ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF ELECTRICAL ENGG. AND COMPUTING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UNDER GRADUATE PROGRAM (CSE 3rd YEAR)

FINAL EXAMINATION

II- SEMESTER

(Common for all groups/Sections)

Course: Data communication and Computer Networks **Marks : 40**

Course Code : CSE3222 **Time Allowed: 2.30Hrs.**

Date and time of Exam: 30 May, 2022 8:30 PM.

Name: _____

Id. No.: _____

Group: _____

Group: _____

GENERAL INSTRUCTIONS:

1. Make sure that Mobile Phone is Switched Off.
2. Make sure the Question Paper contains 8 pages excluding answer sheet papers.
3. Write your answers in attached answer sheet and white papers.
4. The question number must be clearly mentioned while answering each Question.
5. Cheating is strictly forbidden, if found you will obtain Grade 'F'

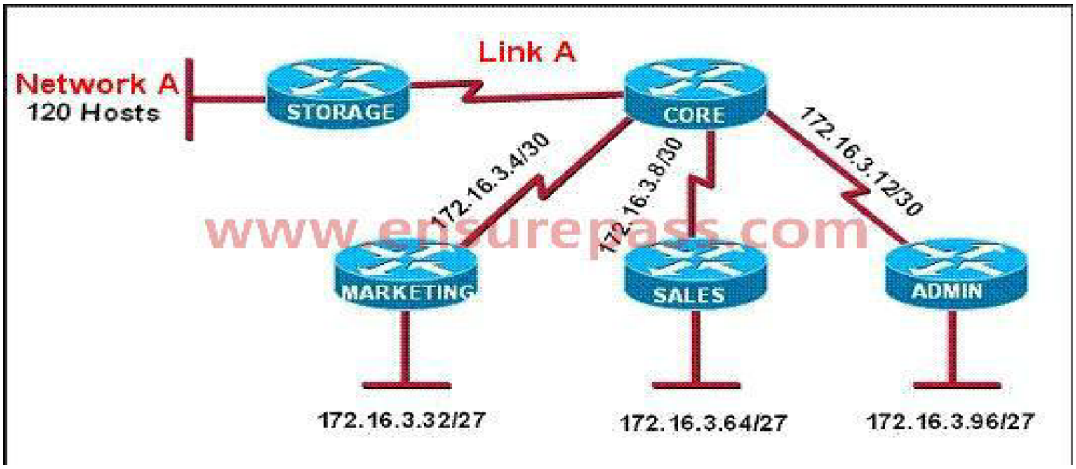
FOR INSTRUCTORS USE ONLY

/40 Total Marks:

Good luck!!!

Part II. Multiple choice questions. **(0.5 pt.)**

1. UDP protocol is called connection less because_____ (please check the answer of this question)
   A. All UDP packets are treated independently by transport layer
   B. It sends data stream of related packets
   C. It sends data very quickly
   D. It received in the same order as sent order
   E. None of the above



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2. Refer to the above diagram. All of the routers in the network are configured with the ip subnet-zero command. Which network address should be used for **Network A**?
   A. 172.16.3.48/25
   B. 172.16.3.40/25
   C. 172.16.3.0/25
   D. 172.16.3.128/25
   E. 172.16.3.192/25

3. Refer to the above diagram. All of the routers in the network are configured with the ip subnet-zero command. Which network address should be used for **Link A**?
   A. 172.16.3.0/29
   B. 172.16.3.0/25
   C. 172.16.3.0/31
   D. 172.16.3.0/30
   E. 172.16.3.0/28

4. Which one of the following is not parts of IPV6 header

A. Fragmentation and Header checksum B. Reassembly and Options

C. types of services D.A and B

E. B and C

5. An administrator must assign static IP addresses to the servers in a network. For network 162.8.20.0/22, the router is assigned the first usable host address while the sales server is given the last usable host address. Which of the following should be entered into the IP properties box for the **sales server**?

