ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΠΟΛΙΤΙΣΜΟΥ
ΔΙΕΥΘΥΝΣΗ   ΜΕΣΗΣ   ΕΚΠΑΙΔΕΥΣΗΣ
ΛΕΥΚΩΣΙΑ

ΠΑΓΚΥΠΡΙΕΣ ΓΡΑΠΤΕΣ ΕΞΕΤΑΣΕΙΣ 2010 (ΓΙΑ ΑΠΟΛΥΣΗ)

Α΄ ΣΕΙΡΑ ΕΞΕΤΑΣΕΩΝ

ΜΑΘΗΜΑ	**: ΔΙΚΤΥΑ - CISCO**
ΧΡΟΝΟΣ	**: 2 ώρες**
ΗΜΕΡΟΜΗΝΙΑ	**: 10 Μαΐου**
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)

Which command tests for end-to-end device connectivity?
    (a) netstat
    (b) nslookup
    (c) ipconfig
    (d) tracert
    (e) arp

Ερώτηση 2. (Chapter 1)
Which device connects a local LAN to a geographically separate network?
    (a) switch
    (b) hub
    (c) router
    (d) bridge

Ερώτηση 3. (Chapter 2)
Which is a function of the transport layer of the OSI model?
    (a) routes data between networks
    (b) converts data to bits for transmission
    (c) delivers data reliably across the network using TCP
    (d) formats and encodes data for transmission
    (e) transmits data to the next directly connected device

Ερώτηση 4. (Chapter 2)

Which address is used by the router to direct a packet between networks?
    (a) source MAC address
    (b) destination MAC address
    (c) source IP address
    (d) destination IP address

Ερώτηση 5. (Chapter 3)
What is the benefit for a company to use an ISR router?
    (a) An ISR provides the functionality of a switch, router, and firewall in one device.
    (b) ISRs use a PC operating system for routing traffic, thus simplifying configuration and management.
    (c) An ISR is immune to security attacks by hackers and so replaces all other network security measures.
    (d) ISRs make routing decisions at OSI Layer 7, thus providing more intelligence to the network than do other routers.

Ερώτηση 6.   (Chapter 3)
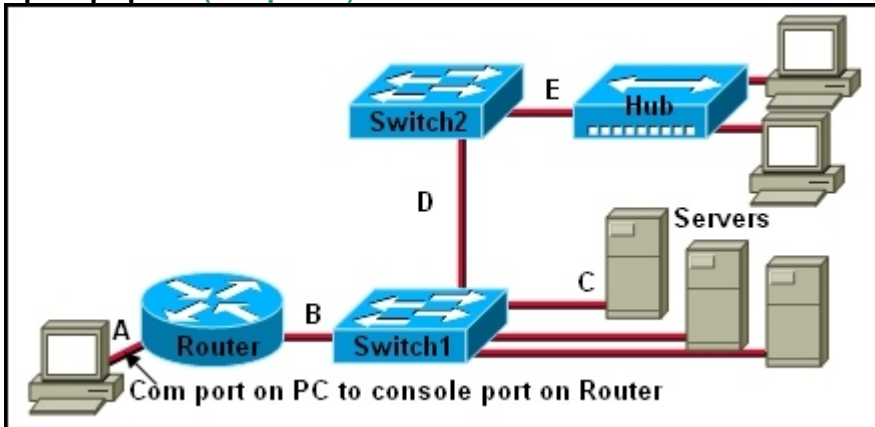
Refer to the exhibit. Which type of twisted pair cable is used between each device?

   (a) A=console, B=straight, C=crossover, D= crossover, E=straight
   (b) A=straight, B=straight, C=straight, D=crossover, E=console
   (c) A=console, B=straight, C=straight, D=crossover, E=crossover
   (d) A=crossover, B=straight, C=straight, D=crossover, E=crossover

Ερώτηση 7.   (Chapter 4)
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) 192.168.32.255
   (e) 192.168.255.255

Ερώτηση 8.   (Chapter 4)
Which option shows the proper notation for an IPv6 address?
   (a) 2001,0db8,3c55,0015,abcd,ff13
   (b) 2001:0db8:3c55:0015::abcd:ff13
   (c) 2001-0db8-3c55-0015-abcd-ff13
   (d) 2001.0db8.3c55.0015.abcd.ff13

