{
    while (n! = 0)
    {
        if (!(n & 1))
        printf("*");
        n = n >> 1;
    }
}
```

The number of times printf("*") statement is executed, when the value 2^{24} is passed to the function foo( ) is _____.

Have any Doubt ?

24 — Correct Option

Solution :
24

The above function prints * as many times as the number of zeroes in the binary representation of n. In 2^{24}, the bit pattern is 10^{24} (1 followed by 24 zeroes), and thus 24 stars are printed by the above function.

Your Answer is 25

QUESTION ANALYTICS

Q. 61

A token bucket scheme is used for traffic shaping. A new token is put into the bucket at every 10 µsec. Assume each token picks one packet which contains 2 byte of data. It is observed that initial capacity of bucket is 10 Mbits. The computer can transmit at the full speed of 8 Mbps for _____ (in seconds upto 2 decimal places)

Have any Doubt ?

1.56 (1.50 - 1.60) — Correct Option

Solution :
1.56 (1.50 - 1.60)

We know,

$$C + R \times S = M \times S$$

Where, C = Initial capacity
R = Token rate
M = Output rate
S = Bursty traffic

Given, C = 10 Mbits

Token arrives at interval of 10 μsec.

Then in 1 sec 100000 token arrives.

So, 100000×16 bit
$= 16 \times 10^5$ bits/sec
$= 1.6$ Mbps

Hence R = 1.6 Mbps

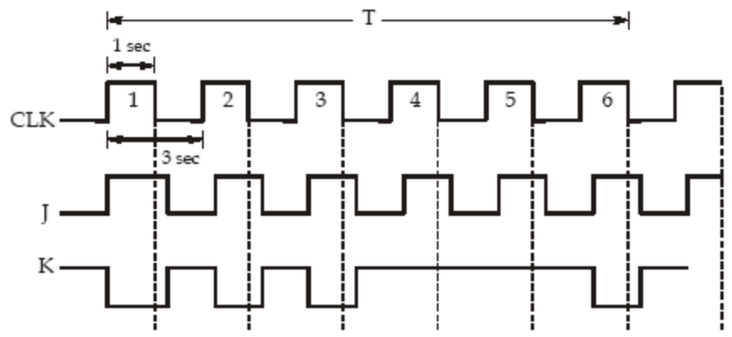
Substituting we get

$$S = \frac{C}{(M-R)} = \frac{10}{(8-1.6)} = 1.5625$$

QUESTION ANALYTICS

Q. 62

Consider a pulse triggered master slave JK flip-flop with inputs J and K as shown below:



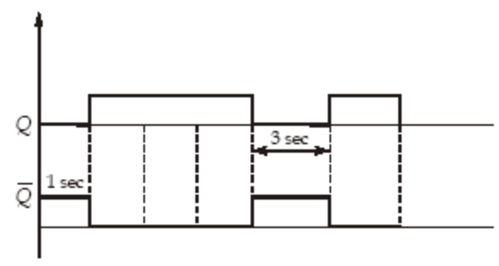
The input to the LED is connected to the output $\overline{Q}$ of the master slave flip-flop. The duration for which the LED will be ON in the time duration of T is _____ sec.

Have any Doubt ?

4 — Correct Option

Solution :
4

The output for the above circuit can be drawn as:



$T_{\text{LED ON}} = 4$ sec

QUESTION ANALYTICS

Q. 63

Consider a 2-way set associative cache with total 6 cache blocks and the following sequence of memory block requests arrived:
21, 7, 20, 32, 21, 16, 27, 22, 7, 16, 22
If LRU replacement policy is used then the hit ratio will be _____. (Upto 2 decimal places.)

Have any Doubt ?

0.09 (0.08 - 0.10) — 0.09
Your answer is **Correct**

Solution :
0.09 (0.08 - 0.10)

21 mod 3 = 0 → miss
7 mod 3 = 1 → miss
20 mod 3 = 2 → miss
32 mod 3 = 2 → miss
21 mod 3 = 0 → hit
16 mod 3 = 1 → miss
27 mod 3 = 0 → miss
22 mod 3 = 1 → miss
7 mod 3 = 1 → miss
16 mod 3 = 1 → miss
22 mod 3 = 1 → miss

$$\text{Hit ratio} = \frac{\text{Total hit}}{\text{Total reference}} = \frac{1}{11} = 0.09$$

SO \ Associativity		
0	21	27
1	~~7~~ ~~22~~ 16	~~16~~ ~~7~~ 22
2	20	32

QUESTION ANALYTICS

Q. 64

Consider the following relations and instances of relations: (where primary keys are underlined)
Supply (sid, sname)
Parts (pid, pname, color)
Catalog (sid, pid)

pid	pname	color
5	X	Red
10	Y	White
12	Z	Blue
15	Y	Red
18	A	Green
25	X	Black
28	B	Red
35	X	Green

Parts

sid	pid
100	5
102	5
108	10
115	12
125	25
115	28
135	18

Catalog

$\pi_{sid}(\pi_{sid}(catalog) \times \pi_{pid}(\sigma_{color = 'violet'}(parts)) - \pi_{sid, pid}(catalog))$

Number of tuples return by the above relational algebra query on the given instance of relations _____.

Have any Doubt ?

0 Correct Option

Solution :
0
There is no violet color in relation parts. Number of tuple return by the cross product is 0 and the number of tuples return by the query is 0.

QUESTION ANALYTICS +

Q. 65

Let G be a simple connected planar graph with 14 vertices and 20 edges. Then, the number of closed regions in the planar embedding of the graph is _____.

FAQ | Have any Doubt ?

7 Your answer is **Correct**7

Solution :
7
It's a fairly straightforward problem.
Given, $n = 14, e = 20$
We have to find the number of closed regions in the planar embedding of G.
Use, $r = (e - n + 2)$
$r = (20 - 14 + 2) = 6 + 2 = 8$
Now, $r = r_{open} + r_{closed}$
We know, $r_{open} = 1$ and $r = 8$ (calculated above)
Therefore $8 = 1 + r_{closed}$
Therefore $r_{closed} = 7$

QUESTION ANALYTICS +