



**JARAMOGI OGINGA ODINGA UNIVERSITY
OF SCIENCE & TECHNOLOGY**

UNIVERSITY EXAMINATIONS 2012/2013

**1ST YEAR 1ST SEMESTER EXAMINATION FOR THE DEGREE
OF MASTER OF SCIENCE IN INFORMATION TECHNOLOGY**

(KISUMU L.CENTRE)

COURSE CODE: IIT 5113

COURSE TITLE: TCP/IP ARCHITECTURE & ENTERPRISE NETWORK

DATE: 14/8/2013

TIME: 9.00-12.00 NOON

DURATION: 3 HOURS

INSTRUCTIONS

- 1. This paper consists of 5 Questions.**
- 2. Answer Question 1 (Compulsory) and any other 2 questions.**
- 3. Write your answers on the answer booklet provided.**

SECTION A

(20 Marks)

Q1.

1. TCP/IP suite was created by
 - A. IEEE
 - B. Department of defence
 - C. Open source
 - D. None of above

2. Telnet protocol
 - A. allows user to connect client machine
 - B. transferring files
 - C. sharing files
 - D. none of above

3. Which protocol deals with emails
 - A. FTP
 - B. SMTP
 - C. LPD
 - D. X window

4. Which protocol deals with resolving domain names
 - A. X-Window
 - B. SMTP
 - C. DNS
 - D. FTP

5. Which protocol ensures reliable delivery
 - A. TCP
 - B. UDP
 - C. Both of above
 - D. None of above

6. Which protocol uses window flow system
 - A. UDP
 - B. TCP
 - C. FTP
 - D. None of above

7. ICMP works on which layer
 - A. Physical Layer
 - B. Datalink Layer
 - C. Network layer
 - D. Transport Layer

8. Which protocol finds the MAC address from IP address
 - A. SMTP
 - B. ICMP
 - C. ARP
 - D. RARP

9. Which IP is reserved for loopback testing
 - A. 192.168.0.0
 - B. 10.255.255.255
 - C. 255.0.0.0
 - D. None of above

10. Which layer of TCP/IP stack is equivalent to transport layer of OSI
 - A. Application layer
 - B. Host to Host layer
 - C. Internet
 - D. Network access

11. Which layer will be used while transmitting data using FTP or Telnet
 - A. Presentation
 - B. Application
 - C. Session
 - D. Transport

12. Which company developed TCP/IP protocol for networking
 - A. IBM
 - B. DEC
 - C. DARPA
 - D. Xerox

13. Which TCP/IP utility can tell you which server is the mail server for the domain foo.com?
 - A. FTP
 - B. nslookup
 - C. tracert
 - D. Telnet

14. A user we'll call Bob is experiencing what he calls "weird problems." The computer is constantly crashing and performs very slowly. In addition, people are sending Bob e-mails asking him to stop sending them e-mails when, in fact, he hasn't sent them any in months. What is the most likely cause of this problem?
 - A. Corrupt operating system
 - B. Corrupt application software
 - C. Virus infection
 - D. Network bottlenecks

15. RSA is a type of which of the following?
 - A. Data encryption
 - B. Network protocol
 - C. Purchase agreement
 - D. Firewall

16. What is the proper name for the device that connects a PC to an ISDN network?
 - A. Hub
 - B. Modem
 - C. Switch
 - D. Terminal adapter

17. VLANs are a feature primarily of which type of network device?
 - A. Hubs
 - B. Switches
 - C. NICs
 - D. Cable

18. Firewalls provide what primary benefit?
 - A. Increased network performance
 - B. Elimination of user training
 - C. Protection from threats on the Internet
 - D. Complete network security

19. Which part of a network interface card (NIC) identifies whether or not there is basic connectivity from the station to a hub or a switch?
 - A. Link light
 - B. Collision light
 - C. Port
 - D. Jumper

20. What is the name of the distance vector routing protocol for AppleTalk?
 - A. RIP
 - B. OSPF
 - C. NLSP
 - D. RTMP

21. Which version is the most current Windows server operating system?
 - A. Windows 2010 Server
 - B. Windows Server 2003
 - C. Windows 2013 Server
 - D. Windows Server 2012
 - E.

