ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΚΑΙ ΠΟΛΙΤΙΣΜΟΥ
ΔΙΕΥΘΥΝΣΗ   ΜΕΣΗΣ   ΕΚΠΑΙΔΕΥΣΗΣ
ΛΕΥΚΩΣΙΑ

ΠΑΓΚΥΠΡΙΕΣ
ΓΡΑΠΤΕΣ ΕΞΕΤΑΣΕΙΣ
2013
(ΓΙΑ ΑΠΟΛΥΣΗ)

Α΄ ΣΕΙΡΑ ΕΞΕΤΑΣΕΩΝ

ΜΑΘΗΜΑ **: ΔΙΚΤΥΑ - CISCO**	
ΧΡΟΝΟΣ **: 2 ώρες**	
ΗΜΕΡΟΜΗΝΙΑ : 14 Ιουνίου	
ΩΡΑ ΕΝΑΡΞΗΣ :7.45 π.μ.	

ΤΟ ΕΞΕΤΑΣΤΙΚΟ ΔΟΚΙΜΙΟ ΑΠΟΤΕΛΕΙΤΑΙ ΑΠΟ ΕΝΤΕΚΑ(11) 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 1 ½ μονάδα.

Ερώτηση 1.   (Chapter 1) 2013α
At which point do individuals and small businesses connect directly to the ISP network to obtain Internet access?
  (a) at a POP
  (b) at an IXP
  (c) at a Metro Ethernet link
  (d) on the ISP extranet

Ερώτηση 2.   (Chapter 1) 2013α
Which device connects an existing wireless LAN to a local wired LAN?
  (a) switch
  (b) hub
  (c) access point
  (d) bridge
  (e) router

Ερώτηση 3.   (Chapter 1) 2013α
Which device connects a local LAN to a geographically separate network?
  (a) switch
  (b) hub
  (c) router
  (d) bridge

Ερώτηση 4.   (Chapter 1) 2013α
What units are used to measure Internet bandwidth?
  (a) bits per second
  (b) bytes per second
  (c) hertz per second
  (d) megabytes per second
  (e) packets per second

Ερώτηση 5.   (Chapter 2) 2012β 2013α

What is one function of the physical layer (Layer 1) of the OSI model?

  (a) Adding the hardware address
  (b) encapsulating data into frames
  (c) routing packets
  (d) converting data to bits
  (e) encapsulating data into segments

Ερώτηση 6.   (Chapter 2) 2013α
Which layer of the OSI model defines logical addressing?
  (a) application
  (b) presentation
  (c) session
  (d) transport
  (e) network
  (f) data link

Ερώτηση 7.   **(Chapter 2) 2013α**
What is the correct de-encapsulation order when data is passed from Layer 1 up to Layer 4 of the OSI model?
- (a) bits, frames, packets, segments
- (b) frames, bits, packets, segments
- (c) packets, frames, segments, bits
- (d) segments, packets, frames, bits

Ερώτηση 8. **(Chapter 2) 2013α**
Which statement characterizes UDP?
- (a) UDP provides connectionless transport of data at Layer 4.
- (b) UDP provides connectionless transport of data at Layer 3.
- (c) UDP works well when an application needs to guarantee delivery of data.
- (d) UDP relies on IP for error detection and recovery.

Ερώτηση 9.   **(Chapter 3) 2012β 2013α**

Which of the following is included in the physical network topology diagram?
- (a) IP configuration of all hosts
- (b) Host names
- (c) Amount of data transferred on each network
- (d) Location of NAT service
- (e) Location of wiring closet

Ερώτηση 10. **(Chapter 4) 2012β 2013α**

Given a host with the IP address 192.168.65.54 and a subnet mask of 255.255.255.240, to which network does the host belong?
- (a) 192.168.65.16
- (b) 192.168.65.32
- (c) 192.168.65.48
- (d) 192.168.65.64

Ερώτηση 11. **(Chapter 4) 2013α**

Which address is a valid host IP address given the subnet mask 255.255.255.252?
- (a) 192.168.200.79
- (b) 194.10.10.96
- (c) 223.168.210.101
- (d) 200.152.2.160

Ερώτηση 12. **(Chapter 4) 2013α**
What is the network broadcast address for a Class C address of 192.168.32.0 with the default subnet mask?
- (a) 192.168.0.0
- (b) 192.168.0.255
- (c) 192.168.32.0
- (d) 192.168.32.254
- (e) 192.168.32.255

Ερώτηση 13. **(Chapter 4) 2013α**
Which statement accurately describes public IP addresses?
- (a) Public IP addresses must be unique across the entire Internet.
- (b) Public addresses cannot be used within a private network.
- (c) Public addresses can be duplicated only within a local network.
- (d) Public IP addresses are only required to be unique within the local network.
- (e) Network administrators are free to select any public addresses to use for network devices that access the Internet.