A. IP address: 162.8.20.254
Subnet Mask: 255.255.252.0
Default Gateway: 162.8.20.1

B. IP address: 162.8.23.254
Subnet Mask: 255.255.252.0
Default Gateway: 162.8.20.1

C. IP address: 162.8.20.1
Subnet Mask: 255.255.255.0
Default Gateway: 162.8.20.254

D. IP address: 162.8.21.254
Subnet Mask: 255.255.254.0
Default Gateway: 162.8.20.1

E.IP address:162.8.20.1
Subnet Mask: 255.255.254.0

6. Which one of the following True about sub netting

A. Sub netting increases the number of 1s in the mask.

B. Sub netting is the process of borrowing bits from the prefix bits, in order to divide the larger network into small subnets.

C. Sub netting give us more hosts, and decrease cost of hosts

D. Sub netting increase number of 0's

7. The optimality principal stated that:

a. If router "Y" is found in the optimal path between two routers "X" and "Z" then the path between routers "Y" and "Z" also optimal.

b. If router "Y" is found in the optimal path between two routers "X" and "Z" then the path between routers "Y" and "Z" OR routers "Y" and "X" also be optimal.

c. If router "Y" is found in the optimal path between two routers "X" and "Z" then the path between routers "Y" and "Z" AND routers "Y" and "X" also be optimal.

d. If router "Y" is found in the optimal path between two routers "X" and "Z" then the path between routers "Z" and "X" also optimal.

e. None of the above

8. A 4 byte IP address consists of _____

A. only network address B. Only host address

C. network address & host address D. Network address & MAC address

9. ICMP is primarily used for _____

A. error and diagnostic functions B. addressing

C. forwarding D. routing

10. You have been asked to come up with a subnet mask that will allow all three web servers (i.e., Web, Application and Database) to be on the same network while providing the maximum number of subnets. Which network address and subnet mask meet this requirement?

a. 172.65.24.128 255.255.255.252
b. 172.65.24.128 255.255.255.224
c. 172.65.24.128 255.255.255.248
d. 172.65.24.128 255.255.255.240
e. 172.65.24.128 255.255.255.192

11. Which one of the following algorithm is not used for congestion control?

A. traffic aware routing B. admission control

C. load shedding D. routing information protocol

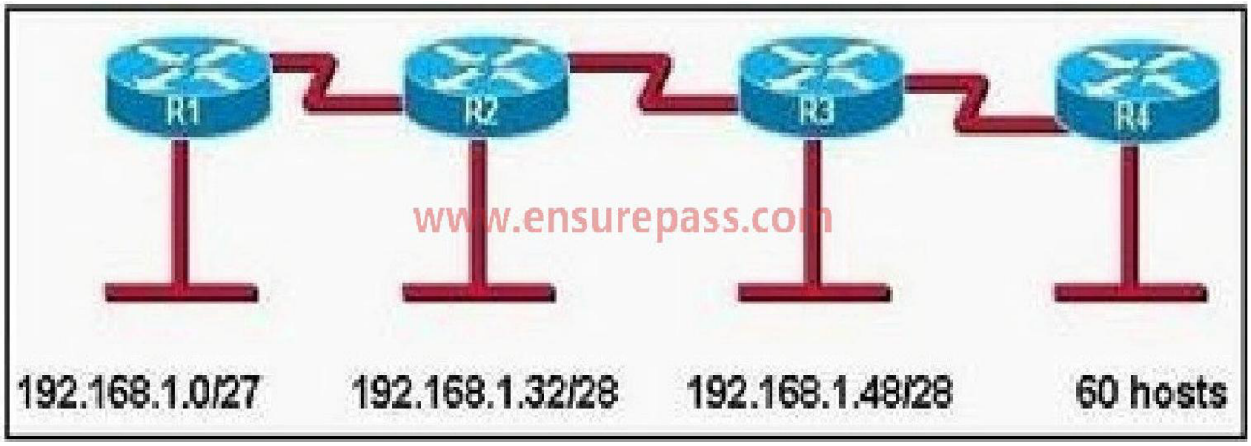
12. The ____ translates internet domain and host names to IP address.

