



Strathmore
UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY
BACHELOR OF SCIENCE IN INFORMATICS AND COMPUTER SCIENCE
FINAL EXAMINATION
ICS 2203-Advanced Networks

DATE: November 2017

Time: 2 Hours

Instructions:

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question One [30 marks]

Possibilities Kenya Limited (PKL) is a growing organization that will soon be opening some four new branches in various regions in Kenya: Nairobi, Mombasa, Eldoret and Nakuru. Assume that the topology represented in **Figure Q.1** below is a partial representation of the organisation's network. Examine the topology and use it to answer the questions that follow.

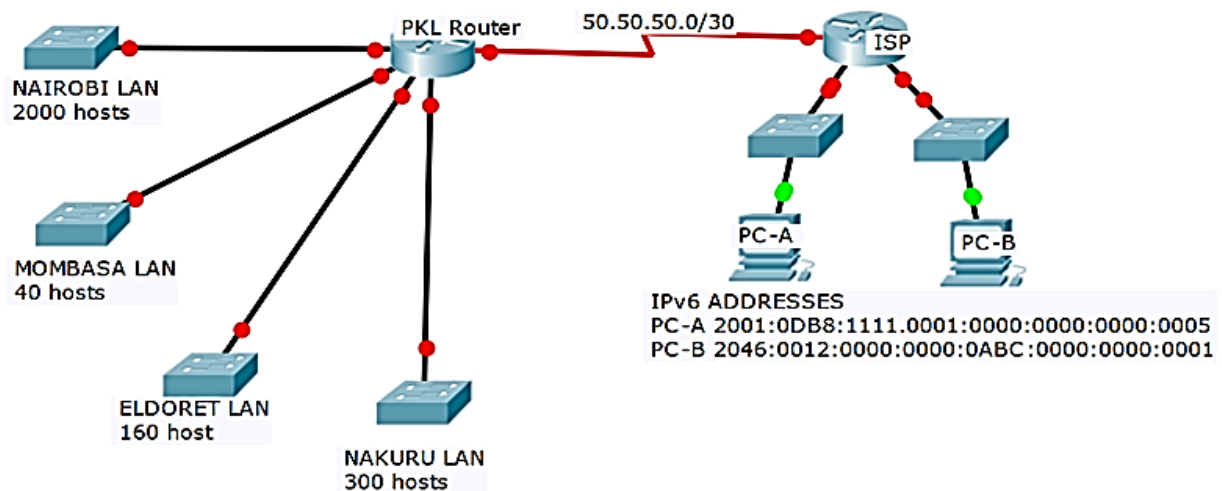


Figure Q.1

- a. Suggest a private IP address that could be used to provide addressing for the four LANs on PKL's router. Ensure that you include an appropriate network prefix. **(1 mark)**
- b. Subnet the suggested address in (a) above in such a way that it is not wasteful (i.e. using VLSM) and document your results in a subnet chart. *Ensure that you show your working. Write only the first four subnets. The chart should contain the following column headings:*

LAN / Subnet Address / Usable Host Address Range / Broadcast Address / Prefix

(10 marks)

- Abbreviate the IPv6 addresses for PC-A and PC-B shown on the topology. Ensure that your answer does not allow for further abbreviation. **(3 marks)**
- Explain THREE benefits and TWO disadvantages of using IPv6 on any network, such as the one shown in **Figure Q.1** **(5 marks)**
- Suppose you were to configure static routing on the topology in **Figure Q.1**, explain THREE benefits and what TWO disadvantages that you would encounter with this method of routing. **(5 marks)**
- Explain FOUR general considerations that you would make as you select a dynamic routing protocol to use on any given topology. **(4 marks)**
- Explain TWO benefits that dynamic routing has over the static method of routing. **(2 marks)**

Question Two [15 marks]

Examine the topology in **Figure Q.2** below and use it to answer the questions the follow. Assume that the router interfaces are configured and the routing table can display the directly connected networks shown.