Ερώτηση 14. **(Chapter 4) 2013α**
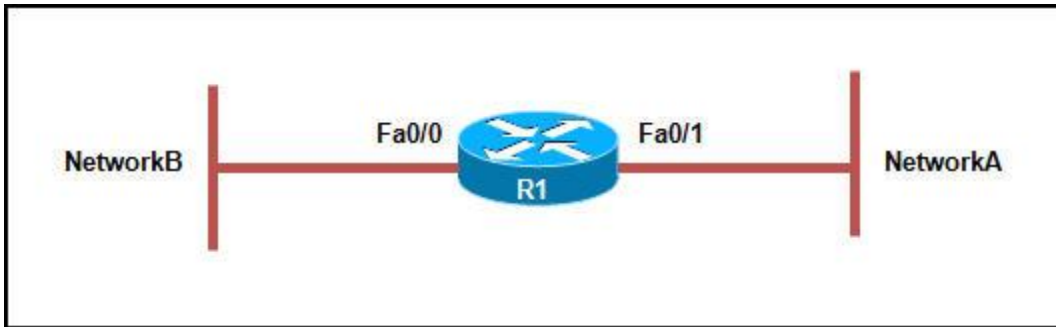
Refer to the exhibit. Which statement is true regarding the IP address configuration?

- (a) Interfaces Fa0/0 and Fa0/1 can be in the same subnet.
- (b) Interface Fa0/0 and NetworkA can be in the same subnet.
- (c) Interface Fa0/0 and NetworkB can be in the same subnet.
- (d) Interface Fa0/1 and NetworkB can be in the same subnet.

Ερώτηση 15. **(Chapter 5) 2013α**
What is required for initial configuration of Cisco routers if the IOS command-line interface is used?
- (a) a crossover cable
- (b) a rollover cable
- (c) an RJ-15 to DB-9 adapter
- (d) router VTY port

Ερώτηση 16. **(Chapter 6) 2013α**

Which routing protocol is used to exchange data between two different ISPs?

- (a) BGP
- (b) EIGRP
- (c) OSPF
- (d) ARP
- (e) RIP v2

Ερώτηση 17. **(Chapter 5) 2012β 2013α**

When does a router enter the setup mode?

- (a) When the Cisco IOS is missing in flash
- (b) When the configuration is missing in NVRAM
- (c) When the setup command is run from the user mode
- (d) When the boot system command is missing in the configuration

Ερώτηση 18. (Chapter 6) 2013α
What is the purpose of a routing protocol?
- (a) It is used to build and maintain ARP tables
- (b) It provides a method for segmenting and reassembling data packets
- (c) It allows an administrator to devise an addressing scheme for the network
- (d) It allows a router to share information about known networks with other routers
- (e) It provides a procedure for encoding and decoding data into bits for packet forwarding

Ερώτηση 19. (Chapter 7) 2013α

Which protocol is used to retrieve email from a mail server?
- (a) SNMP
- (b) TFTP
- (c) FTP
- (d) IMAP4
- (e) SMTP

Ερώτηση 20. (Chapter 8) 2012β 2013α
A user can read e-mail messages, but cannot access any web pages on the Internet. What troubleshooting method would be most efficient for troubleshooting this issue?
- (a) divide-and-conquer
- (b) bottom-up
- (c) top-down
- (d) impossible to determine from this information

Μέρος Β (30 μονάδες)
Να απαντήσετε σε όλες τις ερωτήσεις. Η κάθε ερώτηση βαθμολογείται με έξι (6) μονάδες.

Ερώτηση 1.   **(Chapter 5) 2012β 2013α**

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

(a) The configuration stored in NVRAM can be deleted with the command erase starup-config.
(b) If a router fails to boot the IOS Operating System, it then boots up in   ROM   Monitor mode.
(c) The routing table is stored in   RAM   memory.
(d) The command no router rip can be used to disable the RIP process on a router.
(e) The   show   version   command can be used to verify the configuration entry of a Cisco router.
(f) By using the show   flash   command you can find out which image of the IOS Operating System is installed on a Cisco router.

