ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΚΑΙ ΠΟΛΙΤΙΣΜΟΥ
ΔΙΕΥΘΥΝΣΗ ΜΕΣΗΣ ΕΚΠΑΙΔΕΥΣΗΣ
ΛΕΥΚΩΣΙΑ

ΠΑΓΚΥΠΡΙΕΣ
ΓΡΑΠΤΕΣ ΕΞΕΤΑΣΕΙΣ
2016
(ΓΙΑ ΑΠΟΛΥΣΗ)

Α΄ ΣΕΙΡΑ ΕΞΕΤΑΣΕΩΝ

ΜΑΘΗΜΑ	**: ΔΙΚΤΥΑ - CISCO**
ΧΡΟΝΟΣ	**: 2 ώρες**
ΗΜΕΡΟΜΗΝΙΑ	**: 15 Ιουνίου 2016**
ΩΡΑ ΕΝΑΡΞΗΣ	**: 7.45 π.μ.**

ΤΟ ΕΞΕΤΑΣΤΙΚΟ ΔΟΚΙΜΙΟ ΑΠΟΤΕΛΕΙΤΑΙ ΑΠΟ ΔΕΚΑΠΕΝΤΕ (15) ΣΕΛΙΔΕΣ

Οδηγίες:

- **Να απαντήσετε σε όλες τις ερωτήσεις**
- **Όλες οι απαντήσεις να γραφούν στο τετράδιο απαντήσεων**
- **Επιτρέπεται η χρήση μη προγραμματιζόμενης υπολογιστικής μηχανής**

ΜΕΡΟΣ Α. (30 μονάδες)
Να απαντήσετε και στις είκοσι (20) ερωτήσεις πολλαπλής επιλογής. Η κάθε ερώτηση βαθμολογείται με 1½ μονάδα.

Ερώτηση 1. **(Chapter 1) 2016α**

What is the destination address in the header of a broadcast frame?

(a) 255.255.255.255
(b) 0.0.0.0
(c) FF-FF-FF-FF-FF-FF
(d) 11-11-11-11-11-11

Ερώτηση 2. **(Chapter 2) 2016α**

What happens when the AUTO-MDIX is enabled on a switch interface?

(a) The interface will auto-negotiate duplex with the connected devices
(b) The interface will auto-negotiate speed with the connected devices
(c) The interface will be used for remote access
(d) The interface automatically detects the required cable connection type (straight-through or crossover)

Ερώτηση 3. **(Chapter 3) 2016α**

What is a disadvantage of VLANs?

(a) Reduced security
(b) Reduced performance
(c) Need for more expensive switches
(d) Larger broadcast domains

Ερώτηση 4. **(Chapter 3) 2016α**

Which command is used to remove only VLAN10 from a switch?

(a) delete vlan.dat
(b) no vlan 10
(c) delete flash:vlan.dat
(d) no switchport access vlan 10

Ερώτηση 5. **(Chapter 4) 2016α**

Which software is used for a network administrator to make the initial router configuration securely?

(a) terminal emulation client software
(b) SSH client software
(c) Telnet client software
(d) HTTPS client software

Ερώτηση 6. **(Chapter 4) 2016α**

What is a characteristic of an IPv4 loopback interface on a Cisco IOS router?

(a) The **no shutdown** command is required to place this interface in an Up state

(b) Only one loopback interface can be enabled on a router

(c) It is a logical interface internal to the router

(d) It is assigned to a physical port and can be connected to other devices

Ερώτηση 7. **(Chapter 5) 2016α**

What is a characteristic of legacy inter-VLAN routing?