Ερώτηση 9.   (Chapter 4)
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 10. (Chapter 5)
A network administrator needs to configure a router. Which of the following connection methods requires network functionality to be accessible?
   (a) console
   (b) RS232
   (c) AUX
   (d) Telnet
   (e) Modem

Ερώτηση 11. (Chapter 5)

A router has been switched on. Which of the following will be executed first?
- (a) Load start-up configuration
- (b) Load the operating system from flash
- (c) Load he operating system from a TFTP server
- (d) Bootstrap
- (e) POST

Ερώτηση 12. (Chapter 5)

Which of the following is true about the router's flash memory?
- (a) It stores a router's configuration file
- (b) It maintains the image of the operating system
- (c) It maintains the POST software
- (d) It maintains the bootstrap programme
- (e) It stores the running configuration of the router
- (f) It stores the routing table

Ερώτηση 13. (Chapter 5)

Refer to the exhibit. What can be determined about the network from the exhibited output?

```
MontegoBay> show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
          S - Switch, H - Host, I - IGMP, r - Repeater

Device ID      Local Intrfce   Holdtme   Capability Platform         Port ID
Negril         Ser 0/1         146          R       2620             Ser 0/1
Lucia          Ser 0/0         175          R       2621             Ser 0/0
MBSwitch       Fas 0/0         155          S I     WS-C2950-2        Fas 0/11
```

- (a) The MontegoBay router does not have any LAN interfaces configured.
- (b) The Negril router is connected to the S0/1 interface of the MontegoBay router.
- (c) There are only four devices in this network.
- (d) Layer 3 is functioning properly on all routers.
- (e) The MBSwitch is connected to the Negril, Lucia, and MontegoBay routers.

Ερώτηση 14. (Chapter 6)

What is the purpose of a routing protocol?
- (a) It is used for building and maintaining ARP tables
- (b) It is used to automatically configure the IP address of a router interface
- (c) It changes private IP addresses to public, so that a packet can travel through the Internet
- (d) It is used for de-encapsulating and encapsulating packets on different interfaces
- (e) It allows a router to share information about known networks with other routers

Ερώτηση 15. (Chapter 6)

Which routing protocol is used to exchange data between two different ISPs?
- (a) BGP
- (b) EIGRP
- (c) OSPF
- (d) ARP
- (e) RIP v2

Ερώτηση 16. (Chapter 7)
What is the function of the TCP three-way handshake?

    (a) It enables the synchronization of port numbers between source and destination hosts.
    (b) It immediately triggers the retransmission of lost data.
    (c) It synchronizes both ends of a connection by allowing both sides to agree upon initial sequence numbers.
    (d) It identifies the source application on the sending host.
    (e) It identifies the destination application on the receiving host.

Ερώτηση 17. (Chapter 7)

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

Ερώτηση 18. (Chapter 8)
What is the term for the public network between the boundary router and the firewall?
    (a) clean LAN
    (b) public LAN
    (c) intranet
    (d) extranet
    (e) DMZ

Ερώτηση 19. (Chapter 8)
A router is configured with a security feature that inspects network packets and only permits those that are responses to legitimate requests. What is the name of this feature?
    (a) Packet blocker
    (b) Port filtering
    (c) Proxy filtering
    (d) Stateful packet inspection
    (e) Intrusion alert

Ερώτηση 20. (Chapter 9)

The command `show interfaces serial 0/1` on a Cisco router has produced the output
Serial 0/1 is administratively down, line protocol is down.
Which of the following can be determined?

    (a) Interface Serial 0/1 has not been configured with an IP address
    (b) Interface Serial 0/1 has no cable connected to it.
    (c) Interface Serial 0/1 has been shut down by the administrator.
    (d) A cable is connected to interface Serial 0/1 but no keepalives are received.
    (e) There is a high error rate on Serial 0/1 and the system has automatically disabled it.

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

Ερώτηση 1.   (Chapter 5)

Fill in the blanks in the following statements, which relate to the configuration of a router:
(1 pt for each statement)

a. The command to switch from user mode to privileged mode is __enable__ .
b. The command to back up the current configuration to a TFTP server is
   __copy running-config tftp__ .
c. The command to reboot the router is __reload__ .
d. The command to display devices found by the Cisco discovery protocol (CDP) is
   __show cdp neighbors__ .
e. The start-up configuration file is kept in the __NVRAM__ memory of the router.
f. If a router fails to boot an IOS correctly, it will boot into __ROM__ __monitor__ mode.