A. domain name system B. routing information protocol

C. network time protocol D. internet layer chat

12. Which one is of the following common to all addresses in the network?
    A. Prefix
    B. Suffix
    C. Network ID
    D. Host ID
    E. D &B
    F. A &C
13. Google uses location-based services for advert different products in Gmail and YouTube services. Which kind of casting method is the most suitable for this advertisement services to the company?

    a. Global unicast
    b. Multicast
    c. Broadcast
    D. Anycast
    E. All of the above



14. Refer to the above picture. A new subnet with 60 hosts has been added to the network. Which subnet address should this network use to provide enough usable addresses while wasting the fewest addresses?

    a. 192.168.1.56/26
    b. 192.168.1.64/26
    c. 192.168.1.64/28
    D. 192.168.1.56/27
    E. 192.168.1.64/27

15. Which one of the following is the best shorthand notation for the IPv6 address B514:82C3: 0000:0000:0029:EC7A:0000:EC72?

    a. B514 : 82C3 : 29 : EC7A : EC72

b. B514 : 82C3 :: 29 : EC7A :: EC72

c. B514 : 82C3 :: 29 : EC7A : 0000 : EC72

d. B514 : 82C3 :: 29 : EC7A : 0 : EC72

e. None of the above

16. One of the following is not a task of transport layer.

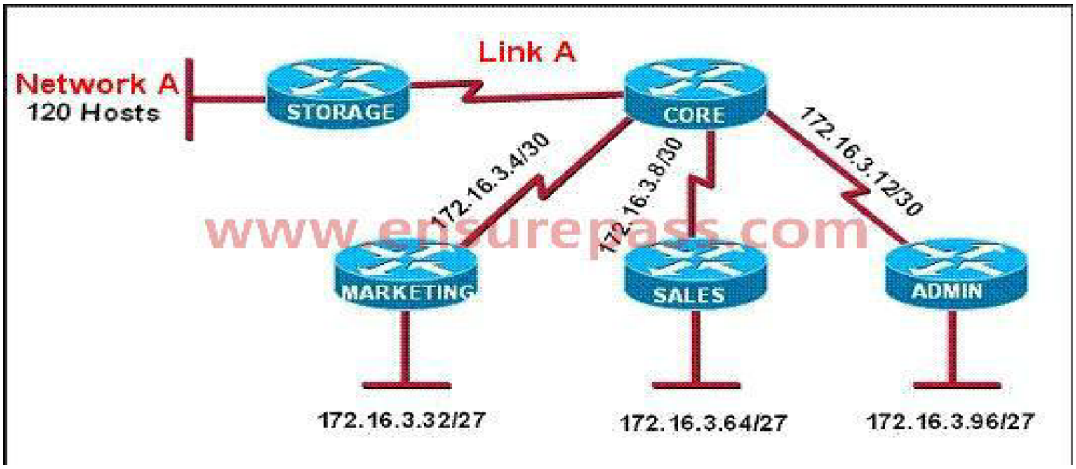
a. Error and flow control

b. Congestion control

c. Route selection

D. Addressing

E. Multiplexing



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17. Refer to the above diagram. All of the routers in the network are configured with the ip subnet-zero command. Which network address should be used for **Network A**?

a. 172.16.3.48/25

b. 172.16.3.128/25

c. 172.16.3.0/25

D. 172.16.3.40/25

E. 172.16.3.192/25

18. Refer to the above diagram. All of the routers in the network are configured with the ip subnet-zero command. Which network address should be used for **Link A**?