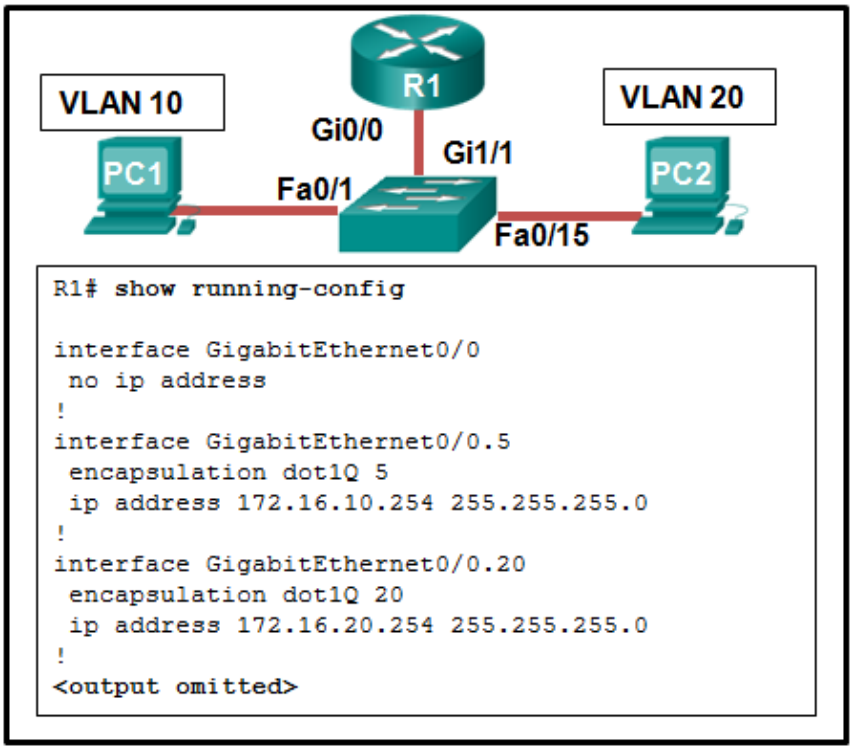
(a) The router requires a separate link for each VLAN

(b) Only one VLAN can be used in the topology

(c) The user VLAN must be the same ID number as the management VLAN

(d) Inter-VLAN routing must be performed on a switch instead of a router

Ερώτηση 8. **(Chapter 5) 2016α**



Refer to the exhibit. A network administrator is verifying the configuration of inter-VLAN routing. Users complain that PC2 cannot communicate with PC1. Based on the output, what is the possible cause of the problem?

(a) Gi0/0 is not configured as a trunk port.

(b) The command interface GigabitEthernet0/0.5 was entered incorrectly

(c) The **no shutdown** command is not entered on subinterfaces

(d) The encapsulation dot1Q 5 command contains the wrong VLAN

Ερώτηση 9. **(Chapter 6) 2016α**

The network administrator configures the router with the command:

ip route 172.16.1.0 255.255.255.0 172.16.2.2

How will this route appear in the routing table?

(a) S 172.16.1.0 [1/0] via 172.16.2.2

(b) C 172.16.1.0 is directly connected, Serial0/0

(c) S 172.16.1.0 is directly connected, Serial0/0

(d) C 172.16.1.0 [1/0] via 172.16.2.2

Ερώτηση 10. **(Chapter 6) 2016α**

Which is true for static routing?

(a) It is scalable

(b) Requires less powerful routers

(c) It is easier to configure for complex networks

(d) It dynamically adapts to changes in network topology

Ερώτηση 11. **(Chapter 7) 2016α**

Which dynamic routing protocol was developed as an exterior gateway protocol to interconnect different Internet Service Providers?

(a) EIGRP

(b) OSPF

(c) RIP

(d) BGP

Ερώτηση 12. **(Chapter 7) 2016α**

The following appears in the routing table:

```
R 172.16.4.0/28 [120/2] via 209.165.200.226, 00:00:12, Serial0/0/0
```

What does the number 120 represent?

(a) The periodic update interval

(b) The administrative distance

(c) The number of hops

(d) The hold-down timer

Ερώτηση 13. **(Chapter 8) 2016α**

What is the **first criterion** used by OPSF routers to elect a DR?

(a) highest priority

(b) highest IP address router ID

(c) highest loopback address

(d) highest IP address

Ερώτηση 14. **(Chapter 8) 2016α**

What are HELLO packets in OSPF?

(a) Packets that contain the state and cost of each directly connected link to a router

(b) Packets that a router sends through OSPF-enabled interfaces to determine if neighbors are present on those links

(c) Packets that contain routing information

(d) Packets that forward traffic from one router to the other

Ερώτηση 15. **(Chapter 9) 2016α**

Which command is used to apply an IPv4 ACL to a router interface?

(a) the access-class command

(b) the ip access-list command

(c) the ip access-group command

(d) the ip traffic-filter command

Ερώτηση 16. **(Chapter 9) 2016α**

Which command is implicitly (by default) placed in an **extended** ACL even if we do not write it?

(a) permit any

(b) deny any

(c) deny ip any any

(d) permit ip any any

Ερώτηση 17. **(Chapter 10) 2016α**

An administrator issues the commands:

```
Router(config)# interface g0/1
Router(config-if)# ip address dhcp
```

What is the administrator trying to achieve?