22. You are the network administrator for a small company. You come to work one morning and find that the server fails to boot. When it does boot, it has all kinds of configuration errors and data corruption. It was fine yesterday when you left work. You remember that there was a short power failure last night. What device would have prevented these problems?
- A. Router
 - B. Switch
 - C. NIC
 - D. UPS
23. IP version 6 (IPv6) uses how many bits in its addressing scheme?
- A. 16
 - B. 32
 - C. 64
 - D. 128
24. Which network installation tool can be used to connect UTP cable to a 110 block?
- A. Cable tester
 - B. Wire crimper
 - C. Media installer
 - D. Punchdown tool
25. Which remote access protocol is used to allow remote application execution?
- A. PPP
 - B. PPTP
 - C. ICA
 - D. RAS
26. Which network device is used to connect dissimilar network technologies at any level of the OSI model?
- A. Bridge
 - B. Router
 - C. Switch
 - D. Gateway
27. At which level of the OSI model does routing occur?
- A. Application
 - B. Network
 - C. Data Link
 - D. Physical
28. Which of the following is an example of an IPv6 address?
- A. ::000F:ABCD:0003
 - B. 123456.132455.119499.201333.111111.010111
 - C. 134.129.51.99
 - D. 275.13.202.100

29. You are the administrator for a 10-station peer-to-peer network that is connected to the Internet. All of the workstations are running TCP/IP, and the server is running IPX/SPX. Unfortunately, your network is having a problem: None of the users can connect to the server. The server can see itself on the network. What do you suspect is the problem?
- A. A hacker has changed addresses on the server.
 - B. The clients' NICs are configured incorrectly.
 - C. The server is using an incorrect protocol.
 - D. The Internet connection is configured incorrectly.
30. The process of grouping computers for fault tolerance and load balancing is known as _____.
- A. grouping
 - B. clustering
 - C. loading
 - D. parceling
31. What additional item is required to connect a PC to a DSL modem?
- A. NIC
 - B. Modem
 - C. Terminal adapter
 - D. Switch
32. Which port number is used for DNS?
- A. TCP port 10
 - B. UDP port 23
 - C. TCP port 29
 - D. UDP port 53
33. An ISDN B channel typically carries how much data?
- A. 4Kbps
 - B. 16Kbps
 - C. 32Kbps
 - D. 64Kbps
34. Which network security implementation will decrease the apparent speed of Internet access?
- A. Password requirement
 - B. Firewall
 - C. Proxy server
 - D. Blocking the ICMP port
35. Which network setting in Windows 9x configures a workstation for DHCP?
- A. Obtain IP Address Automatically
 - B. DHCP Enable
 - C. Use DHCP for Address
 - D. Get IP Address through DHCP

36. Of those listed, which Internet connection type has the most bandwidth?
- A. OC-3
 - B. ISDN
 - C. T1
 - D. POTS
37. Which protocol is primarily used to provide TCP/IP over dial-up Internet connections?
- A. PPP
 - B. ICA
 - C. RAS
 - D. SONET
38. An HTTP proxy cache server will increase the apparent performance of what activity?
- A. Bank transactions
 - B. Web browsing
 - C. Network login
 - D. Screen refreshes

SECTION B

Q1:

- a) With the aid of a diagram, differentiate between OSI Model and TCP/IP Model **(8 Marks)**
- (i) Which layer of the OSI model ensures reliable, end-to-end communications?
 - (ii) Which layer of the OSI model provides routing functionality?
 - (iii) Which layer of the OSI model translates the data from upper-layer protocols into electrical signals and places them on the network media?
 - (iv) At which OSI model layer do routers primarily operate?
- b) Answer the following questions: **(4 Marks).**
- (i) You are a consultant designing a network for a company with more than 1000 users. Which 802 standard would you implement to ensure that bandwidth would be sufficient and equal without bridging or additional segments?
 - (ii) You are the administrator of a 100-node Ethernet network. Your users are complaining of slow network speeds. What could you replace your hub with to increase your network throughput?

c) Briefly explain the difference between hub, bridge, switch and a router. Among the listed devices, which the device(s):

- (i) will not propagate broadcasts from one of its interfaces to another?
- (ii) increases the number of collision domains while decreasing the average number of nodes per collision domain? **(4 Marks)**

d) Differentiate between HTTP, TCP, IP, TFTP, NetBIOS, and UDP protocols. Among the listed protocols, which ones:

- a) uses a connectionless transport?
- b) uses a connection-oriented transport? **(4 Marks)**