Ερώτηση 2.   (Chapter 6)

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

```
R 192.168.50.0/24 [120/2] via 192.168.10.1, 00:00:24, Serial0/1
```

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

a. This route was set up using the __RIP__ routing protocol.
b. The value 120 is called the __administrative__ __distance__ .
c. This route tells the router where to forward packets for network __192.168.50.0/24__ .
d. The **next hop** interface address is __192.168.10.1__ .
e. A packet sent via this route will have to pass through another __2__ routers before reaching the destination network.
f. The next update for this route is expected in __6__ seconds.

Ερώτηση 3.   (Chapter 6)

Correspond each of the routing protocols on the left with the characteristics on the right. Some routing protocols appear in more than one answer.   (1 pt each)

Routing Protocol	A/A	Characteristics	Answer
RIP	a.	Non-proprietary link state protocol	OSPF
OSPF	b.	Uses the Diffused Update Algorithm (DUAL) to calculate the shortest path to a destination	EIGRP
EIGRP	c.	Manages routing between Autonomous Systems (AS)	BGP
BGP	d.	Supports routing up to a maximum of 15 hops	RIP
	e.	Maintains a topological map of the whole network in each router	OSPF
	f.	Uses hop count as its default metric	RIP

Ερώτηση 4.   (Chapter 9)

State the names of the three <u>systematic</u> troubleshooting techniques and give a brief description of each, with reference to the OSI model.   (2 pts each)

Botom-up: Ξεκινούμε από το φυσικό επίπεδο (καλώδια) και ελέγχουμε προς τα ανώτερα επίπεδα

top-down: Ξεκινούμε από το επίπεδο της εφαρμογής και ελέγχουμε προς τα κατώτερα επίπεδα

divide-and-conquer: Ξεκινούμε από κάποιο μεσαίο επίπεδο (συνήθως network layer) και αναλόγως των ευρημάτων αποκλείουμε το πρόβλημα να συμβαίνει στα ανώτερα ή κατώτερα επίπεδα, περιορίζοντας έτσι τη περιοχή ελέγχου.

Ερώτηση 5.   (Chapter 9)

Match the protocol name to the port number. Write the correct answer in the column **port answer** (some port numbers will not be used).   (1 pt each)

Port numbers
21
22
23
25
53
67
80
1023
8000

A/A	Protocol	port answer
a.	FTP	21
b.	SMTP	25
c.	TELNET	23
d.	HTTP	80
e.	DHCP	67
f.	DNS	53

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

Ερώτηση 1.   **(Chapter 5)**
Write the necessary commands for configuring a router to have the passwords set as in the table below. All passwords should appear <u>encrypted</u> in the configuration file and the privileged mode password <u>should have strong encryption</u>. The first two commands are given.

Privileged mode password	DISCOVERY
Console password	CISCOadmin
Telnet password (for all telnet connections)	guesswhat

Router>enable
Router#config t
Router(config)# service password-encryption (1pt)_____
Router(config)#enable secret DISCOVERY (1 pt)_____
Router(config)#line console 0 (1 pt)_____
Router(config-line)#login (1 pt)_____
Router(config-line)#password CISCOadmin (1 pt)_____
Router(config-line)#exit (optional)_____
Router(config)#line vty 0 4 (1 pt)_____
Router(config-line)#login (1 pt)_____
Router(config-line)#password guesswhat (1pt)_____

Ερώτηση 2.   **(Chapter 5)**

Write the necessary commands to configure the following interfaces on a router. After configuration, the router should be left in privileged EXEC mode (not in configuration mode):

Interface	IP Address	Comment
FA 0/1	192.168.10.1	
Serial 0/0	192.168.42.1	Act as DCE at 56000 bps

