November 6th 2018

ECONE **1st Test** **Group 1**

- There are 17 questions. I will appraise every response from 0 to 1 point.
- You have 45 minutes to complete the test.
- It is not allowed to use any electronic devices (e.g. smartphones, laptops) and paper notes.
- You are allowed to use language dictionaries.
- **Please write concisely and legibly!**

Your first name: …… Your name: ……

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1. In which decade the first computer networks appeared? In 50-ties.
2. What were the services offered by Arpanet? Remote login, file transfer, email.
3. What was the main reason for IPv6 construction? The lack of free public IPv4 addresses.
4. What means "packet switching"? It is a technique of message transmission over linked nodes. The message is split into small packets that are transmitted separately. They can travel via the network passing subsequent links in parallel.
5. What is the reason for SDU (Service Data Unit) segmentation? If the chunk of data carried by an SDU is bigger than maximum size of payload supported by PDU (Protocol Data Unit), the protocol instance has to segment (fragment) the data into smaller chunks.
6. What is the main responsibility of the Internet Registry organizations (i.e. RIPE)? IANA oversees global IP address allocation, autonomous system number allocation, media types, and other Internet Protocol-related symbols and Internet numbers. A regional Internet Registry manages the allocation and registration of Internet number resources (e.g. IP addresses and autonomous system numbers) within its region of the world.
7. List the principal functions of the 5th OSI ISO layer. The session layer provides synchronization points and activity management functions, which help management of a communication session.
8. Give the names of the layers defined by the TCP/IP protocol stack model. There are: application, transport, network, and network interface layers.
9. What is the difference between the 2nd layer switch and the 3rd layer switch? The layer 2 switches forward packets looking at MAC addresses. The layer 3 switches forward packets looking at IP addresses.
10. What is the difference between MAC-48 and EUI-48 addresses? The distinction between EUI-48 and MAC-48 identifiers is purely nominal: MAC-48 is used for network hardware; EUI-48 is used to identify other devices and software. They are syntactically indistinguishable and assigned from the same numbering space.
11. What is the host number pointed by the IPv4 address 197.202.233.64/24? 64.
12. What is the meaning of the 197.202.233.0/24 IPv4 address in the subnet? It points a default route, when used as a destination address. It means "I have not yet assigned IP address", when used as a source address.
13. What for a host uses DHCP (Dynamic Host Configuration Protocol)? DHCP distributes network configuration parameters, such as IP addresses for interfaces,

services, and bootstrap file localization. It allows for dynamic IP address assignment, leasing addresses for defined time period.

14. What for is the hop count field in the IP header? To drop a packet that circulates over a temporary loop. The mechanism protects switches against congestion.
15. What for is the protocol field in the IP header? To recognize the subsequent protocol that should obtain the packet for processing (e.g. TCP, UDP, ICMP).
16. What metrics can be used by a routing protocol? Hop count, bandwidth, delay, load, reliability, and cost.
17. What are the important features of the OSPF protocol? It is an interior gateway (intradomain) link-state routing protocol. It is open standard, and scalable.

November 6th 2018

ECONE **1st Test** **Group 2**

- There are 17 questions. I will appraise every response from 0 to 1 point.
- You have 45 minutes to complete the test.
- It is not allowed to use any electronic devices (e.g. smartphones, laptops) and paper notes.
- You are allowed to use language dictionaries.
- **Please write concisely and legibly!**

Your first name: ……. Your name: ……

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1. In which decade Arpanet appeared? In 1971 Arpanet was opened to the public use.
2. What were the main enablers of Internet expansion? * Easy and open access for writers and readers to RFCs, * free UNIX 4.2 BSD with TCP / IP software, * web browsers easy to use for non-qualified users.
3. What was the main reason for NAT (Network Address Translation) construction? To overcome the problem of shortage of public IPv4 addresses.
4. What means "circuit switching"? It is a method of data interchange in which two network nodes establish a dedicated communications channel (circuit) before the nodes may communicate. The circuit guarantees the full bandwidth of the channel and remains connected for the duration of the communication session. The circuit functions as if the nodes were physically connected as with an electrical circuit.
5. What is the reason for SDU (Service Data Unit) grouping? If for any reason (e.g. cost or time efficiency) is better to transport several data chunks carried by subsequent SDUs in a single PDU (Protocol Data Unit), a protocol should group them before sending and split up after reception.
6. What is the main responsibility of Internet Engineering Task Force? IETF develops and promotes standards for Internet. It is an open standards organization, with no formal membership or membership requirements.
7. List the principal functions of the 6th OSI ISO layer. Data context negotiation, data translation from host to network representation, compression, and ciphering.
8. Give the names of the layers defined by the OSI ISO protocol stack model. There are: application, presentation, session, transport, network, data link, and physical layers.
9. What is the difference between the 2nd layer switch and the network bridge? A bridge transforms packets from one LAN to other one (e.g. Token Ring to Ethernet or Ethernet to WiFi). A multiport bridge is called layer 2 switch, which forwards packets looking at MAC addresses. Most of the switches have only Ethernet interfaces and do not translate the headers.
10. What is the structure of the MAC-48 address? There are two flag bits: individual/group (unicast/multicast) and universal/local. If it is a universal address, then 3 bytes (without the two bits) carry an Organizational Unique Identifier and the subsequent 3 bytes carry a manufacturer assigned number or a multicast group number.
11. What is the host number pointed by the IPv4 address 197.202.32.64/16? Host address is 0.0.32.64, thus the number is 8192+64=8296.
12. What is the meaning of the 197.202.255.255/16 IPv4 address in the subnet? It is the broadcast address.

13. What for a host uses ARP and RARP (Reverse Address Resolution Protocol)? The ARP server responds with the MAC address that is assigned to the querying device on the base of its IP address. The RARP server responds with the IP address that is assigned to the querying device on the base of its MAC address.
14. What for is the Type of Service / Traffic Class field in the IP header? To enable routers sending packets using different priority queues.
15. What for is the port number field in the TCP header? To point a process on a given terminal node that is involved in the communication. It enables to recognize the end point application protocol (e.g. smtp, ftp, http).
16. What kind of networks uses reactive routing protocols? Those which changes frequently topology and whose with infrequent traffic over few paths.
17. What does it mean that BGP is a path-vector protocol? BGP's path vector routing information includes the 'path' of ASes that are used to reach the destination.