

**National School of Business Management**

**Name of the Degree Programme BSc in CS/MIS/SE**

**Semester of the Examination XXXXXXX**

**Module Name Computer Networks**

**Module Code CN201.3**

**Calculators are Allowed Time: 03Hrs**

**Question paper has two sections A and B. Answer both sections Date: XXXX**

**SECTION A (50 marks)**

**Answer all questions by indicating the correct answer on the separate answer sheet provided**

1. A link connecting an end device to an access network has a link transmission rate (link capacity) of 100Mbps. If the end device is transmitting a 1250 Byte packet, what is the packet transmission delay?
   1. 0.1ms
   2. 1ms
   3. 1s
   4. 1ps
   5. 1ns
2. Which of the following programs provides delay measurement from source to router along end-end Internet path towards destination?
   1. telnet
   2. ping
   3. traceroute
   4. nslookup
   5. tcpdump
3. Which are the two additional layers available in OSI stack than TCP/IP stack
   1. application, presentation
   2. presentation, session
   3. session, transport
   4. transport, network
   5. link, physical
4. Which of the following is not an HTTP method?
   1. GET
   2. POST
   3. HEAD
   4. PUT
   5. UPLOAD
5. Consider the following statements regarding TCP and UDP
   * 1. UDP: connectionless transport
     2. TCP: connection-oriented reliable transport
     3. TCP provide congestion control
   1. All are correct
   2. Only 1st statement is correct
   3. Only 2nd statement is correct
   4. Only 3rd statement is correct
   5. All are wrong
6. Email user agent is an application....
   1. used to composing, editing, reading mail messages
   2. which should be always up and running
   3. which resides in a central server
   4. used only by mail administrator
   5. used by only by network engineers
7. Which of the following is true about iterative and recursive DNS resolution methods,
   1. Both are identical methods
   2. In iterative resolution the client (host) does not have to send DNS queries to any DNS server
   3. In recursive resolution the client (host) does not have to send DNS queries to any DNS server
   4. Both methods provide translation between domain names and IP addresses
   5. None of them can translate a domain name to an IP
8. Which of the following is a function of the network layer
   1. Delivery of datagram between adjacent devices
   2. Translation domain name into IP addresses
   3. Deliver data packets from sending to receiving host
   4. Translation of physical address into IP address
   5. Deliver data from source process to destination process
9. Which of following cannot be considered as a service provided by network layer
   1. guaranteed delivery
   2. guaranteed delivery with 0 delay
   3. in-order datagram delivery
   4. Best effort delivery
   5. guaranteed minimum bandwidth to flow
10. Classless Inter Domain Routing (CIDR) is a notation used to express the…..
    1. number of hosts in a subnet
    2. length of the subnet part of a IP
    3. length of the host part of a IP
    4. total length of a IP
    5. IP address
11. Which of the following is incorrect regarding using NAT?
    1. A range of public addresses is not needed from ISP; one public IP address is sufficient for all devices
    2. It can change addresses of devices in local network without notifying outside world
    3. It can change ISP without changing addresses of devices in local network
    4. Devices outside the local network can readily access inside devices
    5. services inside local net not explicitly addressable, visible by outside world (a security plus)
12. Routers in SDN forward packets based on a table named,
    1. Routing table
    2. MAC address table
    3. Flow Table
    4. NAT table
    5. ARP table
13. BGP (Border Gateway Protocol) is the de facto inter-domain routing protocol. There are two extensions of the protocol, named eBGP and iBGP. Select correct statement regarding iBGP and eBGP
    1. iBGP is used for inter-AS routing
    2. iBGP is used for intra-AS routing
    3. eBGP is used for intra-AS routing
    4. eBGP and iBGP not used for routing
    5. None of the above
14. Consider the following statements regarding media access control protocols/techniques.
    * 1. single shared broadcast channel
      2. two or more simultaneous transmissions by nodes give rise to collisions (or interferences)
      3. Very useful in non shared dedicated channels
    1. 1 and 2 is correct
    2. 2 and 3 is correct
    3. 3 and 1 is correct
    4. All are correct
    5. All are wrong
15. Which of the following are benefits of using a layered network model?
    * 1. it facilitates modular engineering
      2. it breaks the complex process of networking into more manageable parts
      3. it allows devices produced by different vendors to interoperate
      4. It allows anyone to change the protocol formats
    1. a,c,d
    2. a,b,c
    3. a,b,c,d
    4. a,d
    5. a,b,d
16. Which of the following is true about the format of Ethernet MAC addresses?
    1. MAC address is 24 bits long
    2. MAC address is 48 bits long
    3. MAC address is 64 bits long
    4. MAC address is 128 bits long
    5. MAC address is 8 bytes long
17. Which of the following IEEE protocols defines VLAN trunking protocol frame format?
    1. 802.3
    2. 802.D
    3. 802.1X
    4. 802.1Q
    5. 802.3a
18. With a given network address 192.168.55.0/24, you are required to create 7 sub-networks and each sub-network should support 25 hosts. What is the subnet mask you select for each new sub-network?
    1. 255.255.255.0
    2. 255.255.255.128
    3. 255.255.255.192
    4. 255.255.255.224
    5. 255.255.255.240
19. Multiple access technique used in common WLAN technologies is,
    1. CSMA/CD
    2. CSMA/CM
    3. CSMA/CA
    4. CDMA/CA
    5. CDMA/CD
20. Which of the following is not an access network technology
    1. digital subscriber line (DSL)
    2. cable network
    3. ISP network
    4. Enterprise access networks (Ethernet)
    5. wireless LANs
21. Global ISPs are connecting…..
    1. End devices
    2. Access ISPs
    3. WLAN networks
    4. Ethernet networks
    5. None of the given networks
22. Which of the following is true about end to end throughput of a data transfer?
    1. end to end throughput is equal to the speed of the link with lowest capacity
    2. end to end throughput is equal to the speed of the link with highest capacity
    3. end to end throughput is equal to the average speed of the links
    4. end to end throughput does not depend on any individual link capacity
    5. end to end throughput is always depend on capabilities of end devices
23. What type of address is used to identify a process involved in data communication?
    1. IP address of the host on which process is residing
    2. MAC address of the interface cord used to connect the host to network
    3. Email address
    4. Domain name
    5. IP address and port numbers associated with process on host
24. What are the two types of sockets available for transport services?
