



Kunal Jha  
 Course: GATE  
 Computer Science Engineering(CS)

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## MULTIPLE SUBJECT : COMPUTER NETWORKS + DATABASES (GATE - 2020) - REPORTS

OVERALL ANALYSIS    COMPARISON REPORT    **SOLUTION REPORT**

ALL(33)    CORRECT(0)    INCORRECT(0)    SKIPPED(33)

Q. 1

Solution Video    Have any Doubt ?

Consider the following statements:  
 I. Bit stuffing refer to inserting a '0' in flag stream to avoid ambiguity.  
 II. HDLC is bit oriented.  
 III. TDMA is non polling system.  
 Which of the above statement(s) is/are correct?

A I and II only

B I and III only

C II and III only

Correct Option

**Solution :**  
 (c)

I. Bit stuffing refer to inserting a '0' in data stream to differentiate it with a flag.  
 II. HDLC is bit oriented.  
 III. TDMA is non polling system.

D III only

### QUESTION ANALYTICS

Q. 2

Solution Video    Have any Doubt ?

Consider the following relation  $R(A_1, A_2, \dots, A_n)$  with  $n$  attribute where  $m$  attributes of relation  $R$  are simple candidate key such that ( $m \leq n$ ).  
 What is the number of maximum possible superkeys?

A  $2^m \times (2^{n-m} - 1)$

B  $(2^m - 1) \times 2^{n-m}$

Correct Option

**Solution :**  
 (b)  
 There are  $m$  simple candidate keys which forms  $(2^m - 1)$  superkey.  
 $(n - m)$  non prime attribute.  
 Total superkeys possible =  $(2^m - 1) \times 2^{n-m}$

C  $(2^n - 1) \times 2^{n-m}$

D  $2^m \times 2^{n-m}$

### QUESTION ANALYTICS

Q. 3

Solution Video    Have any Doubt ?

Which of the following statement is true about views?

A Views allowed to update if defined over multiple relation without aggregation.

B Views allowed to update if defined over single relation even with aggregation

C Both (a) and (b)

D None of these

Correct Option

**Solution :**  
 (d)  
 Views allowed to update if defined over single relation without aggregation.

### QUESTION ANALYTICS

Q. 4

Solution Video    Have any Doubt ?

Suppose computer X, Y, Z have following IP address:

X	10.105.1.173
Y	10.105.1.186
Z	10.105.1.141

Which of the following netmask should be used if X and Y belong to the same network but not Z?

A 255.255.255.128

B 255.255.255.224

Correct Option

Solution :

(b)

(a) 255.255.255.128

255.255.255.10000000

All X, Y, Z belongs to same network.

(b) 255.255.255.224

255.255.255.11100000

X 10.105.1.10101101

Z 10.105.1.10001101

Y 10.105.1.10111010

After ANDING X and Y belongs to this network, first three bits of fourth octal of X and Y are same but not Z.

(c) 255.255.255.0

All X, Y, Z belongs to same network.

(d) 255.255.255.192

255.255.255.11000000

Since the first two bits of fourth octal of all the three address are same, all belongs to same network.

C 255.255.255.0

D 255.255.255.192

 QUESTION ANALYTICS

+

Q. 5

 Solution Video

 Have any Doubt ?

Q

Which of the following is true if maximum possible key that can be in  $B$  tree node equal to that of  $B^*$  tree node?

A  $B^*$  tree index nodes is less than or equal  $B$  tree index nodes for  $n$  keys.

B  $B$  tree index nodes is less than or equal  $B^*$  tree index nodes for  $n$  keys.

Correct Option

Solution :

(b)

If maximum possible key that can in  $B$  tree node is equal to that of  $B^*$  tree node then  $B$  tree index nodes less than or equal  $B^*$  tree index nodes for  $n$  keys.

C I/O cost of  $B^*$  tree index less than or equal I/O cost of  $B$  tree index for  $n$  keys.

D None of these

 QUESTION ANALYTICS

+

Q. 6

 Solution Video

 Have any Doubt ?

Q

In a network of LANs connected by bridges, packets are sent from one LAN to another through intermediate bridges, more than one path may exist between two LANs, packets may have to be routed through multiple bridges. Why spanning tree algorithm used for bridge routing?

A For shortest path routing between LANs.