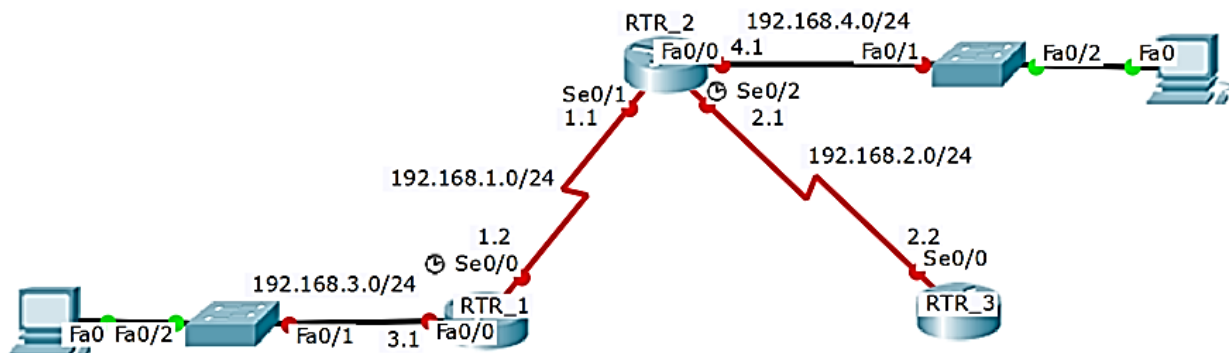


Figure Q.2

- You are asked to configure static routing on RTR_1. Write down the commands that you would use to enable static routing to any TWO remote networks.
Hint: You will enter your command at the prompt:
RTR_1(config)# **(3 marks)**
- Which type of static route have you configured in (a) above. **(1 mark)**
- Apart from the route mentioned in (b) above describe any other THREE types of static routes. **(6 marks)**
- Summarise all the networks shown in the topology above. **(4 marks)**
- Is the result in (d) above a supernet or a regular summary route? **(1 mark)**

Question Three [15 marks]

- Identify any THREE components found on a router's motherboard and explain their role. **(3 marks)**
- In the context of networking differentiate between the following:
 - Interior Gateway Routing Protocols (IGP) and Exterior Gateway Routing Protocols (EGP). Include an example of each. **(3 marks)**

- ii. Routing Metric and administrative distance (AD) (2 marks)
- iii. Classless inter-domain routing (CIDR) and Variable Length Subnet Masks (VLSM) (2 marks)
- c. Describe any FIVE routing metrics used in IP networks. (5 marks)

Question Four [15 marks]

Examine the topology in **Figure Q.4** below and use it to answer the questions that follow.

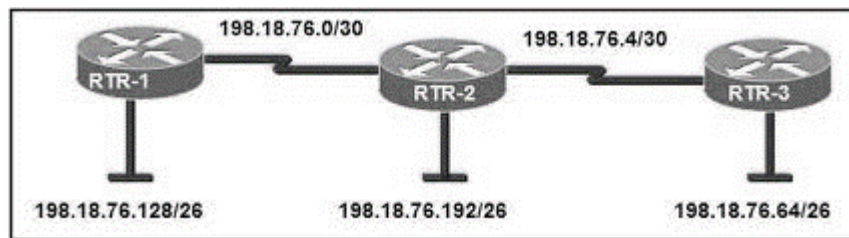


Figure Q.4

- a. What version of RIP would you recommend for such a domain? Justify your answer. (2 marks)
- b. Write the sequence of commands that you would configure on RTR-1 to enable the RIP version that you have recommended in (a) above so that RTR-1 can access any TWO of its remote networks. Assume that all the router interfaces are already configured
Hint: The router prompts that you need are:
RTR-1(config)#
RTR1(config-router)# (4 marks)
- c. Explain FOUR differences between RIPv1 and RIPv2. (4 marks)
- d. Describe the process that RIP follows when building its routing tables. (5 marks)

Question Five [15 marks]

- a. Examine the topology in **Figure Q.5** below and use it to answer the questions that follow. Assume that the letters A to H are router names and the numbers on the connections between the routers refer to the interface cost.

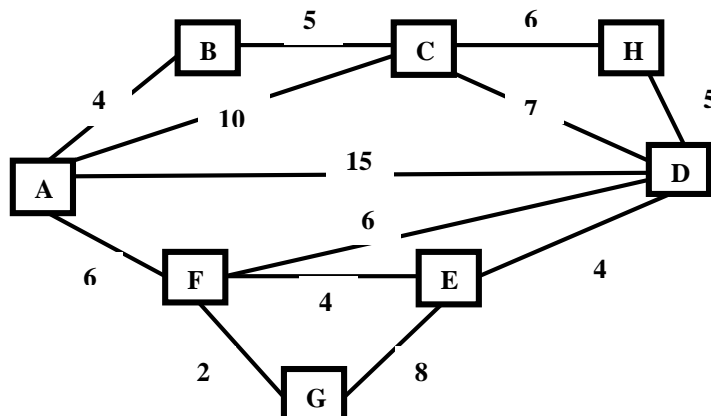


Figure Q.5

- i. Indicate the best path to move a packet from node F to node H if OSPF was configured on the domain. Justify your answer (2 marks)

- ii. Explain TWO scenarios for which it would be ideal to configure OSPF. (2 marks)
- b. Explain THREE characteristics of OSPF (3 marks)
- c. Identify and explain the role of the FOUR messages (packet types) used by OSPF (4 marks)
- d. Explain any TWO differences between RIPv2 and OSPF (2 marks)
- e. Refer to **Figure Q.4** in Question Four above. Determine the wildcard mask of ONE of the networks on the topology. Show your working. (2 marks)