    1. HDLC: reliable and connection oriented, PPP: unreliable datagram
    2. UDP: unreliable datagram, TCP: reliable and connection oriented
    3. HTTP: unreliable datagram, HTTPS: reliable and connection oriented
    4. SMTP: unreliable datagram, IMAP: reliable and connection oriented
    5. None of the above
25. Which of the following is not a service provided by transport layer?
    1. multiplexing, demultiplexing
    2. routing of data packets
    3. reliable data transfer
    4. flow control
    5. congestion control
26. Which of the following is not a protocol used in email services?
    1. POP3
    2. IMAP
    3. SMTP
    4. FTP
    5. POP2
27. DNS uses distributed database implemented in hierarchy of many name servers rather than on a centralized database. Which of the following is not an advantage of this architecture?
    1. Avoid single point of failure
    2. Avoid huge traffic volume on a single server
    3. Easily scalable (Easy to facilitate growth)
    4. Anybody can use any domain name as they wish
    5. Load is distributed among many servers
28. Which of the following is true about forwarding and routing?
    1. Forwarding and routing are data link layer functions
    2. Forwarding and routing are data transport layer functions
    3. Forwarding is moving packets from router’s input to appropriate router output and routing is determining route taken by packets from source to destination
    4. Routing is moving packets from router’s input to appropriate router output and forwarding is determining route taken by packets from source to destination
    5. None of the above
29. Which of following service could be provided by internet/network layer?
    1. guaranteed delivery
    2. guaranteed delivery with less than 40 msec delay
    3. in-order datagram delivery
    4. Best effort delivery
    5. guaranteed minimum bandwidth to flow
30. Dynamic Host Configuration Protocol is used….
    1. By routers to learn new routes
    2. By switches to learn physical addresses attached to its ports
    3. To assign individual IP addresses to the hosts
    4. To assign physical addressees to hosts
    5. To assign domain name to hosts
31. Network Address Translation (NAT) is generally employed at….
    1. Boundary between wireless LAN and wired LAN
    2. Boundary between private network and the internet
    3. Inside private network
    4. In the internet
    5. Boundary between two LANs
32. The length of an IPv6 address is….
    1. 32bits
    2. 64bits
    3. 96bits
    4. 128bits
    5. 256bits
33. The length of an IPv4 address is….
    1. 32bits
    2. 64bits
    3. 96bits
    4. 128bits
    5. 256bits
34. What is the main function of routing algorithms?
    1. Calculating error detection checksums for routing protocols
    2. Calculating hash values for routing messages
    3. Calculating least cost path to reach a destination
    4. Translating IP address to physical address
    5. Translating domain name to IP
35. Link layer is implemented in…
    1. Network interface card (NIC)
    2. OS of the host device
    3. Application software
    4. None of the above
    5. All of the above
36. Which of the following Ethernet standards defines Fast Ethernet over UTP cabling?
    1. 10BASE-T
    2. 100BASE-Ty
    3. 100BASE-TX
    4. 1000BASE-T
    5. None of the other answers is correct
37. Which of the following terms describes Ethernet addresses that can be used to send one frame that is delivered to multiple devices on the LAN?
    1. Burned-in address
    2. Unicast address
    3. Broadcast address
    4. MAC address
    5. None of above
38. What is the length of IPv6 header
    1. 10bytes
    2. 20bytes
    3. 40bytes
    4. 64bytes
    5. 128bytes
39. How does a LAN switch decides to forward a frame destined for a broadcast MAC address?
    1. It compares the unicast destination address to the bridging, or MAC address, table.
    2. It compares the unicast source address to the bridging, or MAC address, table.
    3. It forwards the frame out all interfaces in the Switch except for the incoming interface
    4. It compares the destination IP address to the destination MAC address.
    5. It compares the frame’s incoming interface with a MAC address table entry.
40. Which of the following is not a function of SDN controller?
    1. maintain network state information
    2. interacts with network control applications “above” via northbound API
    3. interacts with network switches “below” via southbound API
    4. Forwarding data packets
    5. All of the above are functions of SDN controller
41. In socket programming in order to contact the server by a client,
    1. The first server process must have been stopped
    2. All the sockets in server side should have been closed
    3. The client and the server should reside in a single host
    4. The server process must first be running and server must have created socket (door) that welcomes client’s contact
    5. The server process must be running without any listening sockets
42. What is the purpose of a content distribution networks (CDN)
    1. It stores copies of multimedia content at CDN nodes and serve them when a subscriber request them
    2. It securely store files so that only the owner can access them
    3. It allows sharing of documents
    4. It distributes emails
    5. It stores copies of software applications at CDN nodes and subscribers to use them
43. What is the main motivation behind introduction of IPv6
    1. IPv4 addressing is too simple
    2. IPv6 is complex
    3. IPv6 is simple
    4. IPv4 addresses is depleted (ran out of addresses)
    5. IPv4 addressing is too old
44. How does a switch decide to forward a frame destined for a known unicast MAC address?
    1. It checks the unicast destination MAC address in the MAC address table and forwards.
    2. It checks the unicast source address in MAC address table
    3. It forwards the frame out all interfaces except for the incoming interface.
    4. It checks the destination IP address to the destination MAC address.
    5. It checks the incoming interface to the source MAC entry in the MAC address table
45. Which of following is a protocol used in email transferring?
    1. SNMP
    2. SMTP
    3. SDN
    4. CDN
    5. DNS
46. HTTP is a protocol used for…
    1. Sending emails
    2. Transferring files
    3. Remote logging
    4. Web browsing
    5. Network monitoring
47. HTTPs is a protocol used for…
    1. Sending emails
    2. Transferring files
    3. Remote logging
    4. Web browsing
    5. Network monitoring
48. BitTorrent is an example of….
    1. P2P file distribution
    2. Client server file distributing
    3. Video streaming
    4. Audio streaming
    5. Emailing
49. Communication channels that connect adjacent nodes along communication path are called
    1. Routes
    2. Cables
    3. Circuits
    4. Links
    5. Virtual circuits
50. Which of the following protocol is used for getting the MAC address while knowing the IP address of the destination system?
    1. ARP
    2. Ping
    3. DNS
    4. IP
    5. None of the above