B For minimizing collisions

C For fault tolerance

D For avoiding loops in the routing paths

Correct Option

Solution :

(d)

Spanning tree approach is a mechanism in which bridges automatically develop a routing table and update that table in response to changing topology, the algorithm consists of 3 mechanisms. Frame forwarding, loop resolution, address learning.

 QUESTION ANALYTICS

+

Q. 7

 Solution Video

 Have any Doubt ?

Q

Which of the following is false?

**A** If the machine is connected and running a TCP/IP protocol stack, it should respond to the PING datagram with a datagram of its own.

**B** If PING encounter an error condition, an ICMP message is not returned.

Correct Option

Solution :

(b)  
PING is a command which is used to check the particular port is working or not by sending echo frame and receiving echo response in specified time.

**C** Fast retransmit deals with congestion but not flow control

**D** None of these

QUESTION ANALYTICS



Q. 8

Solution Video

Have any Doubt ?



A primary key if combined with a foreign key creates

**A** Many-to-many relationship between the tables that connect them.

**B** Parent child relationship between the tables that connect them.

Correct Option

Solution :

(b)  
A primary key is combined with foreign key then a referential constraint is set up between the two relation, hence it creates a parent child relationship between the tables that connects them

**C** Network model between the tables that connect them

**D** None of these

QUESTION ANALYTICS



Q. 9

Solution Video

Have any Doubt ?



A broadcast LAN has 20 Mbps bandwidth and use CSMA/CD. The signal travels along the wire at  $4 \times 10^3$  km/sec. What must be the maximum length of cable (in meter) such that a frame of size 128 B is used on the network \_\_\_\_\_. (Upto 1 decimal place)

**102.4 [102.3 - 102.5]**

Correct Option

Solution :

102.4 [102.3 - 102.5]

Transmission Time  $\geq 2 \times$  Propagation Time

$$\frac{\text{Frame size}}{\text{Bandwidth}} \geq 2 \times \frac{d}{v}$$
$$\frac{128 \times 8}{20 \text{ Mbps}} \geq 2 \times \frac{x}{4 \times 10^6 \text{ m/sec}}$$
$$x = 102.4 \text{ meter}$$

QUESTION ANALYTICS



Q. 10

Solution Video

Have any Doubt ?



IP address of a computer is given as 44.93.53.119. Subnet mask is given as 255.255.0.0 then the number of 1's in subnet Id \_\_\_\_\_.

**8**

Correct Option

Solution :

(8)

Id address = 44.93.53.119

Subnet mask = 255.255.0.0

Subnet Id = 44.93.0.0

IP address and subnet mask perform BITWISE AND will get subnet Id.

In binary representation of subnet Id = 44.93.0.0

00101100.01011101.00000000.00000000

Number of 1's = 8

QUESTION ANALYTICS





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**Q. 11**
[▶ Solution Video](#)
[⌚ Have any Doubt ?](#)


Consider the following statements:

- An entity integrity constraint states that no primary key value can be null.
- A foreign key can not be used to refer to its own relation.

Number of correct statements \_\_\_\_\_.

**1**
[Correct Option](#)
**Solution :**

(1)

An entity integrity constraint states that no primary key value can be null.

II. A foreign key can be used to refer to its own relation.

[QUESTION ANALYTICS](#)

**Q. 12**
[▶ Solution Video](#)
[⌚ Have any Doubt ?](#)


An IP router implementing Classless Inter-domain Routing (CIDR) receives a packet with 144.67.23.82. The router's routing table has the following entries:

Prefix	Output interface Identifier
144.67.16.0/20	6
144.67.28.0/22	5
144.67.32.0/24	3
144.67.22.0/23	2

The identifier of the output interface on which this packet will be forwarded is \_\_\_\_\_.

**2**
[Correct Option](#)
**Solution :**

(2)

3<sup>rd</sup> octet of given IP : 00010111  
 1<sup>st</sup> Interface : 144.67.00010000.0  
 ANDING both will give 147.67.16.0  
 ∴ Matched  
 2<sup>nd</sup> Interface : 144.67.00011100.0  
 ANDING both will give 147.67.20.0  
 ∴ Not matched  
 3<sup>rd</sup> Interface : 144.67.00010000.0  
 ANDING both will give 147.67.0.0  
 ∴ Not matched  
 4<sup>th</sup> Interface : 144.67.00010110.0  
 ANDING both will give 144.67.22.0  
 ∴ Matched

Since the fourth link has 23 as the mask bits which is greater than first link. Hence the interface used will be 2.

