UCLM
UNIVERSIDAD DE CASTILLA-LA MANCHA

Computer Networks II

Curso 16/17 :: Test 2

Escuela Superior de Informática

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This exam consists of 23 question totalling 40 points. The maximum duration is 80 minutes. Three wrong answers substract a point. Only an answer if correct if otherwise not stated. Calculator use is forbidden. Write legibly using only the reserved space.

Apellidos: _____ Nombre: _____ Grupo: _____

1. [1p] In what case does it make sense to consider flow control, but not congestion control?
   - ☐ **a)** On a point-to-point link.
   - ☐ **b)** In a WAN consisting of heterogeneous routers.
   - ☐ **c)** In a TCP-based client-server application.
   - ☐ **d)** When error-free transmission media are considered.

2. [1p] There is an isolated Ethernet switch and several conventional PCs and also resource constrained computers (such as Raspberry Pi) are connected to it. Which of the following mechanisms do you think will be most likely may happen?
   - ☐ **a)** 802.1Q
   - ☐ **b)** Spanning Tree Protocol.
   - ☐ **c)** TCP congestion control.
   - ☐ **d)** TCP flow control.

3. [1p] **Flooding** routing algorithm consists of...
   - ☐ **a)** Sending the packages over a given interface.
   - ☐ **b)** Each arriving packet is forwarded to the other interfaces.
   - ☐ **c)** Exchange information about the networks to which the different routers are connected.
   - ☐ **d)** Each router has a table that indicates the best known distance to any other router from another subnet and the output to reach it.

4. [1p] What is an IP tunnel?
   - ☐ **a)** None is right.
   - ☐ **b)** A combination of the Cisco L2F and PPTP protocol.
   - ☐ **c)** Encapsulation of IP packets over another protocol, simulating a point-to-point link.
   - ☐ **d)** An IP address that is used to reach a network other than the network in the package is.

5. [1p] What does **NOT** appear in the NAPT table?
   - ☐ **a)** The exposed ports of the router.
   - ☐ **b)** The external IP address of the router.
   - ☐ **c)** The used transport protocols.
   - ☐ **d)** The IP addresses of the internal hosts.

6. [1p] Choose the **FALSE** statement about NAT:
   - ☐ **a)** Usually NAT runs on the router that has the public IP.
   - ☐ **b)** It requires many IP addresses on the network and this reduces performance.
   - ☐ **c)** It allows to the hosts with private addresses to access to Internet.
   - ☐ **d)** It uses the "port forwarding"technique to give access to an internal server since the public network.

7. [1p] What is a VPN feature?
   - ☐ **a)** Usually used to connect two neighbor devices.
   - ☐ **b)** Provides end-to-end encryption at the application level.
   - ☐ **c)** It allows to *out-site* users to access the corporate network.
   - ☐ **d)** Used to connect a device to the internal corporate network with public IP.

8. [1p] Over what protocol do you get more performance when encapsulating TCP?
   - ☐ **a)** UDP
   - ☐ **b)** ICMP
   - ☐ **c)** ARP
   - ☐ **d)** IPv6

9. [1p] STP deactivates communication lines that produce loops between switches. But why do not to physically remove these cables if they produce problems?
   - ☐ **a)** Redundant links provide fault tolerance.
   - ☐ **b)** Redundant links reduce energy consumption and bandwidth.
   - ☐ **c)** The manufacturer forces to connect the high-end switches with several cables.
   - ☐ **d)** In switches with VLAN support there must be loops. Others do not need STP.

10. [1p] The entries in the MAC address table of a switch have a *expiration* in order to:
    - ☐ **a)** Increase network security.
    - ☐ **b)** Because it is necessary for the operation of the ARP protocol.
    - ☐ **c)** Enable team mobility.
    - ☐ **d)** None of the above.

11. [1p] Two hosts A and B are respectively connected to two VLANs. Among them the can exchange datagrams by means of a router. The IP address of A is 20.18.20.162/28. Which of the following looks like an appropriate address for B?
    - ☐ **a)** 20.18.20.158/28
    - ☐ **b)** 20.18.20.160/26
    - ☐ **c)** 20.18.20.164/28
    - ☐ **d)** 20.18.20.168/28

12. [1p] Indicate the longest mask network (with more ones) to which the addresses may 152.130.116.108 y 152.130.116.122 belong to.
    - ☐ **a)** 152.130.116.96/27
    - ☐ **b)** 152.116.0.0/24
    - ☐ **c)** 152.130.116.192/26
    - ☐ **d)** 152.130.116.132/28

13. [1p] In what case does an Ethernet switch behave like a hub?
    - ☐ **a)** Never, they are completely different devices.
    - ☐ **b)** When the source address of the frame is not in its table.
    - ☐ **c)** When the target address of the frame is not in its table.
    - ☐ **d)** When neither the destination address of the frame nor the source are not in its table.