Ερώτηση 2. **(Chapter 3) 2012β 2013α**

Fill up the table by naming all numbered components from the figure. The names of the components are provided below. One component might be used more than one time.(0.75 pts each)

IDF, Patch Panel, Patch Cord, Horizontal Cabling, Vertical Cabling, MDF, Switch.

	Component
1	Patch Cord
2	Horizontal Cabling
3	Patch Panel
4	Patch Cord
5	Switch
6	IDF
7	Vertical Cabling
8	MDF
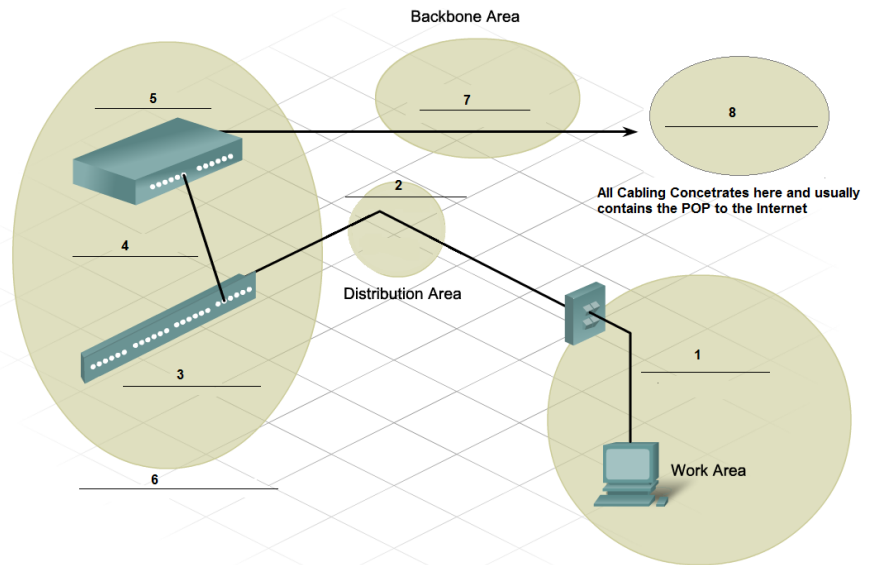
Ερώτηση 3. (Chapter 9) 2012β 2013α

Complete the table below by specifying the Layer 4 (Transport) Protocol and the well-known Port Number for each Application Protocol listed.

NOTE: One of the Application Protocols may use more than one Transport Protocol and one uses two port numbers.   (0.5 pt for each answer)

Protocol Name	Transport protocol	Port Number
FTP	TCP	20,21
TELNET	TCP	23
DNS	UDP, TCP	53
DHCP	UDP	67
POP3	TCP	110
SMTP	TCP	25

Ερώτηση 4. (Chapter 6) 2013α

A network administrator has issued the command **show ip route** on a router. One of the lines in the output is the following:

R 192.168.60.0/24 [120/3] via 192.168.20.254, 00:00:22, Serial0/1

Answer the following questions: (1 pt for each answer)

A/A	Question	Answer
(a)	Which routing protocol was used to learn this route?	RIP
(b)	What is the administrative distance?	120
(c)	What is the **next hop** interface address?	192.168.20.254
(d)	To which network does this route forward packets?	192.168.60.0/24
(e)	How many **other** routers will a packet travel through before reaching the destination network?	3
(f)	The next update for this route is expected in how may seconds?	8

Ερώτηση 5. (Chapter 6) 2013α

Identify the layer to which the protocol or technology belongs. For each protocol or technology write the corresponding Layer number to the Layer Answer column.   (0.75 pts each)

Layer
5 – Upper Layers
4 - Transport
3 - Network
2 - Data link
1 - Physical

A/A	Protocol/Technology	Layer answer
(a)	UDP	4
(b)	Hubs	1
(c)	SMTP	5
(d)	MAC Address	2
(e)	HTTP	5
(f)	Routing	3
(g)	Port Numbers	4
(h)	Packets	3

ΜΕΡΟΣ Γ (24 Μονάδες)
Να απαντήσετε σε όλες τις ερωτήσεις. Η κάθε ερώτηση βαθμολογείται με οκτώ (8) μονάδες.