[QUESTION ANALYTICS](#)

**Q. 13**
[▶ Solution Video](#)
[⌚ Have any Doubt ?](#)


Consider the following schedule and given statements:

 $S : R_2(A), W_1(B), W_1(C), R_3(B), R_2(B), R_1(A), C_1, R_2(C), C_2, W_3(A), C_3$ 

- Schedule ( $S$ ) is allowed by 2PL.
- Schedule ( $S$ ) is strict recoverable schedule.

Number of correct statements \_\_\_\_\_.

**1**
[Correct Option](#)
**Solution :**

(1)

$T_1$	$T_2$	$T_3$
X(B) W <sub>1</sub> (B)	S(A) $R_1(A)$	
X(C)		
S(A)		
U(A)		
		S(B) $R_3(B)$
	S(B) $R_2(B)$	
S(B) R(A) U(B) $C_1$		$R_2(C)$

	U(A) U(B)	C <sub>2</sub>	X(A) W <sub>3</sub> (A)	U(B), U(A)	C <sub>3</sub>
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Schedule (S) is allowed under 2PL but not strict recoverable.

#### QUESTION ANALYTICS

Q. 14

Solution Video

Have any Doubt ?



In standard ethernet with transmission rate of 20 Mbps, the length of the cables is 2500 m and the size of frame is 1024 bits. The propagation speed of a signal in a cable is  $2 \times 10^8$  m/s. The percentage of the time medium is occupied but not used by a station is \_\_\_\_\_ (in approx Ex. 31.1 = 31).

61

Correct Option

**Solution :**  
(61)

$$(P_d) \text{ Propagation delay} = \frac{2500}{2 \times 10^8} = 12.5 \mu\text{sec}$$

$$(t_t) \text{ Transmission delay} = \frac{1024}{20 \times 10^6} = 51.2 \mu\text{sec}$$

For standard ethernet

$$\text{Efficiency } (\eta) = \frac{1}{1 + 6.4 \times a}$$

$$\text{where } a = \frac{P_d}{T_t} = \frac{12.5 \mu\text{sec}}{51.2 \mu\text{sec}} = 0.24$$

$$\therefore \eta = \frac{1}{1 + 6.4 \times (0.24)} = 0.39 = 39\%$$

i.e. 39% of the time channel is occupied and used by sender and remaining 61% of the time channel is idle.

#### QUESTION ANALYTICS

Q. 15

Solution Video

Have any Doubt ?



Consider the stop and wait protocol with packet size is 2000 bytes, line bandwidth is  $8 \times 10^3$  bps, propagation time is 30 sec, the effective bandwidth utilization is \_\_\_\_\_ bps. (Upto 2 decimal places)

61 (258.06) [258.05 - 258.07]

Correct Option

**Solution :**  
(258.06) [258.05 - 258.07]

$$\text{Transmission time } T_t = \frac{2000 \times 8}{8 \times 10^3} = 2 \text{ sec}$$

$$\text{Propagation time } T_p = 30 \text{ sec}$$

$$\text{Efficiency} = \frac{T_t}{T_t + 2T_p} = \frac{2}{2 + 60} = \frac{2}{62} = \frac{1}{31}$$

$$\text{Effective bandwidth} = \frac{1}{31} \times 8 \times 10^3 = 258.06 \text{ bps}$$

#### QUESTION ANALYTICS

Q. 16

Solution Video

Have any Doubt ?



The following table has two attributes A and C where A is the primary key and C is the foreign key referencing A with on-delete cascade.

A	C
2	4
3	4
4	3
5	2
7	2
9	5
6	4

The number of tuples that must be additionally deleted to preserve referential integrity when the tuple (4, 3) is deleted \_\_\_\_\_.

6

Correct Option

**Solution :**  
(6)

If (4, 3) is deleted then 4 is the primary key but in (2, 4), (6, 4) and (3, 4), 4 is the foreign key so these must be deleted.

The primary key for (2, 4), (3, 4) and (6, 4) is 2, 3 and 6 respectively must be deleted but in (5, 2) and (7, 2) with primary key 5 and 7 is the foreign key also deleted and (9, 5) is also deleted because 5 is primary key which is already deleted.

## QUESTION ANALYTICS

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Q. 17

▶ Solution Video

Have any Doubt ?



