



The University of Fiji

Undergraduate Programme
Department of Computer Science and Mathematics
Semester 1 Year 2019

FINAL EXAMINATION PAPER

ITC362 SYSTEM AND NETWORK ADMINISTRATION

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. **This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.**
6. This paper contains Two (2) sections; Section A and Section B. Answer all questions.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1 - 20	Multiple Choice	20	30 minutes
B	21 - 61	Open-Ended	80	150 minutes
		TOTAL	100	180 Minutes

SECTION A: MULTIPLE CHOICE QUESTIONS**[20 MARKS]****All questions are compulsory.**

For each question, write the letter representing the answer(s) in the Answer Book, for example, 1. D

1. Which of the following standards uses **CAT 6a** cable?
 - A. 10GBASE-T
 - B. 10GBASE-SR
 - C. 10GBASE-FX
 - D. 10GBASE-ER

2. Which type of the following fiber connectors has a twist-type attachment?
 - A. ST
 - B. SC
 - C. LC
 - D. MT-RJ

3. To increase wireless network security, you have decided to implement port-based security. Which of the following standards specifies port-based access control?
 - A. 802.16
 - B. 802.1X
 - C. 802.11ac
 - D. 802.11n

4. Which of the following network types is easiest to add new nodes to?
 - A. Bus
 - B. Ring
 - C. Star
 - D. Mesh

5. Placing a node on which of the following types of networks would require that you obtain an address from the **IANA** (whether you do so directly or an ISP does so on your behalf)?
 - A. Private network
 - B. Public network
 - C. Ethernet network
 - D. LAN

16. What is the primary purpose of **PPTP**?
- A. Routes data through multiple ports
 - B. Enables you to disable the capability for traffic to pass through a port
 - C. Creates a secure tunnel between two points on a network
 - D. Looks for inappropriate activity and sends notification of any potential threats
17. What type of cable connects systems to the switch or hub using the **MDI-X** ports?
- A. Plenum
 - B. ISA
 - C. Cross-over
 - D. Straight-through
18. What does **FE80::5EFE:10.0.0.2%2** refer to?
- A. IPv6 link-local address
 - B. IPv4 to IPv6 tunneling
 - C. Global routing prefix
 - D. CIDR
19. You need to connect a desktop computer to a WLAN using the strongest encryption type possible. Of the following choices, which is the strongest?
- A. RADIUS
 - B. WEP
 - C. WPA, TKIP
 - D. WPA2, AES
20. Which of the following is an example of packet switching technology? (choose two answers)
- A. OCx
 - B. Frame Relay
 - C. X.25
 - D. T1

SECTION B: Open Ended Questions

[80 MARKS]

All questions are compulsory.

Questions 21 – 40 are worth one mark each. [20 marks]

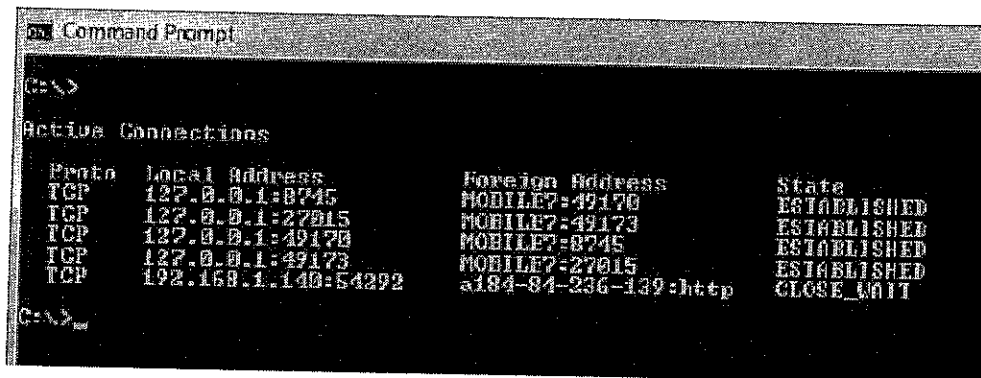
21. You have connected thirteen PCs and laptops to a wireless network. To make your WLAN more secure, what should you do to disallow additional client access to the WAP?
22. You are troubleshooting an older 100BASE-TX network, and you suspect that the maximum cable length has been exceeded. What is the maximum length of a 100BASE-TX network segment?
23. You are troubleshooting a network connectivity error and have issued a continuous ping command. How will you stop the continuous ping?
24. You are installing a wireless network solution that uses a feature known as **MIMO**. Which wireless networking standard are you using?
25. State name of a network device that is specifically designed to deal with attenuation?
26. What is the basic purpose of a firewall system?
27. You come into work on Monday to find that the DHCP server failed over the weekend. Before you can fix it, DHCP-enabled client systems boot up and can communicate with each other. However, they cannot directly access the Internet or a remote network segment. Given that the DHCP server has failed, how can the systems communicate?
28. You are preparing a patch cable using **TIA-EIA-568B** standard. Write down the arrangement of wires for pin1 to pin8 connection using the format: (1-2-3-4-5-6-7-8) by replacing each number with wire colors.
29. You have configured network clients to obtain IP addresses using **APIPA**. Write down the IP ranges that would be assigned to client systems?
30. A user on your network can send data packets within the local subnet but cannot send packets beyond the local subnet. What is likely the problem?
31. You are upgrading the antenna on your wireless network. You need to purchase an antenna that provides a 360-degree dispersed wave pattern. Which antenna type would you select?
32. A client on your network has had no problems accessing the wireless network in the past, but recently she moved to a new office. Since the move, she has had only intermittent network access. Which of the following is most likely the cause of the problem?
33. You are managing a network that uses both a UNIX server and a Windows server. Write the FTP command you will use to transfer a file called **manual.pdf** between the two servers?