**SECTION B (50 marks)**

**Answer any TWO questions out of the three questions using the separate answer sheet provided.**

1. 1. Draw general format of HTTP request.

(5 Marks)

* + 1. State what information are conveyed in each of the fields?

(4 Marks)

* + 1. Give possible value which can be found in each of the field? (you can give values which were in the requests captured during lab sessions)

(3 Marks)

* 1. Draw general format of HTTP response.

(6 Marks)

* + 1. State what information are conveyed in each of the fields?

(4 Marks)

* + 1. Give possible value which can be found in each of the field? (you can give values which were in the requests captured during lab sessions)

(3 Marks)

* 1. Divide following IP block into 2 equal size subnets.

IP block 192.168.22.0/26

* + 1. For each subnet give following details,
       1. First Address
       2. Last address
       3. Number of addresses in subnet
       4. Subnet address

(3 x 4 Marks)

* + 1. How many addresses are wasted?

(3 Marks)

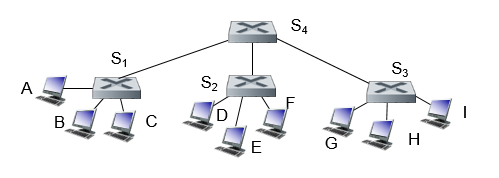
* 1. 1. Suppose that the UDP receiver computes the Internet checksum for the received UDP segment and finds that it matches the value carried in the checksum field. Can the receiver be absolutely certain that no bit errors have occurred? Explain.

(5 Marks)

* + 1. Suppose that a Web server runs in Host C on port 80. Suppose this Web server uses persistent connections, and is currently receiving requests from two different Hosts, A and B. Are all of the requests being sent through the same socket at Host C? If they are being passed through different sockets, do both of the sockets have port 80? Discuss and explain.

(5 Marks)

1. Consider the network in the figure below



* 1. Explain the process carried out by S1, S4, S3 in forwarding a frame from A to G, assuming all the switch tables are empty.

(6 Marks)

* 1. Provide the contents of switch table of each S1, S4, S3 after conveying above frame from A to G.

(6 Marks)

* 1. Explain the process carried out by S3, S4, S1 in forwarding the response for above frame from G to A.

(6 Marks)

* 1. Show in a diagram how frame from A to G passes through layers of internet model (TCP/IP model) at devices A, S1, S4, S3, G

(5 Marks)

* 1. Briefly explain the security risk involved in the process you explained in section a.

(2 Marks)