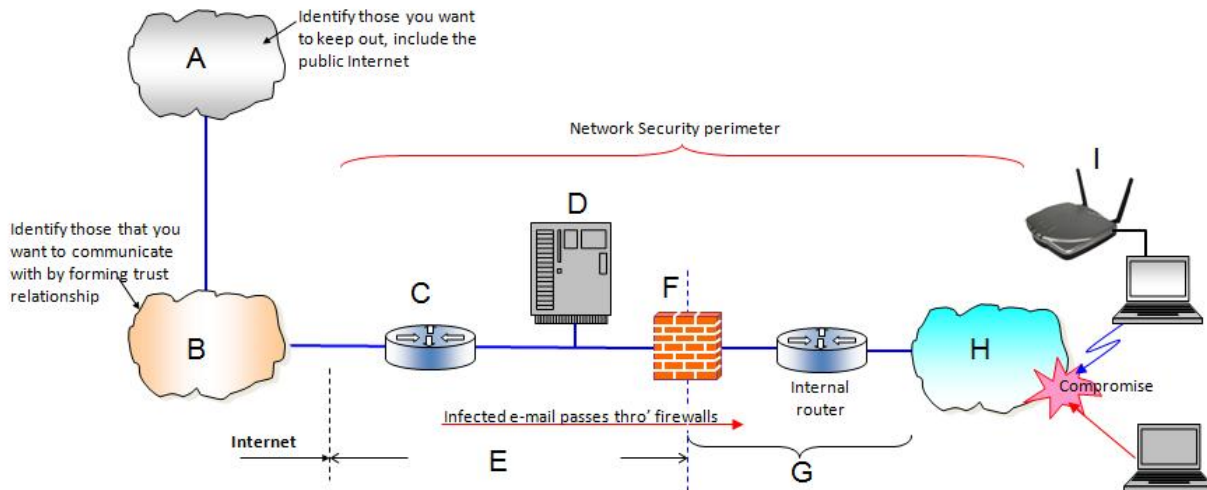
Q2. Proxy Server & Firewalls

a) Briefly explain the critical function of a firewall in IT network. **(2 Marks)**

b) From the figure shown below, identify components shown in letters A to I. **(7 Marks)**

c) Under letter D, list the servers that normally are placed here and why? **(3 Marks)**

d) Under H, we have an explosion listed as compromise; briefly explain what might have caused it. **(2 Marks)**



Select the Right Answer(s) and Explain Why?

e) What is an initial step in creating a proper firewall policy? **(3 Marks)**

f) Which of the following is often used as a detection and deterrent control against Internet attacks? **(2 Marks)**

Q3. Networking

- a) Using network diagram, explain the difference between various networking topologies. (3 Marks)
- b) Why is Mesh topology better than other networking topologies (2 Marks)
- c) Explain briefly the difference between a hub, bridge, switch and router. (4 Marks)
- d) You work as the enterprise administrator at Company.com. The Company.com network consists of a single Active Directory domain named Company.com. Company.com has its headquarters located in Miami. The Company.com network servers run Microsoft Windows Server 2008 and the client computers run Microsoft Windows Vista.

Company.com currently makes use of a computer named Company-SR01 configured as the corporate Virtual Private Network (VPN) server. Company.com has remote users working outside the office who access and transmit sensitive information to Company-SR01.

The Company.com written security policy states that the user or computer accessing Company-SR01 should make use of Public Key Infrastructure (PKI) to connect to the domain for transmission of the sensitive data. Company.com wants you to ensure that Company-SR01 is configured to comply with the security policy. What should you do? (3 Marks)