Consider the following statements:

- I. Suppose host A is sending a large file to host B over a TCP connection, the number of unacknowledged bytes that host A send can not exceeds the size of advertised receiver buffer.
- II. Digital signature ensures authenticity of the sender but not integrity of the message.
- III. In tunnel mode it encrypts only the payload not the IP header.

Which of the above statements is/are correct?

 A I only

Correct Option

**Solution :**

- (a) I is correct statement.
- II. Digital signature preserved the integrity, we can not get the same signature, if the message is changed so authenticity and integrity both is preserved.
- III. In tunnel mode it encrypts the payload and IP header both.

 B II only C II and III only D All of the above

## QUESTION ANALYTICS

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Q. 18

▶ Solution Video

Have any Doubt ?



If the broadcast address of the subnet is given as 163.93.63.255. Which of the following mask cannot suit the above address?

 A 255.255.248.0

Correct Option

 B 255.255.128.0**Solution :**

- (b)
    - Broadcast address 163.93.63.255
    - 163 is a class B address.
    - 163.93.0011111.11111111
    - (a) 255.255.248.0  
255.255.11111000.00000000  
11 bits are host.
    - (b) 255.255.10000000.00000000  
15 bits are host.
    - (c) 255.255.252.0  
255.255.111111100.00000000  
10 bits are host.
    - (d) 255.255.11110000.00000000  
12 bits are host.
- 15 bits of host remains '0's so all 15 bits should be 1's in broadcast address, this condition is violating so 255.255.128.0 can not suit as mask.

 C 255.255.252.0 D 255.255.240.0

## QUESTION ANALYTICS

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Q. 19

▶ Solution Video

Have any Doubt ?



Consider relation schema P(A, B, C) and Q(A, B, C) and given SQL query:

- I. Select \* FROM P where (A, B, C)
  - NOT IN (Select \* FROM Q where (A, B, C)
  - NOT IN (Select \* FROM P))
- II. Select \* FROM P where EXISTS
  - (Select \* FROM Q where P.A = Q.A
  - and P.B = Q.B and P.C = Q.C)

Which of the following is equivalent to  $P \cap Q$ ?

 A I only B II only

Correct Option

**Solution :**

- (b)
  - II SQL query are equivalent to  $P \cap Q$ .

 C Both I and II

QUESTION

D Neither I nor II

QUESTION ANALYTICS

+

Q. 20

Solution Video

Have any Doubt ?

?

Consider the following relation  $R(A, B, C, D, E)$  with functional dependencies  $\{AB \rightarrow C, C \rightarrow AB, C \rightarrow D, D \rightarrow E\}$  is decomposed to  $R_1(A, B, C), R_2(C, D), R_3(D, E)$ . Which of the following is true about given decomposition?

A Lossless join and dependency preserving BCNF.

Correct Option

Solution :

(a)

$$\begin{array}{l} R(A, B, C, D, E) \\ \{AB \rightarrow C, C \rightarrow AB, C \rightarrow D, D \rightarrow E\} \\ R_1(A, B, C) \qquad \qquad R_2(C, D) \qquad \qquad R_3(D, E) \\ AB \rightarrow C \qquad \qquad C \rightarrow D \qquad \qquad D \rightarrow E \\ C \rightarrow AB \end{array}$$

Lossless join and dependency preserving BCNF.

B Lossless join but not dependency preserving BCNF.

C Dependency preserving BCNF but not lossless join.

D None of these

QUESTION ANALYTICS

+

Item 11-20 of 33

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**Q. 21**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following statements:

- I. HELO is commands from the SMTP protocol.
- II. PROMPT is commands from HTTP protocol.
- III. DNS is used to locate the IP address of URL.

Which of the above statement(s) is/are correct?

 A I and III only

[Correct Option](#)
**Solution :**

- (a)  
 HELO is SMTP protocol.  
 PROMPT is FTP protocol.  
 DNS is used to locate the IP address of URL.