(a) configuring the router to act as a DHCPv4 server

(b) configuring the router to obtain IP parameters from a DHCPv4 server

(c) configuring the router to act as a DHCP relay agent

(d) configuring the router to resolve IP address conflicts

Ερώτηση 18. **(Chapter 10) 2016α**

As a DHCPv4 client lease is about to expire, what is the message that the client sends to the DHCP server?

(a) DHCPDISCOVER

(b) DHCPOFFER

(c) DHCPACK

(d) DHCPREQUEST

Ερώτηση 19. **(Chapter 11) 2016α**

Which type of NAT maps a single inside local address to a single inside global address?

(a) static

(b) dynamic

(c) port address translation

(d) overloading

Ερώτηση 20. **(Chapter 11) 2016α**

Which one of the following types of NAT allows many-to-one address mapping between local and global addresses?

(a) Static NAT

(b) Dynamic NAT

(c) ALG

(d) PAT

Μέρος Β (30 μονάδες)

Να απαντήσετε σε όλες τις ερωτήσεις. Η κάθε ερώτηση βαθμολογείται με έξι (6) μονάδες.

Ερώτηση 1. **(Chapter 2, Chapter 6) 2016α** (1 pt for each row)

Copy this table in your answer book and complete it by adding an X mark to the appropriate cells to indicate which characteristic corresponds to each protocol.

Routing Protocol Comparison Table

Routing Protocol / Characteristic	RIP v1	RIP v2	EIGRP	OSPF
Distance Vector	X	X	X	
Link State				X
VLSM support		X	X	X
Cisco proprietary			X	
Hop Count metric	X	X		
Ideal for large networks			X	X

Ερώτηση 2. **(Chapter 5, 9) 2015β, 2016α** (1 pt for each answer)

In the following table write the show command that will display what is explained in the "Description" column.

A/A	Description	Show command
(a)	Provides a brief status of the interfaces on the router	Show ip int brief
(b)	Displays detailed status and statistics for all interfaces on the router	Show int
(c)	Displays version information for the hardware and firmware	Show version
(d)	Shows the configuration stored in RAM	Show run
(e)	Shows the configuration stored in NVRAM	Show start
(f)	Displays the routing table	Show ip route

Ερώτηση 3. **(Chapter 7) 2016α**

Complete the table below with the appropriate protocol, RIP or EIGRP: (1 pt for each answer)

Distance Vector Routing Protocol Description	RIP or EIGRP
(a) Sends HELLO packets	EIGRP
(b) Version 2 supports VLSM and classless routing	RIP
(c) Maximum limit of 255 hops	EIGRP
(d) Maximum limit of 15 hops	RIP
(e) Forms neighbour adjacencies	EIGRP
(f) It is an open protocol	RIP

Ερώτηση 4. **(Chapters 3,4,9,11) 2016α**

Fill in the blanks in the following statements: (1 pt for each statement)

(a) The show vlan command displays the VLAN assignment for all ports as well as the existing VLANs on the switch.

(b) The no shutdown command enables an interface (brings it up).

(c) The election of a DR and a BDR takes place on multiaccess or Ethernet networks.

(d) An implicit deny any rejects any packet that does not match any Access Control Entry (ACE).

(e) A way to quickly find your PC's IP address and MAC Address is to go to command prompt and type ipconfig /all .

(f) A public IP address must be unique across the Internet.

Ερώτηση 5. **(Chapter 4, 6, 7 subnetting) 2016α**

A small school administrator has decided to design the school network using the network 193.1.1.0/24. The network must support 6 different user groups.

- Management: 10 users
- Lab2, Lab3, Lab4: 16 users each
- Library: 6 users
- Classes: 25 users

Based on the above, answer the following questions: (1 pt each)

(a)	How many bits must be borrowed from the host portion of the IP address to allow the administrator to subnet the 6 networks	3 bits. 2^3 = 8
(b)	Calculate the available IP addresses for each subnet, in order to verify that these can cover the needs of the biggest network group	2^5 -2 = 32-2 = 30
(c)	Write the new subnet mask in a dotted decimal notation	255.255.255.224
(d)	Write the broadcast address of the first subnet (subnet 0)	193.1.1.31
(e)	Write the network address of the second subnet (subnet 1)	193.1.1.32
(f)	Write the host range of the second subnet (subnet 1)	193.1.1.33 – 193.1.1.62

ΜΕΡΟΣ Γ (24 Μονάδες)

Να απαντήσετε σε όλες τις ερωτήσεις. Η κάθε ερώτηση βαθμολογείται με οκτώ (8) μονάδες.