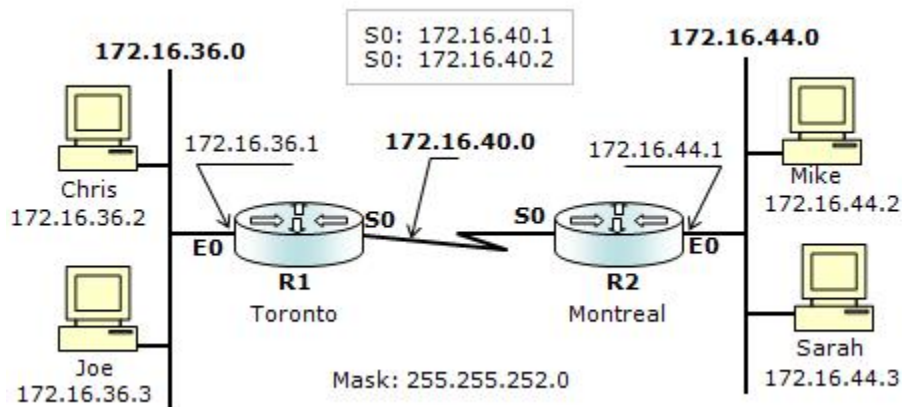
- e) The two key components of a digital signature include the secure hash algorithm and a ___ ? (1 Marks)
- f) Briefly explain the different types of backup methods. Which backup method clears the archive bit and is the shortest to perform but takes the longest to restore? (3 Marks)
- g) Which is the standard security algorithm developed in 1975 that uses 56-bit symmetric key encryption? (1 Marks)
- h) A ___ is an electronic security mark that can indicate the publisher of the software, as well as whether someone has changed the original contents of the driver package. If a driver has been signed by a publisher that has verified its identity with a ___ , you can be confident that the driver actually comes from that publisher and hasn't been altered. Complete the two missing words from the question. (2 Marks)
- i) You are trying to install a printer driver on a clients desktop PC running Windows 7. However, the following error appears before the installation completes. **"Windows cannot install this driver"** (1 Marks)

Q4. Answer the following questions:

- a) Briefly the term metric in routing protocol (2 Marks)
- b) Briefly explain the difference between RIP, RIP2 and OSPF routing protocols (8 Marks)

c) You're presented with the figure shown below:

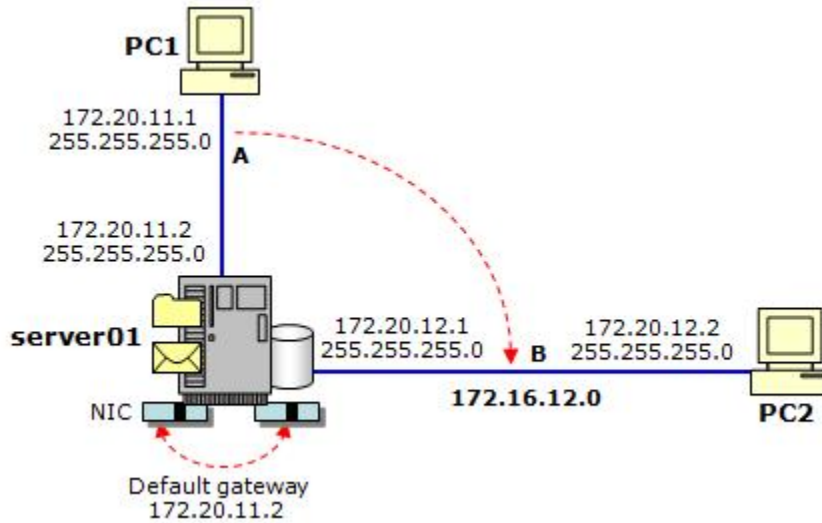
(3 Marks)



Complete the missing data in the table below:

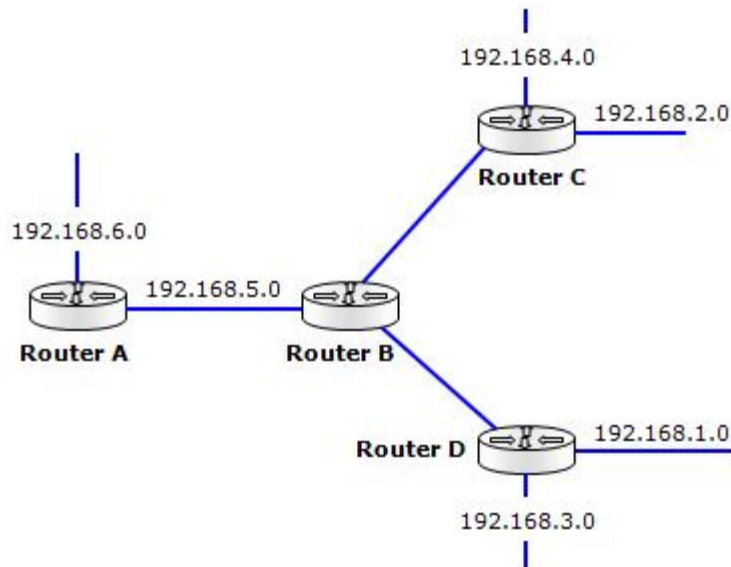
Group	Outgoing Interface	Next-Hop Router	Metric	Comments
172.16.36.0	E0	-	0	Directly connected
172.16.40.0	S0	-	0	
172.16.44.0	S0		1	Learned from R2

d) You're a network consultant, and you have just been called on an emergency to help troubleshoot a network problem, which is presented in the figure below. You have been informed that PC1 and PC2 cannot communicate. Server01 is fitted with two NICs. All the computers are Windows machines.