a. 172.16.3.0/29

b. 172.16.3.0/25

c. 172.16.3.0/30

D. 172.16.3.0/31

E. 172.16.3.0/28

19. An administrator must assign static IP addresses to the servers in a network. For network 162.8.20.0/22, the router is assigned the first usable host address while the sales server is given the last usable host address. Which of the following should be entered into the IP properties box for the **sales server**?

a. IP address: 162.8.20.1

D. IP address: 162.8.20.1

Subnet Mask: 255.255.255.0
Default Gateway: 162.8.20.254

b. IP address: 162.8.20.254
Subnet Mask: 255.255.252.0
Default Gateway: 162.8.20.1

c. IP address: 162.8.23.254
Subnet Mask: 255.255.252.0
Default Gateway: 162.8.20.1

Subnet Mask: 255.255.254.0
Default Gateway: 162.8.21.254

E. IP address: 162.8.21.254
Subnet Mask: 255.255.254.0
Default Gateway: 162.8.20.1

20. What will happen if a private IP address is assigned to a public interface connected to an ISP?
    a. Addresses in a private range will be not be routed on the Internet backbone.
    b. Only the ISP router will have the capability to access the public network.
    c. The NAT process will be used to translate this address to a valid IP address.
    d. A conflict of IP addresses happens, because other public routers can use the same range.
21. One of the following is advantage of static routing when compared to dynamic routing?
    a. Configuration complexity decreases as network size increases.
    b. Security increases because only the network administrator may change the routing table.
    c. Routing tables adapt automatically to topology changes.
    d. An efficient algorithm is used to build routing tables, using automatic updates.
    e. Routing updates are automatically sent to neighbors.
22. One of the following is not a technique to implement a switching fabric in router.
    a. Switching via bus
    b. Switching via memory
    c. Switching via interconnection network

    D. All of the above
    E. None of the above
23. Which one of the following wrong about sub netting
    A. Sub netting increases the number of 1s in the mask.
    B. Sub netting is the process of borrowing bits from the HOST bits, in order to divide the larger network into small subnets.
    C. Sub netting give us more hosts, and decrease cost of hosts
    D. Sub netting decrease number of 0's
24. One of the following is true about TCP.

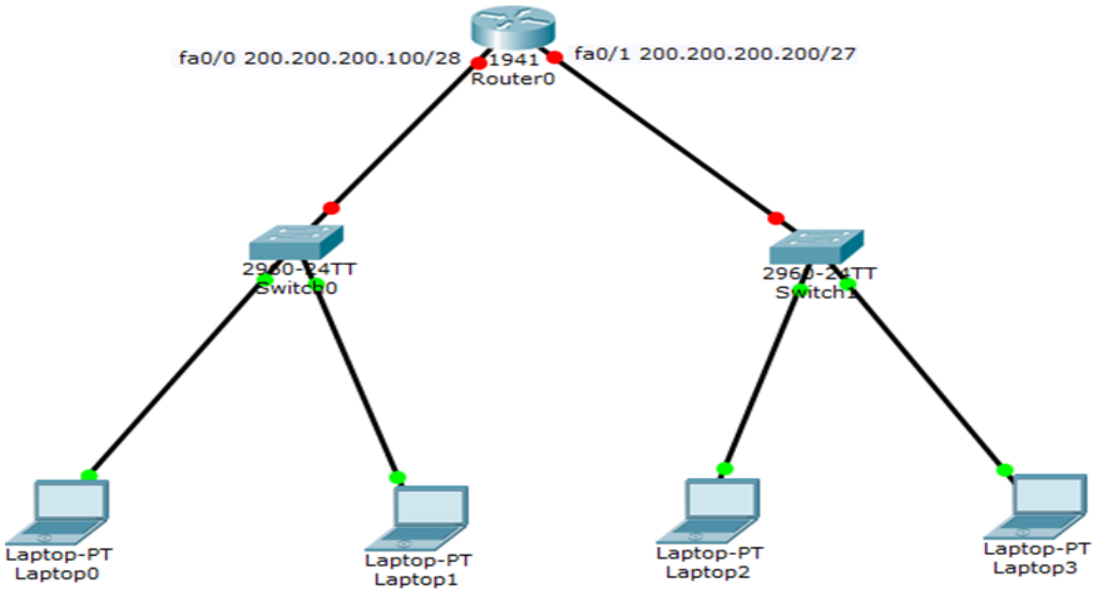
a. It supports connection-oriented service
b. It supports connectionless service
c. It is suitable for broadcast communication
d. It is suitable for non-reliable connection
e. None of the above