 B II and III only

 C I and II only

 D I only



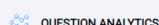
**Q. 22**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Which of the following relational algebra queries correct representation to retrieve Eid's of female employees whose salary more than all male employees of the company over database relation Emp ( Eid, Salary, Sex)

 $Q_1 : \pi_{Eid}(\text{Employee} \bowtie_{\text{sex=female} \wedge \text{Sex=male} \wedge \text{salary}>S} \rho_{I,S,\text{Sex}}(\text{Employee}))$ 
 $Q_2 : \pi_{Eid}(\sigma_{\text{Sex=female}}(\text{Employee})) - \pi_{Eid}(\text{Employee} \bowtie_{\text{sex=female} \wedge \text{Sex=male} \wedge \text{salary}\leq S} \rho_{I,S,\text{Sex}}(\text{Employee}))$ 
 $Q_3 : \pi_{Eid,I}(\text{Employee} \bowtie_{\text{sex=female} \wedge \text{Sex=male} \wedge \text{salary}>S} \rho_{I,S,\text{Sex}}(\text{Employee})) / \pi_{Eid}(\sigma_{\text{sex=males}}(\text{Employee}))$ 
 A  $Q_1 Q_2$  correct but not  $Q_3$ 
 B  $Q_1 Q_3$  correct but not  $Q_2$ 
 C  $Q_2 Q_3$  correct but not  $Q_1$ 
[Correct Option](#)
**Solution :**

(c)

 $Q_1$  : Uses conditional join "which retrieves female employees salary more than any male employees".

 $Q_2$  :  $|All\ female\ employee| - |Females\ salary \leq Some\ male\ Emp| \equiv |Female\ salary\ more\ than\ all\ male|$ 
 $Q_3$  :  $Eid, I [Female\ Eid\ salary\ more\ than\ some\ male\ I] / All\ male\ Eids = Female\ salary\ more\ than\ every\ male.$ 
 D  $Q_2$  correct but not  $Q_1 Q_3$ 


**Q. 23**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following database table:

 $\text{Emp (Eid, Ename, age)}$ 
 $\text{Project (Pid, Pname, budget)}$ 
 $\text{Works for (Eid Pid)}$ 

Select Eid

From Emp E

where age &gt; 30 and not Exists (select Pid

From project P

where Pname = 'database' and not exist (select Pid

from works W

where W.Eid = E.Eid

and W.Pid = P.Pid))

Which of the following sets is computed by the above query retrieves employees whose

 A age more than 30 and works for every project with project name database.

[Correct Option](#)
**Solution :**

(a)

(a)

```

Select Eid      <= employee age max than 30
From Emp E
where age > 30 and
    not Exists (select Pid <= all the project id whose project name is database
                  From project P
                  where Pname = 'database' and
                      not exist (select Pid <= the P.id where Eid is not in work relation
                                  from works W
                                  where W.Eid = E.Eid
                                  and W.Pid = P.Pid))

```

**B** age more than 30 and works for some project with project name database

**C** age more than 30 and not works for every project with project name database.

**D** age more than 30 and not works for any project with project name database.

#### QUESTION ANALYTICS



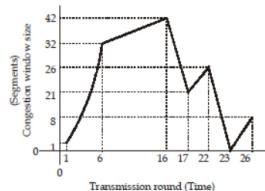
Q. 24

Solution Video

Have any Doubt ?



Consider the following plot of TCP window size as a function of time. Assume TCP is operating with slow start, congestion avoidance, fast retransmit and fast recovery mechanism.



What is the time interval where the slow start runs again because of a time-out and congestion avoidance because of 3 ACKs respectively?

**A** 16, 22

**B** 23, 17

Correct Option

**Solution :**

(b)

If a time out occurs there is a stronger possibility of congestion, hence TCP reacts strongly. It sets the value of threshold to one-half of current window size. Set cwnd to size of one segment and starts slow start phase again.  
If three ACKs are received, there is a weaker possibility of congestion, a segment may have been dropped. Hence TCP has a weaker reaction. It sets value of threshold to half of current window size. It sets cwnd to the value of threshold. It starts congestion avoidance phase again.

**C** 17, 23

**D** 17, 22

#### QUESTION ANALYTICS



Q. 25

Solution Video

Have any Doubt ?



There is a database of the dealers of a Products\_deal. Following is the snapshot.

Product\_deal

Dealer-no	Part-no	Color-id
$D_6$	$P_2$	$C_4$
$D_2$	$P_1$	$C_2$
$D_7$	$P_4$	$C_3$
$D_5$	$P_3$	$C_6$
$D_2$	$P_5$	$C_5$
$D_7$	$P_2$	$C_6$

Consider the following query:

```

SELECT A.Color-id, A.Dealer-no
FROM Product_deal A, Product_deal B
WHERE A.Dealer-no = B.Dealer-no
and A.Part-no < > B.Part-no;

```

The number of tuples contained in the output will be \_\_\_\_\_.