Router>enable
Router#conf t
Router(config)#interface fa 0/1_____
Router(config-if)#ip address 192.168.10.1 255.255.255.0_____
Router(config-if)#no shutdown_____
Router(config-if)#exit (optional)_____
Router(config)#interface s 0/0_____
Router(config-if)#ip address 192.168.42.1 255.255.255.0_____
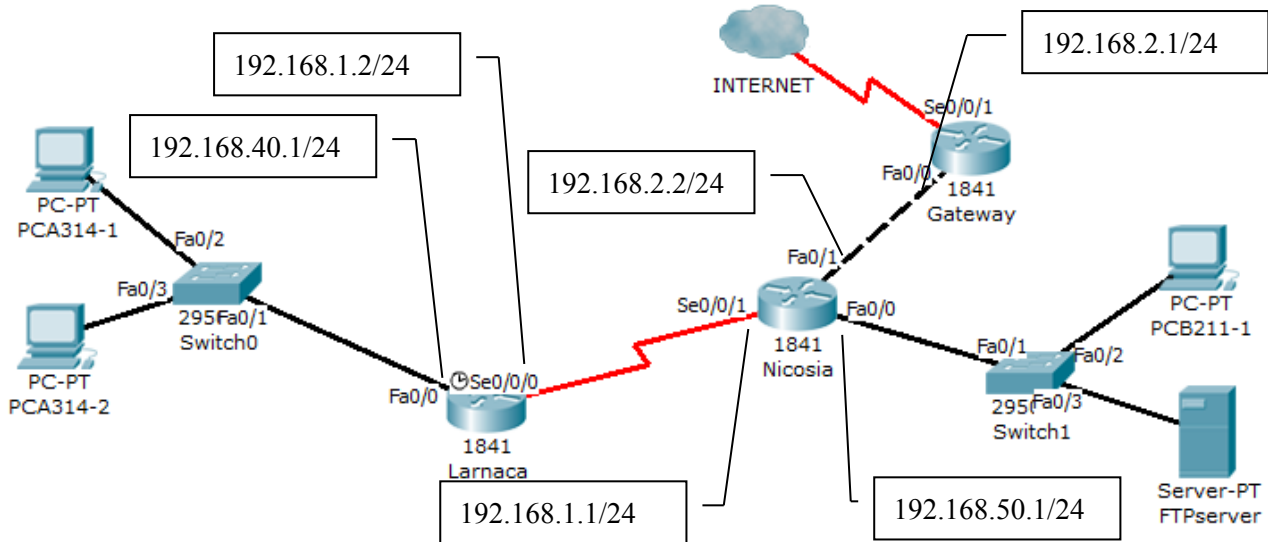Router(config-if)#clock rate 56000_____
Router(config-if)#no shutdown_____
Router(config-if)#exit + exit (or CTRL+Z)_____

Ερώτηση 3.
Answer the following questions based on the network below:

a. Give the necessary commands for configuring RIP v2 on routers Larnaca and Nicosia, so that routes to all connected networks are created on both routers. Assume that both routers are initially in global configuration mode. You must clearly indicate which commands should be entered on Nicosia and which commands should be entered on Larnaca.   (6 pts)

Nicosia (config)# **router rip**   (1pt για την πρώτη χρήση της εντολής)
Nicosia (config-router)# **version 2** (1pt για την πρώτη χρήση της εντολής)
Nicosia (config-router)# **network 192.168.50.0** (1pt για την 1 χρήση της εντολής)
Nicosia (config-router)# **network 192.168.2.0** (0.5 pt)
Nicosia (config-router)# **network 192.168.1.0** (0.5 pt)
Larnaca (config)# **router rip**   (0.5 pt)
Larnaca (config-router)# **version 2**   (0.5 pt)
Larnaca (config-router)# **network 192.168.40.0** (0.5 pt)
Larnaca (config-router)# **network 192.168.1.0** (0.5 pt)

b. Write the necessary commands to set up the default route of router Nicosia and router Larnaca, so that packets to unknown networks are forwarded to router Gateway.   (2 pts)

`Nicosia(config)#` ip route 0.0.0.0 0.0.0.0 192.168.2.1

`Larnaca(config)#` ip route 0.0.0.0 0.0.0.0 192.168.1.1 (or s 0/0/0)