i) You finally found that two NICs on sever01 have not been binded. Using **route add** command, write down the syntax required to bind the two NICs two allows he two PCs to communicate (3 Marks)

e) Using the figure shown below, build a routing table for Router A and Router B. (4 Marks)



Q5 Servers

a) You are a networking consultant in a small town. A local networking services calls to sort out their Networking problem. A customer wanted a server capable of doing file sharing. The server had to be robust and capable of interacting with all of the company's Windows clients. However, they also informed you that they are at the end of a budget cycle and the new budget wouldn't be approved for at least a month and they needed the server for one of their

workgroups immediately. The good news is they had the hardware but couldn't afford either the Windows 2k3/2k8 server's licenses. **(3 Marks)**

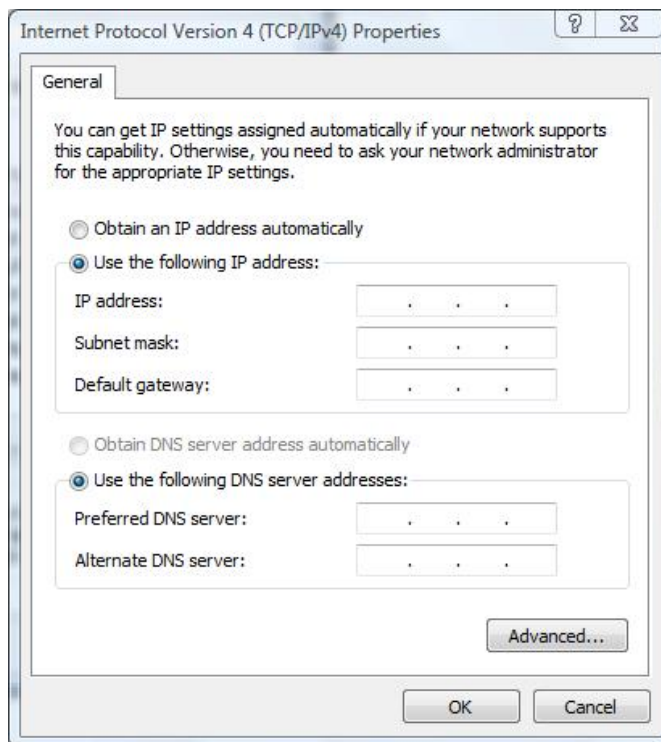
b) Explain briefly why it's important to have Proxy Server in your network. List the advantages and disadvantages of a Proxy Server. **(5 Marks)**

c) You are setting up a new Windows and Linux workstations on your network, and your DHCP server provides all of the normal TCP/IP configuration information. Your network is configured as follows: 192.168.1.0/24, DHCP IP range: 192.168.1.51 – 192.168.1.254. IP address range: 192.168.1 – 192.168.1.50 is reserved. After you have added the TCP/IP protocol:

i) What must you do to configure the IP address on the workstation that requires automatic DHCP configuration? **(2 Marks)**

ii) You have been tasked with deploying a Web servers, what type of NIC configuration should you apply: Static or Automatic? Explain why? **(3 Marks)**

iii) Using the figure shown below, enter the appropriate information in the table provided. **(2 Marks)**



IP address:	
Subnet mask:	
Default Gateway:	
Preferred DNS Server:	

- iv) Before departing from the company, a call came from the CIO asking you to add another machine in the network to be later used to deploy a DNS server, what type of NIC configuration would you apply: Static or Automatic? Explain why? **(3 Marks)**
- v) While reviewing the security logs for your server, you notice that a user on the Internet has attempted to access your internal mail server. Although it appears that the user's attempts were unsuccessful, you are still very concerned about the possibility that your systems may be compromised. Indicate which of solutions are you most likely to implement to arrest this situation? **(2 Marks)**