

Student Number: _____

Signature: _____

There is only one right statement, indicate the correct one (correct answer will give 1 point, incorrect or more than one answer will not count).

The objective of this section is to ensure that some of the basic concepts of transport, link layer and application protocols are understood.

1- HTTP 1.0

- a) uses 70 as the default port in the server for incoming connections
- b) can only transfer a single object over a TCP connection
- c) uses both persistent and non persistent connections
- d) uses RTP as transport protocol

2- HTTP client uses

- a) "WWW-Authenticate" header to send user authentication info to the server
- b) "Authorization" header to send user authentication info to the server
- c) "User-Agent" header to send client authentication info to the server
- d) "Content-Disposition" header to send user authentication info to the server

3- The conditional GET mechanism is used for

- a) downloading files and requires server to cache them
- b) web caching and requires Last-Modified header
- c) web caching and requires If-Modified-Since header
- d) file transfer with HTTP but requires two parallel TCP connections

4- HTTP pipelining

- a) increases the RTT for each session
- b) the client issues a new request only after the previous responses is received
- c) is the default mode in HTTP 1.1
- d) requires special parameter in the "User-Agent " header to inform the client

5- The DNS resource records

- a) include Name, Value, Type, TTL and Date fields
- b) are stored in database of centralized root name servers only
- c) are stored in databases of the hierarchical name servers
- d) are four-tuple record that includes Name, Value, MX and TTL fields

6- The DNS system

- a) is a distributed database implemented in a hierarchy of name servers
- b) runs over TCP for the request that translate hostname into IP address
- c) is a link layer protocol that convert hostnames into IP addresses
- d) is a databases that stores the routing information

7- port numbers

- a) are used at transport layer to multiplex-demultiplex data between applications in the same host
- b) available are up to 65535 but between 0-1123 are restricted for well known applications
- c) are used at physical layer to differentiate the applications in the same host
- d) in the same host are assigned to the same sockets

8- UDP provides the following services to upper layers

- a) reliable transfer
- b) only point-to-point communications
- c) support for multicast communications
- d) connection-oriented communications

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9- The TCP acknowledge number is

- a) the number selected in the receiver to indicate the bytes that it can receive
- b) a random number selected for every TCP segment
- b) the byte number of the first byte in the TCP segment
- d) the next byte receiver is expecting from sender

10- The TCP SYN flag is set to 0 when

- a) when server receives connection-granted from the client and subsequent messages
- b) when client initiates the connection with the server and after the connection is granted
- c) when client closes the connection with the server and server sends connection-closed
- d) when client initiates the connection with the server

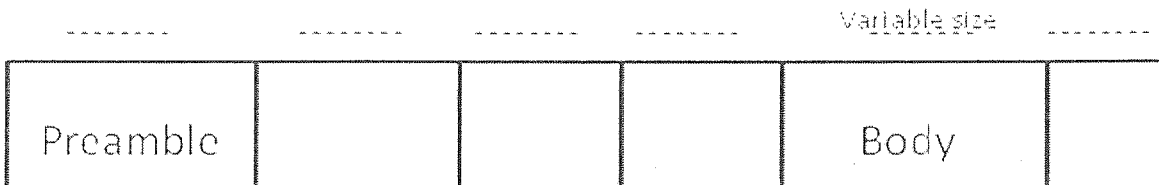
Give the answer to the following questions (correct answer will give 2 points, incorrect will not count):

The student should have deep understanding of basic IP message structure, routing algorithm and application protocol

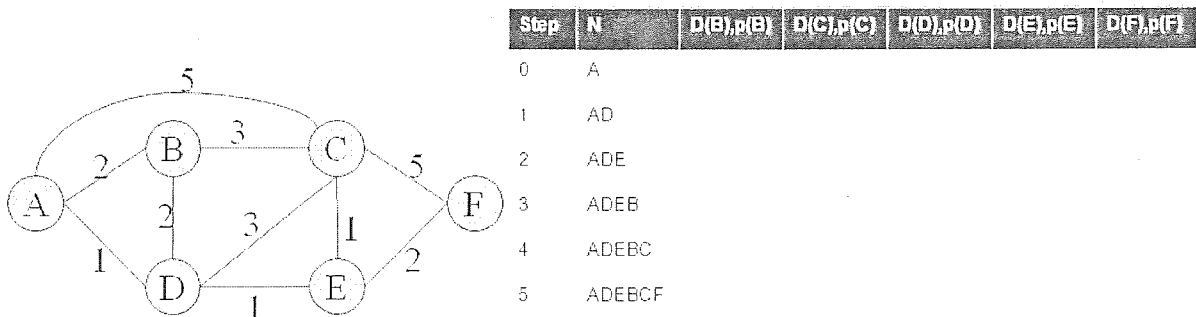
12 - Explain briefly the following acronyms/concepts. For acronyms also tell what they are short for.

- a) ARP
- b) FQDN
- c) sliding window
- d) BGP
- e) MIME
- f) SMTP

13 - Fill in the fields and their size in bytes of the following Ethernet message structure



14- Fill in the routing table according to distance vector algorithm for source node E



D(v): cost of the path from the source node to destination that has currently the least cost
 p(v): previous node along the current least-cost path from the source
 N: set of nodes whose least-cost path from the source is known

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15- Explain the 3-way handshake when establishing a TCP connection and the values of the MaxSeqNum, SeqNum, SYN flag, ACK number in the messages exchanged.

16- Fill in the missing mandatory fields in the following SIP message to ensure it is well-formed

INVITE sip: bob@tkk.fi SIP/2.0

.....

.....

.....

Via: SIP/2.0/UDP 123.123.11.11

.....

Call-ID: NNNN

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