ΜΕΡΟΣ Δ (16 Μονάδες)
Να απαντήσετε στην πιο κάτω ερώτηση.
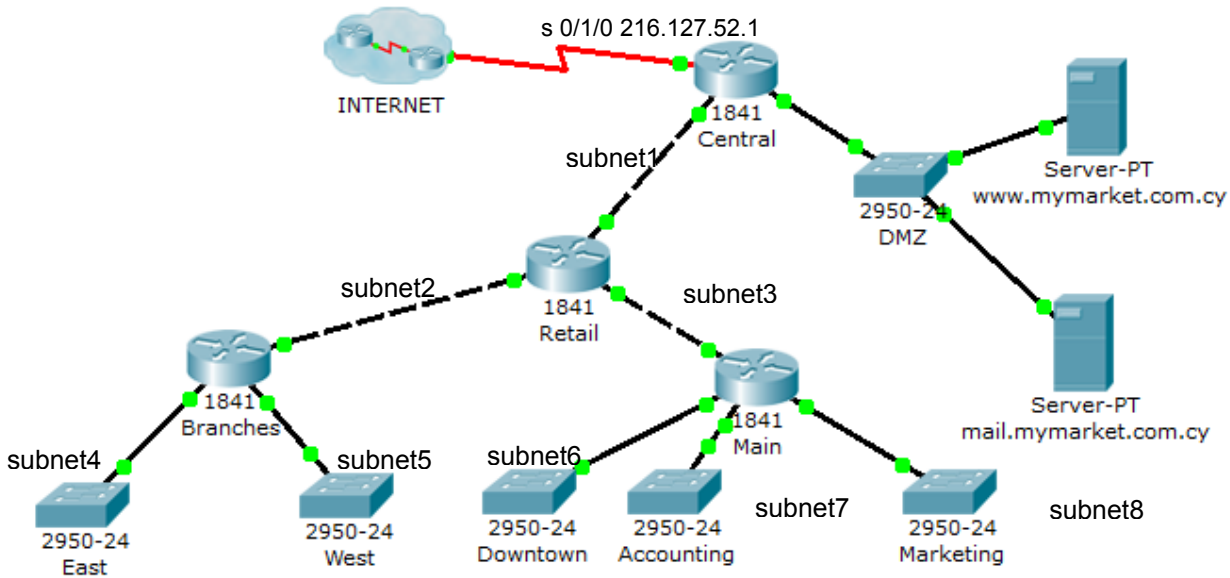
Consider the above network diagram, which shows the network of MyMarket, a supermarket chain. The five departments/branches and the remaining subnets (subnet1–subnet8) must be assigned addresses, by subnetting network 192.168.200.0. Each of the five departments (subnet4 to subnet8) can have **up to 12 hosts** and the company wishes to have the **maximum number of possible spare subnets for future expansion**.
Answer the following questions:

a. How many bits must be borrowed from the host part to create these subnets?

    4
    (2 pts)

b. What is the subnet mask for these subnets?
    255.255.255.240
    (1 pt)

c. How many subnets in total can we have on this network?

    16
    (1 pt)

d. How many <u>spare subnets</u> are available for future expansion? (assume all subnets are useable.)

    8
    (1 pt)

e. Assign the first available subnet to subnet1, the second to subnet2, and so on and fill in the following table. Assign the first useable IP address as the default gateway of each subnet:
    (8 pts)

Subnet	Subnet address	Default gateway	Broadcast address
Subnet1	192.168.200.0	192.168.200.1	192.168.200.15
subnet2	192.168.200.16	192.168.200.17	192.168.200.31

subnet3	192.168.200.32	192.168.200.33	192.168.200.47
subnet4 (East)	192.168.200.48	192.168.200.49	192.168.200.63
subnet5 (West)	192.168.200.64	192.168.200.65	192.168.200.79
subnet6 (Downtown)	192.168.200.80	192.168.200.81	192.168.200.95
subnet7 (Accounting)	192.168.200.96	192.168.200.97	192.168.200.111
subnet8 (Marketing)	192.168.200.112	192.168.200.113	192.168.200.127

f. The following configuration file is loaded to a router. Identify and describe briefly three problems, which relate to the configuration settings provided in this file. (3 pts)

```
!
interface FastEthernet0/0
ip address 192.168.100.33 255.255.255.192
no shutdown
!
interface FastEthernet0/1
ip address 192.168.100.62 255.255.255.224
no shutdown
!
interface Serial0/0/0
ip address 19.25.32.16 255.255.255.252
encapsulation ppp
no shutdown
!
interface Serial0/0/1
encapsulation ppp
ip address 172.12.32.31 255.255.255.240
no shutdown
!
```

(a) FastEthernet 0/0 and FastEthernet 0/1 have overlapping subnets
(b) Serial 0/0/0 has been assigned a network address
(c) Serial 0/0/1 has been assigned a broadcast address

ΤΕΛΟΣ ΕΞΕΤΑΣΗΣ