Ερώτηση 1. **(Chapter 2 and Chapter 7) 2016α**

(a) Write the necessary commands for configuring a router to have the passwords set as per the table below. All passwords should be encrypted in the configuration file and the enable password should have strong encryption. (0.5 pt for each line x 8 = 4pts)

Enable password	ena123
Console Password	con123
Telnet Password	tel123

Router>enable

Router#config t

Router(config)# service password-encryption

Router(config)#enable secret ena123

Router(config)#line console 0

Router(config-line)#password con123

Router(config-line)#login

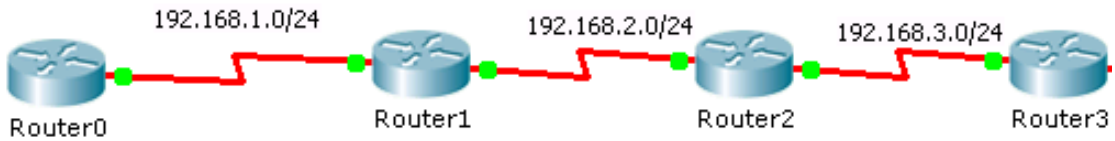
Router(config-line)#exit (δεν είναι απαραίτητο)

Router(config)#line vty 0 4

Router(config-line)#password tel123

Router(config-line)#login

(b) The following network must be configured using RIP (version 2). Assume that all interfaces are properly configured. Write the necessary commands to configure RIP (version 2) on Router1. (0.5 pt for each line x 4 = 2pts)



Router1(config)#router rip

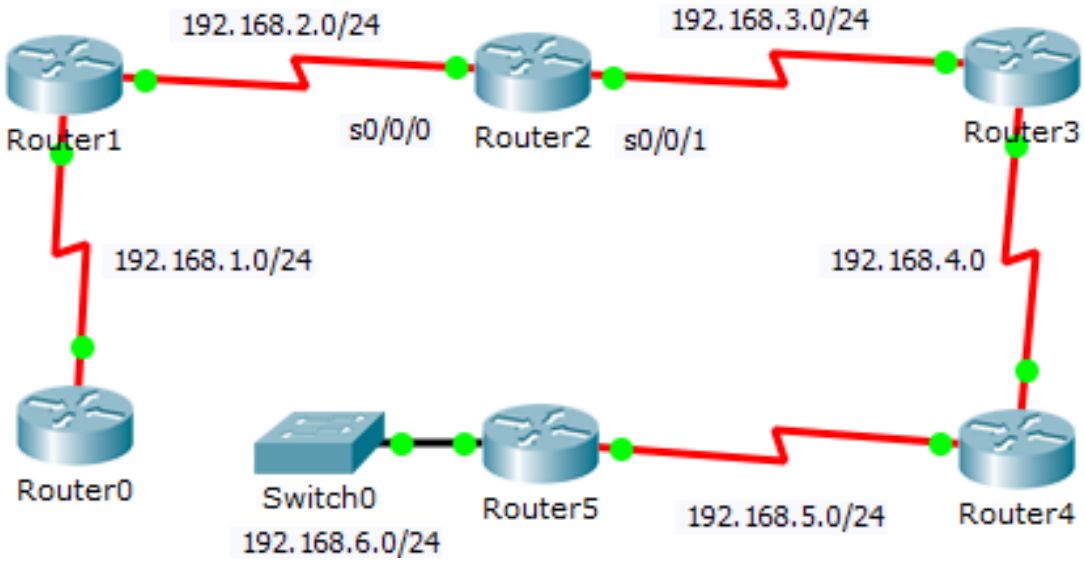
Router1(config-router)#version 2

Router1(config-router)#net 192.168.1.0

Router1(config-router)#net 192.168.2.0

Η ΕΡΩΤΗΣΗ ΣΥΝΕΧΙΖΕΤΑΙ ΣΤΗΝ ΕΠΟΜΕΝΗ ΣΕΛΙΔΑ

(c) The following network must be configured using Static Routing. Assume that all interfaces are properly configured. Write the necessary commands to configure static routing on Router2 (0.5 pt for each line x 4 = 2pts)