14. [1p] In STP, the administrator can influence the choice of the root switch to prevent...
    - ☐ **a)** a perimeter switch is chosen.
    - ☐ **b)** choose a switch with few ports.
    - ☐ **c)** a switch with many ports is chosen.
    - ☐ **d)** an attack cut off access to the routers.

15. [1p] Frame Relay is a technology of...
    - ☐ **a)** Cells switching.
    - ☐ **b)** Dynamic routing.
    - ☐ **c)** Static routing.
    - ☐ **d)** Virtual circuit Switching.

16. [1p] Frame Relay is a technology that allows to create...
    - ☐ **a)** A full-meshed network.
    - ☐ **b)** Routing tables without default routes.
    - ☐ **c)** Simplex virtual links for two non-network devices.
    - ☐ **d)** Simplified switching tables to improve latency.

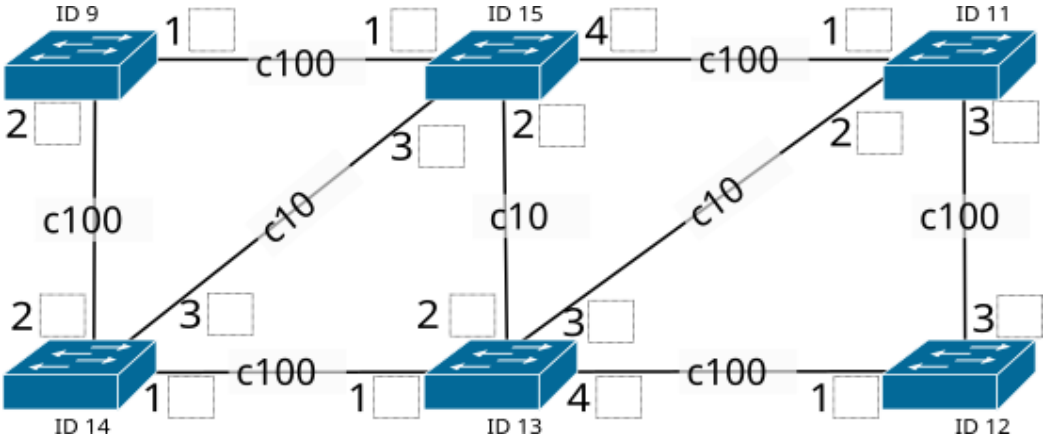
17. [1p] Mark the right statement about SONET:
    - ☐ **a)** It does not allow multiplexing.
    - ☐ **b)** It is not used in optical fiber.
    - ☐ **c)** It operates over transport layer.
    - ☐ **d)** Each frame is a two-dimensional byte array.

18. [1p] What is the advantage of IPv6 over IPv4 when fragmenting packages?
    - ☐ **a)** In IPv6 the routers do not fragment, just the source.
    - ☐ **b)** In IPv6 routers can also reassemble, but in IPv4 they can not.
    - ☐ **c)** In IPv6 it is not necessary to fragment because the MTU of all links is the same.
    - ☐ **d)** There is no difference, the fragmentation procedure has not changed.

