Computer Networks Unit Test 2 Question Bank

1. what is subnetting? What are the default subnet masks? Find the subnet address if the IP address is 129.31.72.24 and subnet mask is 255.255.192.0. **[5Marks]**

2.What is subnetting? Given the class C network 192.168.10.0 use the subnet mask 255.255.255.192 to create subnets and answer the following:

(i) What is the number of subnets created?

(ii) How many hosts per subnet?

(iii) Calculate the IP address of the first host, the last host and the broadcast address of each subnet

Q3. An ISP is granted a block of addresses starting with 150.80.0.0 /16 The ISP wants to distribute these blocks to 2600 customers as follows:

i) The first group has 200 medium-size businesses; each needs 128,
ii) The second group has 400 small businesses; each needs 16 ,
iii) The third group has 2000 households; each needs 4 addresses.

Design the sub-blocks and give the slash notation for each sub block. Find out how many addresses are still available after these allocations.

Q4. An ISP is granted a block of address starting with 190.100.0.0 /16(65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows:

i) The first group has 64 customers; each needs 256 address
ii) The second group has 128 customers; each 128 addresses.
iii) The third group has 128 customers; each needs 64 addresses are still available after these allocations.

Q5. For the following IP Addresses-

A. 1.2.3.4
B. 10.15.20.60
C. 130.1.2.3
D. 150.0.150.150
E. 200.1.10.100
F. 220.15.1.10
G. 250.0.1.2
H. 300.1.2.3
I. 190.25.31.5

Identify the Class, Network IP Address, Direct broadcast address and Limited broadcast address of each IP Address. **[5Marks]**

Q6.Suppose that instead of using 16 bits for network part of a class B Address, 20 bits have been used. How many class B networks would have been possible? **[2.5Marks]**

Q7.Match the following-

Column-I:

I. 200.10.192.100
II. 7.10.230.1
III. 128.1.1.254
IV. 255.255.255.255
V. 100.255.255.255

Column-II:

A. Class A
B. Limited Broadcast Address
C. Direct Broadcast Address
D. Class C
E. Class B **[2.5Marks]**

Q8.Consider the following routing table in a router. On which intrerface will an IP packet with destination address 144.25.64.120 be forwarded? **[5Marks]**

Destination	Subnet Mask	Interface
144.25.0.0	255.255.0.0	Eth0
144.25.64.0	255.255.224.0	Eth1
144.25.68.0	255.255.255.0	Eth2
144.25.68.64	255.255.255.224	Eth3
default	0.0.0.0	Eth2

Q9. A router uses the following routing table-

Destination	Mask	Interface
144.16.0.0	255.255.0.0	eth0
144.16.64.0	255.255.224.0	eth1
144.16.68.0	255.255.255.0	eth2

144.16.68.64	255.255.255.224	eth3

Q10. A packet bearing a destination address 144.16.68.117 arrives at the router. On which interface will it be forwarded? **[5Marks]**

Q11.Consider the following subnet masks-

1. 255.0.0.0
2. 255.128.0.0
3. 255.192.0.0
4. 255.240.0.0
5. 255.255.0.0
6. 255.255.254.0
7. 255.255.255.0
8. 255.255.255.224
9. 225.255.255.240

For each subnet mask, find-

A. Number of hosts per subnet
B. Number of subnets if subnet mask belongs to class A
C. Number of subnets if subnet mask belongs to class B
D. Number of subnets if subnet mask belongs to class C
E. Number of subnets if total 10 bits are used for the global network ID

Any 3 May be asked **[5Marks]**

12. Consider default subnet mask for a network is 255.255.255.0. How many number of subnets and hosts per subnet are possible if 'm' bits are borrowed from HID.

A. 2^m , $2^{(HID-m)} - 2$
B. 2^m , $2^{(HID-m)}$
C. $2^m - 1$, $2^{(HID-m)} - 2$

D. 2^m , (HID-m) – 2

[2.5Marks]

13. If default subnet mask for a network is 255.255.255.0 and if 'm' bits are borrowed from the NID, then what could be its supernet mask?

A. $255.255.(2^{8-m} - 1) \times 2^m.0$
B. $255.255.(2^{8-m}) \times 2^m.0$
C. $255.255.(2^{8-m-1}) \times 2^{m-1}.0$
D. $255.255.(2^{8-m}) \times 2^{m-1}.0$

[2.5Marks]

14.The subnet mask for a particular network is 255.255.31.0. Which of the following pairs of IP Addresses could belong to this network?