Ερώτηση 1. **(Chapter 6) 2012 2013α**
Answer the following questions based on the network below:
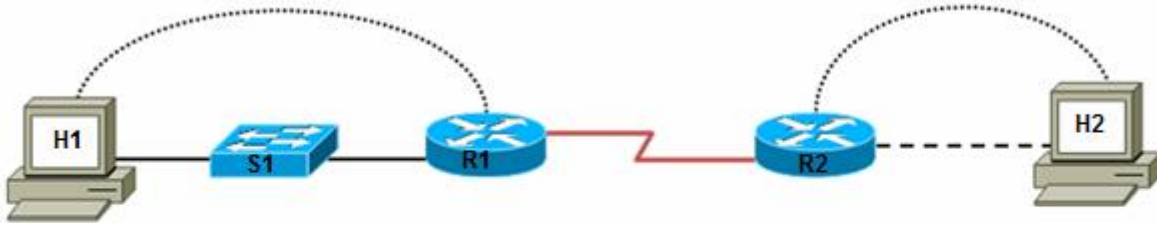
Device	Host Name	Interface	IP Address	Subnet Mask
R1	**R1**	Serial 0/0/0 (DCE)	172.17.0.1	255.255.0.0
		Fast Ethernet 0/0	172.16.0.1	255.255.0.0
R2	**R2**	Serial 0/0/0 (DTE)	172.17.0.2	255.255.0.0
		Fast Ethernet 0/0	172.18.0.1	255.255.0.0

(a) Give the necessary commands for configuring and activating the serial interface S0/0/0 of router **R1**. Assume that the router is initially in privileged mode and clock rate 64000.   (4 pts)

R1# **configure terminal**   (0,5 pt)
R1(config)# **interface serial 0/0/0**   (0,5 pt)
R1(config-if)# **ip address 172.17.0.1 255.255.0.0** (1pt)
R1(config-if)# **clock rate 64000** (1 pt)
R1(config-if)# **no shutdown** (1 pt)
R1(config)# **exit**   (δεν είναι απαράιτητο)
R1#

(b) Give the necessary command to configure a default route on router R1. Assume that the router is in global configuration mode.   (1 pt)

R1(config)# **ip route 0.0.0.0 0.0.0.0 S0/0/0**   (1pt)
Or
R1(config)# **ip route 0.0.0.0 0.0.0.0 172.17.0.2**   (1pt)

(c) Give the necessary command to configure the word CISCO as the password to access the console port. Assume that the router is in global configuration mode   (3 pts)

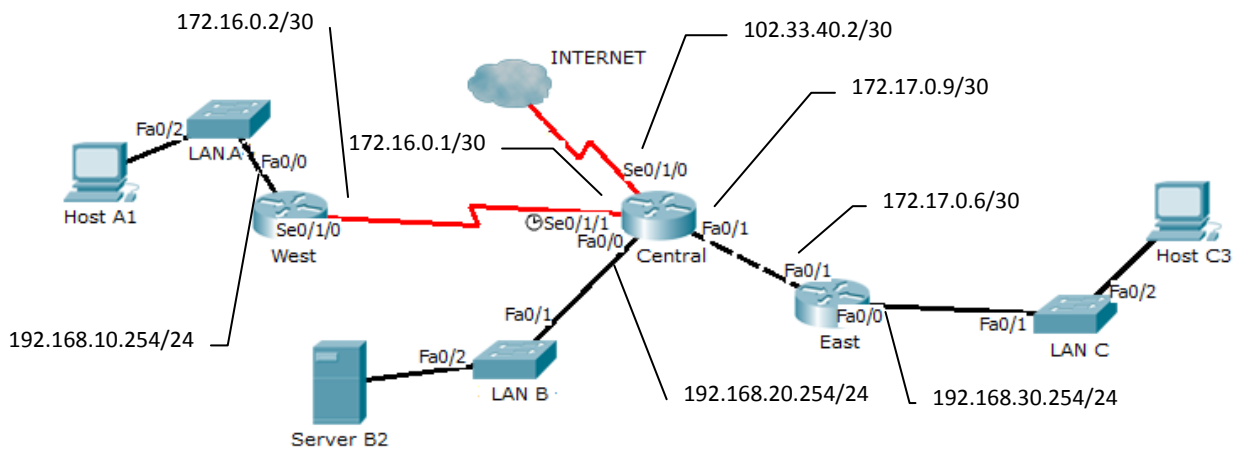R1(config)# **line con 0**   (1 pt)
R1(config-line)# **password CISCO**   (1 pt)
R1(config-line)# **login**   (1 pt)

Ερώτηση 2.   (Chapter 6,9) 2012β 2013α

The diagram below shows the network of an organisation. Recently, LAN C and the East Router were added to the network and at the same time network administrator decided to use RIPv2 for managing routing on the entire network. Routing configuration for each router is also shown.