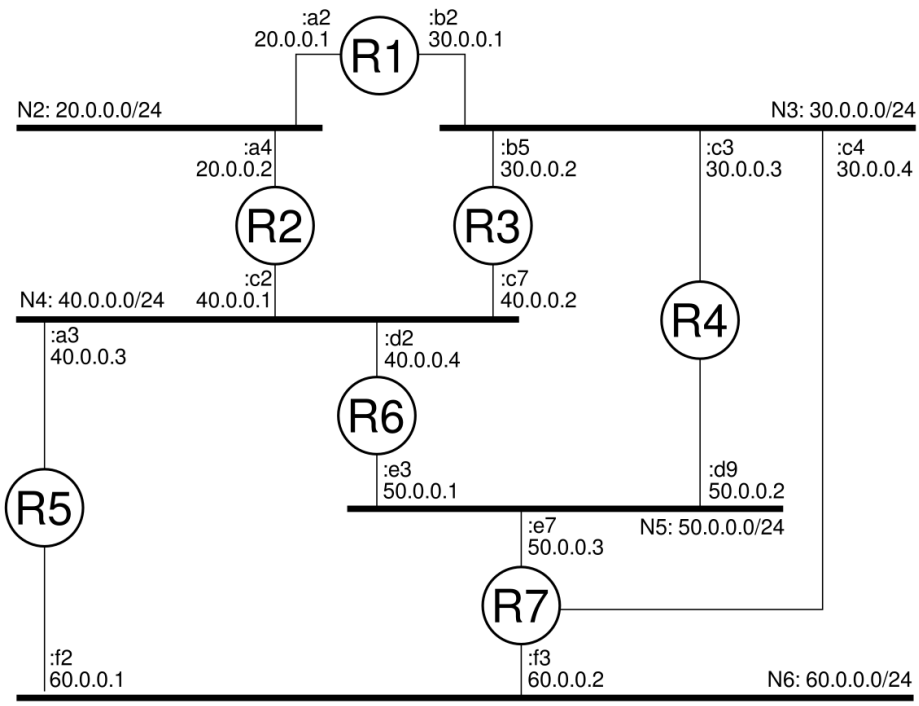
19. [1p] Why does not IPv6 use the ARP protocol?
    - ☐ **a)** The equivalence between physical and logical addresses is direct and can be deduced locally.
    - ☐ **b)** A new protocol called *Neighbor Discovery* is used and it allows to discover local routers too.
    - ☐ **c)** In IPv6 the problem is to find out the logical addresses, the physical ones are always known.
    - ☐ **d)** It is used, but only for *indirect deliveries*.

20. [1p] Mark the FALSE statement about ICMPv6.
    - ☐ **a)** It inherits all ICMPv4 functionality.
    - ☐ **b)** It incorporates multicast group management mechanisms.
    - ☐ **c)** It incorporates the mechanisms of neighbor discovery.
    - ☐ **d)** It incorporates the domain name translation mechanisms.

21. [7p] Six switches are interconnected to each other in accordance with the topology of the figure and with the indicated costs. Complete this figure as follows:
    - Specify the root switch (write Root"near to switch).
    - Mark the root port of each switch (write a R in the box).
    - Markl the designated ports for each LAN (write a D in the box).
    - Mark the blocked ports (write a B in the box).



22. [6p] Consider the following topology that uses a distance-vector protocol:



(a) What networks appear in the initial R7 distance-vector?

- ☐ **a)** N3 and N5
- ☐ **b)** N5 and N6
- ☐ **c)** N3, N5 and N6
- ☐ **d)** All of them

(b) Considering that direct delivery metric value is 0. What is the cost value of R1 to reach 60.0.0.12 when the routing protocol has converged?

- ☐ **a)** 1
- ☐ **b)** 2
- ☐ **c)** 3
- ☐ **d)** 4

(c) How many rows does the R6 distance-vector after convergence?

- ☐ **a)** 2
- ☐ **b)** 4
- ☐ **c)** 5
- ☐ **d)** 6

(d) How many rows does the R4 distance-vector after convergence?

- ☐ **a)** 4
- ☐ **b)** 5
- ☐ **c)** 6
- ☐ **d)** 7

(e) On the figure, draw the R4 route table after convergence.

(f) On the figure, draw the R5 route table after convergence.

23. [7p] From the block 192.168.0.0/16, you need to assign addresses to:
    - Subnet A for 150 devices (hosts and routers).
    - Subnet B for 128 devices.
    - Subnet C for 75 devices.
    - Serial links between routers.

    Choose the smallest block that can meet the indicated needs. Assign address space first to larger networks. Answer the following questions:

    (a) How many free assignable addresses are in subnet A?

    ☐ **a)** 0 ☐ **c)** 104
    ☐ **b)** 2 ☐ **d)** 128

    (b) What is the subnet B address?

    ☐ **a)** 192.168.0.150/25 ☐ **c)** 192.168.1.0/24
    ☐ **b)** 192.168.0.152/25 ☐ **d)** 192.168.1.2/24

    (c) What is the subnet C broadcast address?

    ☐ **a)** 192.168.0.127 ☐ **c)** 192.168.2.127
    ☐ **b)** 192.168.1.255 ☐ **d)** 192.168.2.255

    (d) How many free assignable addresses are in subnet C?

    ☐ **a)** 51 ☐ **c)** 55
    ☐ **b)** 53 ☐ **d)** 57

    (e) What are possible addresses for serial links?

    ☐ **a)** 192.168.0.1, 192.168.1.1 ☐ **c)** 192.168.2.127, 192.168.2.128
    ☐ **b)** 192.168.1.1, 192.168.2.1 ☐ **d)** 192.168.2.129, 192.168.2.130

    (f) Draw a possible topology and assign addresses to the routers required. Place at least two hosts on each network and assign them respectively the first and last direction of each block.