**4**

Correct Option

**Solution :**

(4)

The output Table will be

Dealer-No.	Color-id
$D_2$	$C_2$
$D_7$	$C_3$
$D_5$	$C_6$
$D_7$	$C_6$

Q. 26

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider an instance of TCP's additive increase multiplicative decrease algorithm where the window size at the start of slow start phase is 2 KB, the receiver advertises its window at the start of communication to be 28 KB, assume the size of advertised window is never changed by the receiver throughout the communication, time taken to send the full window is \_\_\_\_\_. (msec) (RTT is 20 msec)

220

Correct Option

**Solution :**  
(220)

$$\text{Threshold} = \frac{28}{2} = 14$$

- 1<sup>st</sup> RTT → 2 KB
- 2<sup>nd</sup> RTT → 4 KB
- 3<sup>rd</sup> RTT → 8 KB
- 4<sup>th</sup> RTT → 14 KB
- 5<sup>th</sup> RTT → 16 KB
- 6<sup>th</sup> RTT → 18 KB
- 7<sup>th</sup> RTT → 20 KB
- 8<sup>th</sup> RTT → 22 KB
- 9<sup>th</sup> RTT → 24 KB
- 10<sup>th</sup> RTT → 26 KB
- 11<sup>th</sup> RTT → 28 KB

In 11 RTT full window is sent

$$\text{Total time delay} = 11 \times 20 \text{ msec} = 220 \text{ msec}$$

QUESTION ANALYTICS

Q. 27

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider B-tree with Order  $P$ , where Order  $P$  is between 2 to  $P$  child pointers can store in Root node and between  $\left(\frac{P}{2}\right)$  to  $P$  child pointers can store in other nodes of B-tree index. The maximum levels of index required to store 300 distinct keys in order( $P$ ) = 5 B-tree index \_\_\_\_\_.

5

Correct Option

**Solution :**  
(5)

Level	Min Nodes	Min BP	Min Keys
1	1	2	1
2	2	$2 \times 3$	$2 \times 2$
3	6	$6 \times 3$	$6 \times 2$
4	18	$18 \times 3$	$18 \times 2$
5	54	$54 \times 3$	$54 \times 2$
6	162	$162 \times 3$	$162 \times 2$

Min 485 keys needed to get into 6<sup>th</sup> level, but as per question 300 keys only. So that max levels 5 of index.

QUESTION ANALYTICS

Q. 28

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the two hosts  $A$  and  $B$  are connected via a Router  $R$  which is having a queuing delay of 7  $\mu\text{sec}$  as shown below:



The Router  $R$  has two links Link1 and Link2, connected to  $A$  and  $B$  respectively. Each link is 250 meters long and has a bandwidth of  $10^9$  bps. The propagation speed is 500,000 km/sec. The total transfer delay for 2 KB packet from  $A$  to  $B$  is \_\_\_\_\_.  $(\mu\text{sec})$  (Ignore the processing delay)

40

Correct Option

**Solution :**  
(40)

Total transfer delay = Trans delay from  $A$  to Link1 + Propagation delay from  $A$  to  $R$  + queuing delay at  $R$  + Trans delay from  $R$  to Link2 + Propagation delay from  $R$  to  $B$ .

$$\begin{aligned} T_{\text{trans}} (\text{from } A \text{ to Link1}) &= T_{\text{trans}} (\text{from } R \text{ to Link2}) \\ &= \frac{2 \text{ KB}}{10^9 \text{ bps}} = 16 \mu\text{sec} \end{aligned}$$

$$\begin{aligned} T_{\text{prop}} (\text{from } A \text{ to } R) &= T_{\text{prop}} (\text{from } R \text{ to } B) \\ &= \frac{250 \text{ m}}{(500,000 \text{ km/sec})} = 0.5 \mu\text{sec} \end{aligned}$$

$$\begin{aligned} \text{Total transfer delay} &= 16 \mu\text{sec} + 0.5 \mu\text{sec} + 7 \mu\text{sec} + 16 \mu\text{sec} + 0.5 \mu\text{sec} \\ &= 40 \mu\text{sec} \end{aligned}$$

QUESTION ANALYTICS



Consider the following Relations:  
 Student(Sid, Sname, dob)  
 Course(Cid, Cname, Instruction)  
 Enroll(Sid, Cid, fee)

How many following Relational algebra Queries correct to Retrieve students who enrolled all courses?