West	Central	East

`router rip`
` version 2`
` network 172.16.0.0`
` network 192.168.10.0`
`ip classless`
	`router rip`
	` version 2`
	` network 172.17.0.0`
	` network 192.168.20.0`
	` default-information originate`
	`ip classless`
	`ip route 0.0.0.0 0.0.0.0 Se0/1/0`
		`router rip`
		` version 2`
		` network 172.17.0.0`
		` network 192.168.30.0`
		`ip classless`

During testing, it was found that Host C3 could only ping router East and Host A1 could only ping router West. Router Central could ping Server B2 and router West, but could not ping router East.

(a) The problems described above were caused by two different mistakes in the configuration of the network. Find and describe these faults.   (3 pts)

Fa0/1 of East and Fa0/1 of Central are on different subnets, so they cannot
Exchange packets (and RIP updates) (1.5pt)
Central does not include network 172.16.0.0 in RIP advertisements, so West
gets no RIP updates   (1.5pt)

(b) Give the necessary configuration commands to correct these mistakes. State clearly to which router each command should be applied. Assume routers are in global configuration mode.
        (3 pts)

Central (config)# router rip   (0.5 pt)
Central (config-router)# network 172.16.0.0   (1 pt)

East (config)# interface fa 0/1 OR Central (config)# interface fa 0/1   (0.5 pt)
East (config-if)# ip address 172.17.0.10 255.255.255.252
OR Central (config-if)# ip address 172.17.0.5 255.255.255.252   (1pt)

(c) Give the necessary configuration commands to enable in-band (telnet) management of router West, using a password 9455w0Rd with strong encryption. Assume the router is initially in global configuration mode.   (2 pts)

West (config)# service password-encryption   (0.5 pt)
West (config)# line vty 0 4   (0.5 pt)
West (config-line)# password 9455w0rd   (0.5 pt)
West (config-line)# login   (0.5 pt)

Ερώτηση 3.   (Chapter 5) 2013α

Consider the routing table of router R1 shown below and answer the questions that follow:

R1#**show ip route**
<Output omitted>

Gateway of last resort is not set

C   172.17.0.0/16 is directly connected, Serial0/1/0
C   192.168.1.0/24 is directly connected, FastEthernet0/0
C   192.168.2.0/24 is directly connected, FastEthernet0/1
R   192.168.3.0/24 [120/1] via 172.17.0.2, 00:00:14, Serial0/1/0
R   192.168.4.0/24 [120/1] via 172.17.0.2, 00:00:14, Serial0/1/0

(a) Which networks are directly connected to this router? (indicate network number and subnet mask for each one)   (2 pts)

172.17.0.0 255.255.0.0	Network No 0.5 pt
192.168.1.0 255.255.255.0	Network No 0.5 pt
192.168.2.0 255.255.255.0	Network No 0.5 pt
0.5 pt for all s/n masks	

(b) Which networks have been learned from another router? (indicate network number/subnet mask for each one and the routing protocol used)   (2 pts)

192.168.3.0 255.255.255.0 via RIP Network No 0.5 pt each s/n mask 0.25 pt RIP 0.25
192.168.4.0 255.255.255.0 via RIP Network No 0.5 pt each s/n mask 0.25 pt RIP 0.25

(c) Draw a network diagram showing router R1, the above networks and any other routers required.   (4 pts)
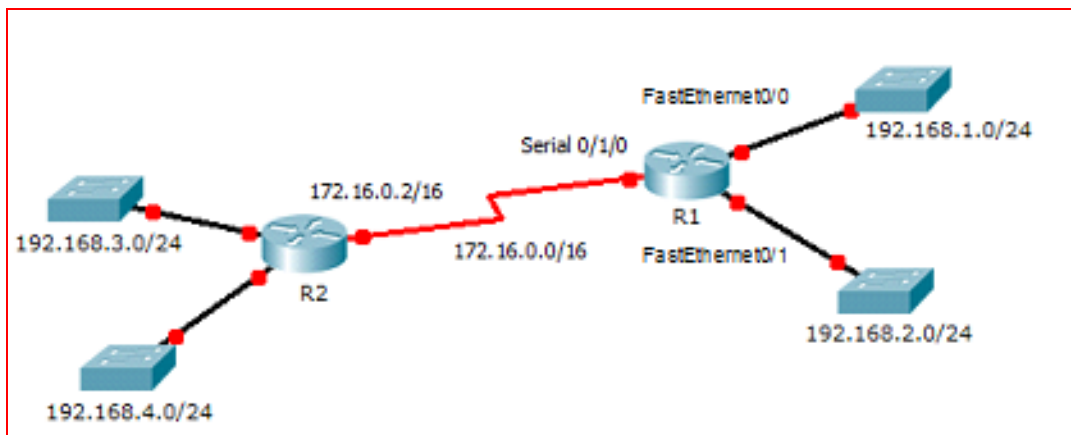
ΜΕΡΟΣ Δ (16 Μονάδες)
Να απαντήσετε στην πιο κάτω ερώτηση.
2012β 2013α