34. Which switch is used with **ipconfig** to purge the DNS cache?
35. Explain the purpose of a proxy server.
36. You suspect an issue with one of the ports on the firewall. You decide to scan the ports. What is the most appropriate tool to use?
37. Which configurable client identification setting is used to differentiate one WLAN from another?
38. Which layer of the OSI model is responsible for converting data from the application layer into a format that can be sent over the network?
39. On which part of the network will you place servers that must be accessible by sources both outside and inside your network?
40. A computer with IP **10.16.0.215** is not connecting to Classful A network because of an incorrect subnet mask. What should be the IP of the subnet mask so that the computer can communicate properly with all networking devices and other hosts on the network?

Questions 41 – 50 are worth two marks each. [20 marks]

41. What is a VPN?
42. What **two** layers of the **OSI model** match the network interface layer of the **TCP/IP model**?
43. To create secure data transmissions, IPsec uses which **two** separate protocols?
44. Which topology type offers the greatest amount of redundancy? Also draw simple diagram of this topology using four hosts.
45. What type of IP address sends data to all hosts on a subnet or network instead of a single or multiple hosts? Also state an example of such an IP address.
46. A customer requires help with networking issues that cropped up when he added a number of new workstations. The CIDR notation appearing in the documentation kept on site is 192.168.12.0/26. Calculate the maximum number of workstations that can be assigned to this subnet?
47. The CIDR notation for the network you are now troubleshooting is 192.168.67.32/28. What is the range of IPv4 addresses that can be assigned to workstations?
48. Truncate the IP address **2001:4860:0000:2001:0000:0000:0001:0055** to its simplest form.

49. Which TCP/IP utility is executed in the following figure (portions of which have been obscured to prevent telegraphing the answer)?



```
Command Prompt
C:\>netstat
Active Connections
Proto Local Address Foreign Address State
TCP 127.0.0.1:8745 MOBILE7:49170 ESTABLISHED
TCP 127.0.0.1:27015 MOBILE7:49173 ESTABLISHED
TCP 127.0.0.1:49170 MOBILE7:8745 ESTABLISHED
TCP 127.0.0.1:49173 MOBILE7:27015 ESTABLISHED
TCP 192.168.1.140:54392 a184-84-236-139:80 CLOSE_WAIT
C:\>
```

50. A customer requires that you setup an extremely fast WAN connection that can communicate at 1.2 Gbps over fiber optic lines. What service should you recommend?

Questions 51 – 60 are worth three marks each. [30 marks]

51. A customer requires you to run several cabling drops between patch panels and RJ45 jacks. What tools will you need to accomplish this task?
52. What three most common configuration information are supplied via DHCP to any client computer?
53. A customer requires you to secure its wireless LAN. Name three things you can do to make the wireless LAN more secure.
54. At which layer of the OSI model does each of the following work?
- a) Patch panel
 - b) Router
 - c) Logon/logoff
55. Traffic is not being allowed through each of the following port of the firewall. Which TCP or UDP protocol is associated with each of the following port by default?
- a) 23
 - b) 67/68
 - c) 3389

56. What service has to be installed to perform each of the following?
- Allow virtual connectivity to the LAN from remote clients in a secure manner.
 - Enable host name to IP address resolution internally in the company.
 - Allow administrators to access servers to control them remotely.
57. Briefly describe the following WAN technologies:
- T-carrier
 - ATM
 - ISDN
58. Briefly explain the following firewall methodologies:
- Packet filtering
 - NAT filtering
 - Application level gateway
59. A customer currently uses the 192.168.1.0 Class C network for 240 computers. He wants to install a new DHCP server, migrate the existing computers to this new server, and add another 200 new computers.
- What classful IP network number should you select for the DHCP server to support the total number of computers, old and new?
 - What TCP/IP commands will you issue to obtain new addresses from the new DHCP server on the original 240 computers?
60. Write the complete TCP/IP commands to carry out each of the following:
- Ping a server with the IP 10.225.225.1 that will consist of 100 ICMP echoes.
 - Create a static entry in a laptop's ARP table. The desktop computer's IP address is 192.16.4.10, and its MAC address is AF-13-EF-B4-66-00.
 - Write the command to clear the routing table of all gateway entries?

Question 61 is worth 10 marks

61. A client wants you to design a basic WAN with two LANs that can communicate with each other. The client would like the following configuration:

LAN A

- 192.168.1.0 network
- 255.255.255.0 subnet mask
- A router with the following configurations:
 - LAN address: 192.168.1.100
 - WAN address: 18.52.197.1

LAN B

- 192.168.2.0 network
- 255.255.255.0 subnet mask
- A router with the following configurations:
 - LAN address: 192.168.2.200
 - WAN address: 18.52.197.2

- a) Create **network routing documentation** that shows the LANs, their central connecting device (such as a switch), and the router. **(6 marks)**
- b) Then show the TCP/IP command syntax you would use in the command line to make the routed connections between the LANs. **(4 marks)**

End