- I.  $\pi_{\text{Sid}}(\text{Enroll}) - \pi_{\text{Sid}}(\pi_{\text{Sid}}(\text{Enroll}) \times \pi_{\text{Cid}}(\text{course}) - \pi_{\text{Sid Cid}}(\text{Enroll}))$
- II.  $\pi_{\text{Sid}}(\text{Student}) - \pi_{\text{Sid}}(\pi_{\text{Sid}}(\text{Enroll}) \times \pi_{\text{Cid}}(\text{course}) - \pi_{\text{Sid Cid}}(\text{Enroll}))$
- III.  $\pi_{\text{Sid}}(\text{Student}) - \pi_{\text{Sid}}(\pi_{\text{Sid}}(\text{Student}) \times \pi_{\text{Cid}}(\text{course}) - \pi_{\text{Sid Cid}}(\text{Enroll}))$
- IV.  $\pi_{\text{Sid}}(\text{Enroll}) - \pi_{\text{Sid}}(\pi_{\text{Sid}}(\text{Student}) \times \pi_{\text{Cid}}(\text{course}) - \pi_{\text{Sid Cid}}(\text{Enroll}))$

3

Correct Option

**Solution :**

(3)

Query 2 results Students Enrolled all courses and also students Enrolled no courses.

Remaining 1, 3, 4 Queries results only students Enrolled all courses.

QUESTION ANALYTICS

+

An IP datagram of size 6500 bytes arrives at a router and router has to forward this packet on a link whose MTU is 1540 bytes. Assume that the size of IP header is 20 bytes. The value of offset field of third IP segment \_\_\_\_\_.

380

Correct Option

**Solution :**

380

Datagram size = 6500

MTU 1540 (1520 + 20)

(1520 + 20) bytes is sent.

1<sup>st</sup> fragment offset value = 02<sup>nd</sup> fragment offset value = 1903<sup>rd</sup> fragment offset value = 190 + 190 = 380

QUESTION ANALYTICS

+



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## MULTIPLE SUBJECT : COMPUTER NETWORKS + DATABASES (GATE - 2020) - REPORTS

OVERALL ANALYSIS    COMPARISON REPORT    **SOLUTION REPORT**

ALL(33)    CORRECT(0)    INCORRECT(0)    SKIPPED(33)

Q. 31

Solution Video

Have any Doubt ?



Consider the following relation:

- P (A, B, C) A is primary key with 150 tuples.
- Q (E, F, G) E is primary key with 70 tuples.
- R (A, E, D) AE is primary key with 90 tuples.

The maximum number of possible records in the result of  $(P \bowtie R \bowtie Q)$  \_\_\_\_\_.

90

Correct Option

**Solution :**

(90)  
 $P \bowtie R$  contain maximum of 90 record.  
 $(P \bowtie R) \bowtie Q$   
 E is primary key in Q  
 Maximum record in result = 90

QUESTION ANALYTICS



Q. 32

Solution Video

Have any Doubt ?



For a class C network if IP address of a computer is 200.99.39.112 and subnet mask is 255.255.255.224 the decimal value of last octet of last host of sixth subnet is \_\_\_\_\_.

222

Correct Option

**Solution :**  
 (222)

Since the subnet mask is 255.255.255.224 that means the first 3 bits of subnet are reserved for subnet id and rest 5 are host id bits.  
 Hence, sixth subnet, last octet will be  $[11011110]_2 = [222]_{10}$ .

QUESTION ANALYTICS



Q. 33

Solution Video

Have any Doubt ?



Consider the following schedule:

S :  $w_1(A)$   $w_1(B)$   $r_2(A)$   $r_2(B)$   $r_3(A)$   $w_3(B)$   $w_4(c)$   
 The number of conflict equivalent schedule \_\_\_\_\_.

56

Correct Option

**Solution :**  
 (56)

Conflict equal schedule of S

$$r_2(A) \Rightarrow \begin{cases} w_1(A) r_2(A) w_1(B) w_2(B) w_3(B) \\ w_1(A) w_1(B) r_2(A) w_2(B) w_3(B) \end{cases}$$

In each sequence above  $r_3(A)$  can place in 4 positions i.e. 8 sequence are possible for placing  $r_3(A)$ , then  $w_4(c)$  can be placed 7 positions in above 8 sequence.  
 Total number of schedule =  $7 \times 8 = 56$

QUESTION ANALYTICS