It has been decided to create a network of 12 small shops by subnetting 10.1.1.0/24 to create 12 subnets, one for each shop. In each shop there will be 3 computers, 2 network printers and 4 VoIP telephones. Assuming that there is no problem to use first (subnet 0) and last subnet, answer the following questions:

(a) How many bits must be borrowed from the host portion to implement the solution to this problem?   (2 pts)

   4 (2x >= 12, άρα x = 4)

(b) What is the total number of subnets this solution will provide?   (2 pts)

   2^4 = 16 (12 σήμερα και περιορισμένη πρόνοια για επέκταση)

(c) How many network devices can be connected to each subnet?   (2 pts)

   Μέχρι και 14 (Απομένουν 4 bits για το host portion, 2^4 – 2 = 14)

(d) Fill in the following network addressing table for the first three and the last two subnets. (7 pts)

Subnet	Subnet Address	Useable Addresses	Broadcast Address
0	10.1.1.0	10.1.1.1 - 10.1.1.14	10.1.1.15
1	10.1.1.16	10.1.1.17 - 10.1.1.30	10.1.1.31
2	10.1.1.32	10.1.1.33 - 10.1.1.46	10.1.1.47
...	...	...	...
14	10.1.1.224	10.1.1.225 - 10.1.1.238	10.1.1.239
15	10.1.1.240	10.1.1.241 - 10.1.1.254	10.1.1.255

Εναλλακτικά για τα τελευταία 2 ορθές απαντήσεις θεωρούνται επίσης:
10	10.1.1.160	10.1.1.161-10.1.1.174	10.1.1.175
11	10.1.1.176	10.1.1.177-10.1.1.190	10.1.1.191

(e) The networks of all the shops will be connected to a Central router and also to neighbouring shops to provide redundancy, as shown in the diagram below. The network administrator is considering whether to use static or dynamic routing to enable the shops to communicate with each other. State one advantage for static routing and one for dynamic routing to help him/her decide. What type of routing (static or dynamic) is preferable in this network and why?   (3 pts)
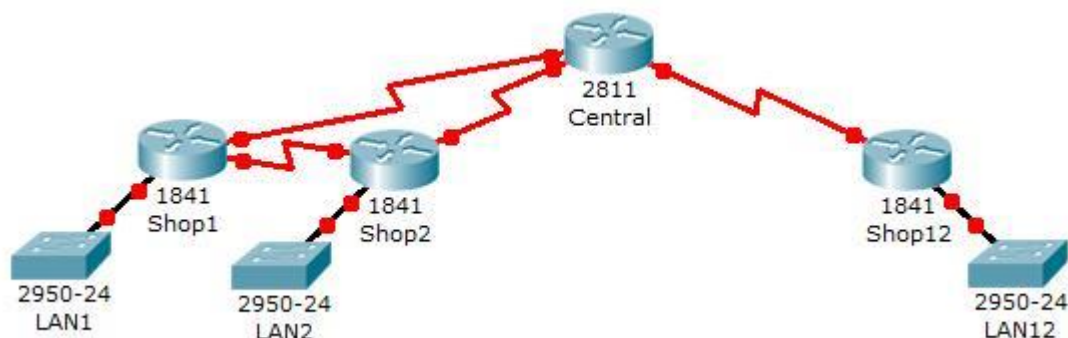
Static routing advantages (1 pt for any one of the advantages)
        Simple to implement
        Do not require additional router resources (RAM/CPU)
Dynamic routing advantages (1 pt for any one of the advantages)
        Faster to converge in case of dynamic changes
        Easier administration for larger or complex networks (smaller chance of routing loops)
Dynamic routing is more suitable in this network, because it will make administration easier since we have 12 networks with several interconnections. (1 pt)

ΤΕΛΟΣ ΕΞΕΤΑΣΗΣ