25. Which application areas suitable for connectionless transport service?
    a. In order to send an email message to your colleagues.
    b. In order to disseminate a broadcast message to users.
    c. Real-time audio or video streaming.
    d. In order to perform a bank transaction from your Bank.
    e. B and D
    f. B and C
26. Suppose the company wants to provide an email service to its customers and employees. Which transport layer protocol is best suited for the proposed service.
    a. UDP
    b. SCTP
    C. SMTP
    D. TCP
27. _____ provides a means to send a feedback about problems in the communication environment.
    a. IGMP
    b. ICMP
    c. SNMP
    D. IP
    E. SMTP
28. Suppose an internet service provider (ISP) have large number of routers to provide an internet service to their clients. In order to provide this service to the clients' routers can share a routing table among them. Therefore, what kind of routing algorithm is suitable for this company?
    a. Flooding
    b. Shortest Path First
    c. Distance-vector
    D. Hierarchical
    E. Link-state
    F. None of the above

Part II. Short answer questions

1. Suppose a TCP connection is transferring a file of 16,000 bytes. The first byte is numbered 20,001. What are the sequence numbers for each segment if data are sent in four segments, each carrying 4000 bytes?(3)
2. The network layer should provide connection oriented or connectionless service to transport layer. Compare these two services in terms of (2 pts.)
    A. Circuit setup,
    B. Addressing
    C. Quality of service
3. How the transport layer is different from network layer in terms of data transfer services? Describe the different elements of transport layer that support smooth data transfer services. (3 pts).
4. Suppose in connection-oriented communication (i.e., TCP) the sender and receiver systems accept a time-out event and the three-duplicate-ACKs event respectively during data transfer. Which one is a stronger sign of congestion in the network? Why?
   (3 pts)
5. How the UDP does is different from TCP? List out the applications that can benefit more from the services of UDP than from those of TCP. (2 Pts).
6. Discuss the different TCP congestion control techniques which are to be used to improve the congestion in a network. (2 pts.)
7. An ISP is granted the block 16.12.64.0/20 to Ministry of Finance and Economic Development. The ministry has planned to allocate IP addresses for 5 departments. From them two departments have 875 hosts, one department have 256 hosts and the remaining departments have 180 hosts.
    A. Find the subnet mask addresses of each network. (2 pts.)
    B. Find valid IP address, network and broadcast addresses of each network. (3 pts.)
    C. Find unallocated IP address range available in the ministry. (3 pts.)
8. Compare and contrast distance vector and Link state routing algorithms. (3 pts.)

9. Ethio Telecom (an ISP) is granted 213.27.16.64/28 to Adama Science and Technology University. The university have five servers and around five thousand hosts. Therefore, as a networking student how you can solve IP address shortage in the university? (3 pts.)
10. What is ARP and RARP? Why we require them in computer networking? (2 pts.)



11. By considering the above network diagram;
    a. Fill the IP-addresses, subnet mask and default gateway for all hosts. (3 pts.)

Device	IP-Address	Subnet Mask	Default Gateway
Laptop-PT Laptop0			
Laptop-PT Laptop1			
Laptop-PT Laptop2			
Laptop-PT Laptop3			

    b. Fill the network, and broadcast addresses and subnet masks in the following table for both networks. (2 pts.)

Interface	Network Address	Broadcast Address	Subnet mask
Fa0/0			
Fa0/1			