Router2(config)#ip route 192.168.1.0 255.255.255.0 s0/0/0

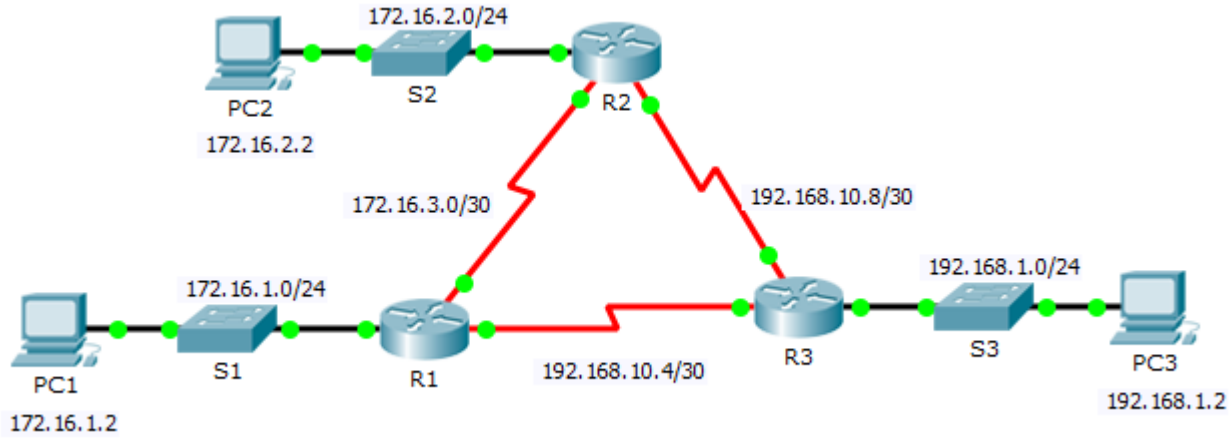
Router2(config)# ip route 192.168.4.0 255.255.255.0 s0/0/1

Router2(config)# ip route 192.168.5.0 255.255.255.0 s0/0/1

Router2(config)# ip route 192.168.6.0 255.255.255.0 s0/0/1

Ερώτηση 2. **(Chapter 8) 2016α**

The following network must be configured using OSPF. Assume that all interfaces are properly configured.



Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	172.16.1.1	255.255.255.0	N/A
	S0/0/0	172.16.3.1	255.255.255.252	N/A
	S0/0/1	192.168.10.5	255.255.255.252	N/A

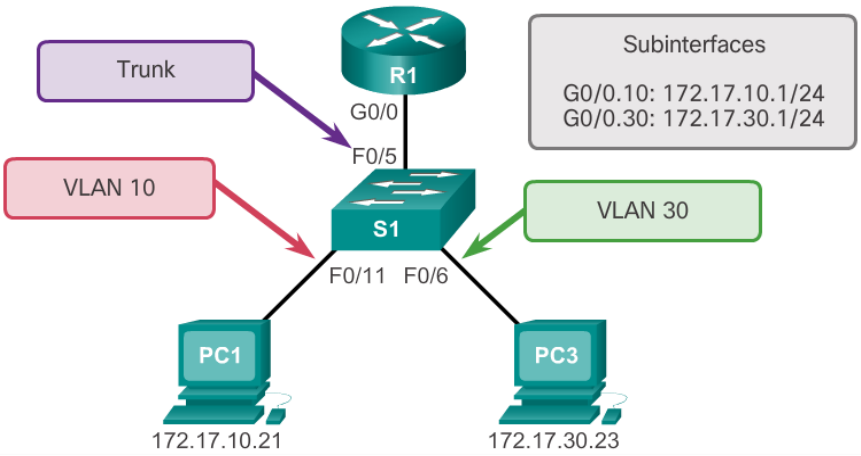
Η ΕΡΩΤΗΣΗ ΣΥΝΕΧΙΖΕΤΑΙ ΣΤΗΝ ΕΠΟΜΕΝΗ ΣΕΛΙΔΑ

Use the following requirements to configure OSPF routing on router R1:
- Process ID 10
- Router ID for R1 = 1.1.1.1
- Network address for each interface
- LAN interface set to passive

(1 pt for each line x 8 = 8pts)

```
R1>ena
R1#configure terminal
R1(config)#router ospf 10
R1(config-router)# router-id 1.1.1.1
R1(config-router)# passive-interface GigabitEthernet0/0
R1(config-router)# network 172.16.1.0 0.0.0.255 area 0
R1(config-router)# network 172.16.3.0 0.0.0.3 area 0
R1(config-router)# network 192.168.10.4 0.0.0.3 area 0
```

Ερώτηση 3. **(Chapter 5) 2016α**



Given the network shown in the figure above:

(a) Provide the necessary commands to create VLAN 10 and VLAN 30 to S1 and to assign the VLANs to the following ports: (4 pts)
- VLAN 10: Fast Ethernet 0/11
- VLAN 30: Fast Ethernet 0/6

Η ΕΡΩΤΗΣΗ ΣΥΝΕΧΙΖΕΤΑΙ ΣΤΗΝ ΕΠΟΜΕΝΗ ΣΕΛΙΔΑ

S1(config)#vlan 10

S1(config-vlan)#vlan 30

S1(config-vlan)#interface fa0/11

S1(config-if)#switchport mode access

S1(config-if)#switchport access vlan 10

S1(config-vlan)#interface fa0/6

S1(config-if)#switchport mode access

S1(config-if)#switchport access vlan 30

(b) Provide the necessary configuration commands for R1 to implement Router-on-a-Stick Inter-VLAN routing. (4 pts)

R1(config)# interface g0/0.10

R1(config-subif)# encapsulation dot1q 10

R1(config-subif)# ip address 172.17.10.1 255.255.255.0

R1(config-subif)# interface g0/0.30

R1(config-subif)# encapsulation dot1q 30

R1(config-subif)# ip address 172.17.30.1 255.255.255.0

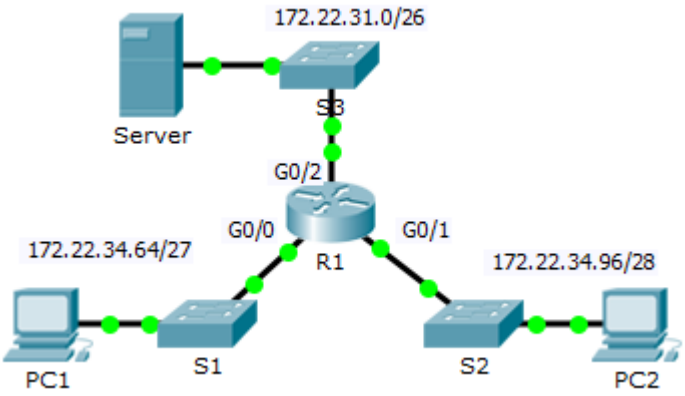
R1(config)# interface g0/0

R1(config)# no shutdown

ΜΕΡΟΣ Δ (16 Μονάδες)

Να απαντήσετε στην πιο κάτω ερώτηση.

(Chapter 6 and Chapter 9) 2016α



Refer to the exhibit.

(a) Complete the Subnet Mask and the Default Gateway (first IP of subnet) of PC1 and PC2.
(1 pt each 1x8=8)

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	172.22.34.65	255.255.255.224	N/A
	G0/1	172.22.34.97	255.255.255.240	N/A
	G0/2	172.22.34.1	255.255.255.192	N/A
Server	NIC	172.22.34.62	255.255.255.192	172.22.34.1
PC1	NIC	172.22.34.66	255.255.255.224	172.22.34.65
PC2	NIC	172.22.34.98	255.255.255.240	172.22.34.97

Η ΕΡΩΤΗΣΗ ΣΥΝΕΧΙΖΕΤΑΙ ΣΤΗΝ ΕΠΟΜΕΝΗ ΣΕΛΙΔΑ

Scenario

Two employees need access to services provided by the server. PC1 only needs FTP access (access list 100) while PC2 only needs web access (access list 101). Both computers are able to ping the server, but not each other.

(b) Configure the appropriate access lists according to the scenario above and apply them to the proper interfaces. (1 pt for each line x 8 = 8pts)

R1(config)#access-list 100 permit tcp 172.22.34.64 0.0.0.31 host 172.22.34.62 eq ftp

(or R1(config)#access-list 100 permit tcp 172.22.34.64 0.0.0.31 172.22.34.62 0.0.0.0 eq 21)

R1(config)#access-list 100 permit icmp 172.22.34.64 0.0.0.31 host 172.22.34.62

R1(config)#access-list 101 permit tcp 172.22.34.96 0.0.0.15 host 172.22.34.62 eq www

(or R1(config)#access-list 101 permit tcp 172.22.34.96 0.0.0.31 172.22.34.62 0.0.0.0 eq 80)

R1(config)#access-list 101 permit icmp 172.22.34.96 0.0.0.15 host 172.22.34.62

R1(config)#interface g0/0

R1(config-if)#ip access-group 100 in

R1(config)#interface g0/1

R1(config-if)#ip access-group 101 in

ΤΕΛΟΣ ΕΞΕΤΑΣΗΣ