Practice Questions – Set 1

From GATE Examinations

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Practice Questions – Set 1: Focus

- Practice Questions from GATE Exams
  - From GATE 2011- 2 Questions
  - From GATE 2012 - 4 Questions

Course page where the course materials will be posted as the course progresses:

From GATE 2011

1. Layer 4 Firewall: Q2

A layer-4 firewall (a device that can look at all protocol headers up to the transport layer) **CANNOT**

(A) block entire HTTP traffic during 9:00PM and 5:00AM
(B) block all ICMP traffic
(C) stop incoming traffic from a specific IP address but allow outgoing traffic to the same IP address
(D) block TCP traffic from a specific user on a multi-user system during 9:00PM and 5:00AM

Ans: D

- Layer 4 firewall can detect HTTP traffic based on TCP port 80. - A is not the correct option
- ICMP operates at L3, where it facilitates error reporting and diagnostic functions, L4 – firewall can block ICMP traffic. - B is not the option.
- IP address (Layer 3) based filtering can be done by L4 firewall. - C is also not the option.
- TCP traffic from a specific user is not possible for a L4 –firewall to know, because association between the user level processes and specific network packets is not available within the network packets up to L4 , so **D is the correct option.**

2. Protocols used for Email Access: Q4

Consider different activities related to email.

m1: Send an email from a mail client to a mail server
m2: Download an email from mailbox server to a mail client
m3: Checking email in a web browser

Which is the application level protocol used in each activity?

(A) m1: HTTP	m2: SMTP	m3: POP
(B) m1: SMTP	m2: FTP	m3: HTTP
(C) m1: SMTP	m2: POP	m3: HTTP
(D) m1: POP	m2: SMTP	m3: IMAP

IMAP (Internet Message Access Protocol) is used for retrieving and managing emails from a mail server, but unlike POP, it allows emails to be managed and synchronized across multiple devices.

Ans: C

- POP (Post Office Protocol) is primarily used to download emails from a mail server to a local email client and it is not used for sending emails.
- SMTP (Simple Mail Transfer Protocol) is used for sending emails from the client to recipient's mail server
- Checking email using a web browser uses HTTP.
- FTP (File Transfer Protocol) is for exchanging files between hosts.

From GATE 2012

1. PDU: Q10

1 Mark

The protocol data unit (PDU) for the application layer in the Internet stack is

(A) Segment (B) Datagram (C) Message (D) Frame

Ans: C

- Segment – TCP PDU (connection-oriented)
- Datagram – IP and UDP (connectionless)
- Frame – Ethernet
- Message - Application

PDU: Protocol Data Unit

2. Protocols: Q22

1 Mark

Which of the following transport layer protocols is used to support electronic mail?

(A) SMTP (B) IP (C) TCP (D) UDP

Ans: C

- Notice the word “transport protocol” in the question
- Though SMTP handles email it is an application protocol and not a transport protocol
- Since the reliable connection-oriented TCP transport protocol is used by SMTP, the answer is TCP and not SMTP

3. IPv4 Classful Addressing: Q23 **1 Mark**

In the IPv4 addressing format, the number of networks allowed under Class C addresses is

(A) 2^{14} (B) 2^{7} (C) 2^{21} (D) 2^{24}

Ans: C

- 24 bits of IPv4 are reserved for Network ID and the remaining 8 for Host ID in Class C addressing format
- Since the first three bits are **110** for all the Class C addresses, the maximum number of networks that can be realized with a class C addressing scheme would be 24 – 3 bits = 21 bits, so, $\mathbf{2^{21}}$

4. CIDR: Q34

2 Marks

An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Which of the following is a valid allocation of addresses to A and B?

(A) 245.248.136.0/21 and 245.248.128.0/22
(B) 245.248.128.0/21 and 245.248.128.0/22
(C) 245.248.132.0/22 and 245.248.132.0/21
(D) 245.248.136.0/24 and 245.248.132.0/21

Subnet mask for **/20**: **255.255.240.0**
That is: **0xFF FF F0 00**

/21 will give one half of the available addresses. If the **higher half** is given to **Org A**, make the **21st bit** in the **Net ID** part as **one,** thus **245.248.136.0/21**

Now, the lower half can be given to other organizations. To give the quarter of the total address allocated, half of available address after Org A was allotted can be given to Org B. If the lower quarter is given to Org B, then, **245.248.128.0/22** can be allotted to **Org B**.

Ans: A

- Option B is overlapping address. Option C allocates only quarter of the address to Org A and Org B address is wrong. Option D gives very less to Org A and Org B address is wrong.
- Explanation for Option A is given above. There can be different allocations possible, need to choose the one which is non-overlapping

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