A. 172.57.88.62 and 172.56.87.233
B. 10.35.28.2 and 10.35.29.4
C. 191.203.31.87 and 191.234.31.88
D. 128.8.129.43 and 128.8.161.55

[5Marks]

15. What are all the fields required from IP header to allow the destination to perform reassembly of fragments?

A. Identification, MF, Offset, Header length and Total length
B. MF, Offset and Destination IP
C. MF, Datagram length, Source IP
D. MF, Options and Offset

[2Marks]

16. The checksum in IP must be recomputed at every router because of change in ____ fields.

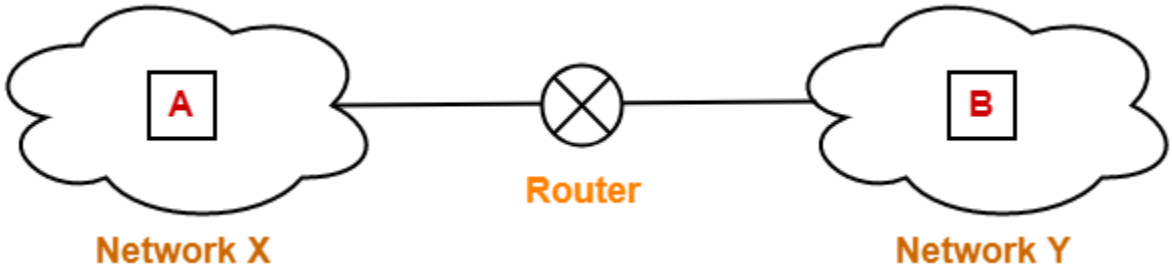
A. TTL, Options, Identification Number, Offset
B. TTL, Options, Datagram Length, Offset
C. TTL, Options, Data, Offset
D. TTL, Header Length, Offset, ToS

[2Marks]

17. Suppose a router receives an IP packet containing 600 data bytes and has to forward the packet to a network with maximum transmission unit of 200 bytes. Assume that IP header is 20 bytes long. Find the Total length field value, MF bit value, Fragment offset field value, Identification number if fragmentation occurs **[5 Marks]**

18. Consider-

- There is a host A present in network X having MTU = 520 bytes.
- There is a host B present in network Y having MTU = 200 bytes.
- Host A wants to send a message to host B.



Find the Total length field value, MF bit value, Fragment offset field value, Identification number **[5 Marks]**

Problems on TCP

Q19. If WAN link is 2 Mbps and RTT between source and destination is 300 msec, what would be the optimal TCP window size needed to fully utilize the line?

Q20. A TCP machine is sending windows of 65535 B over a 1 Gbps channel that has a 10 msec one way delay.

A. What is the maximum throughput achievable?
B. What is the line efficiency?

Q21. Given the bandwidth of a network is 1 MB / sec. Calculate the wrap around time.

Q22. If bandwidth of the network is 1 GBps, how many extra bits will have to be appended in the Options field so that wrap around time becomes equal to the life time of segment?

Q23. In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of 30 sec and 8 bit sequence number, what is the maximum data rate per connection? (TPDU is Transport layer protocol data unit which is the segment.

TCP Congestion Control

Q24. Consider the effect of using slow start on a line with a 10 msec RTT and no congestion. The receiver window is 24 KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent?

Q25. Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of slow start phase is 2 MSS and the threshold at the start of first transmission is 8 MSS. Assume that a time out occurs during the fifth transmission. Find the congestion window size at the end of tenth transmission.?

Q26. Suppose that the TCP congestion window is set to 18 KB and a time out occurs. How big will the window be if the next four transmission bursts are all successful? Assume that the MSS is 1 KB.

Q27. On a TCP connection, current congestion window size is 4 KB. The window advertised by the receiver is 6 KB. The last byte sent by the sender is 10240 and the last byte acknowledged by the receiver is 8192.

The current window size at the sender is ____.

The amount of free space in the sender window is ____.

Q28. Suppose that the advertised window 1 MB long. If a sequence number is selected at random from the entire sequence number space, what is the probability that the sequence number falls inside the advertised window?