

**PAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**Faculty of Computing and Informatics**

Department of Computer Science

<b>QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF COMPUTER SCIENCE IN CYBER SECURITY, BACHELOR OF ENGINEERING: ELEC. &amp; TELECOM</b>	
<b>QUALIFICATION CODE: 07BACS, 07BCCS, 35BEET</b>	<b>LEVEL: 6</b>
<b>COURSE: Communication Networks</b>	<b>COURSE CODE: CMN620S</b>
<b>DATE: January 2019</b>	
<b>DURATION: 2 hours</b>	<b>MARKS: 50</b>

<b>SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	<b>Peter Gallert</b>
<b>MODERATOR:</b>	<b>Prof Dharm Singh Jat</b>

**THIS QUESTION PAPER CONSISTS OF 2 PAGES**  
(Excluding this front page)

**INSTRUCTIONS**

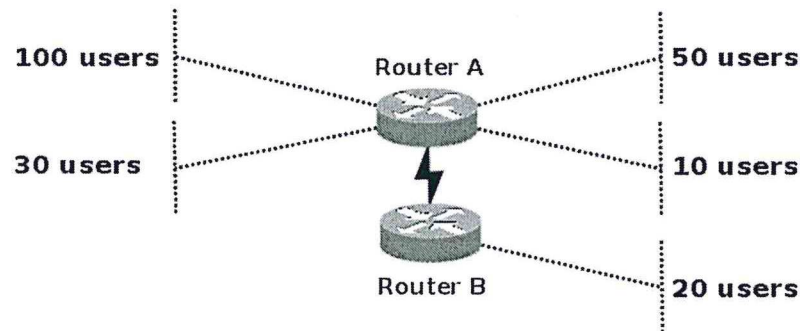
- 1) Answer all questions.
- 2) When answering questions you should be led by the allocation of marks.
- 3) Write clearly and neatly in your examination book. Answers that appear only on the question paper **cannot be marked**.

**PERMISSIBLE MATERIALS**

- 1) Calculators are **not allowed!**
- 2) Do not use or bring into the examination venue books, mobile devices and other material that may provide you with unfair advantage. Should you be in possession of such material right now, draw the attention of the examination officer or invigilator.

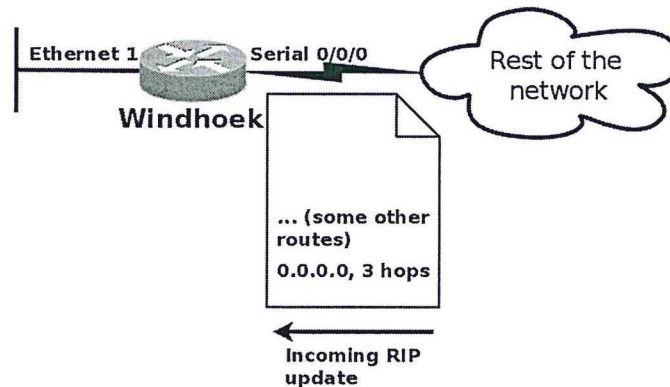


1. Consider the following network topology:



- (a) You have been allocated the class-C IP address block 192.168.192.0 /23. Subnet this address block to provide valid IP addresses to all users in the five different LANs and to the WAN link between router A and router B. (9)
- (b) Write down the range of the unallocated address space. (2)

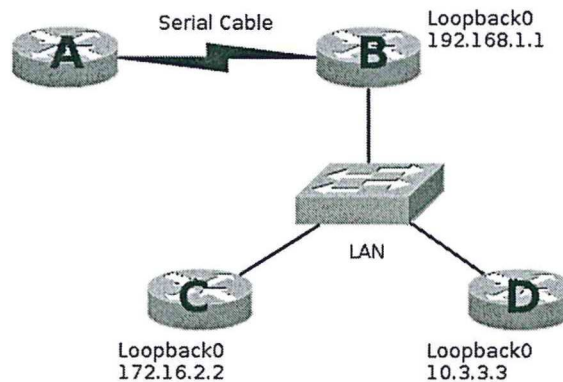
2. Consider the situation below. Router Windhoek receives a RIP routing protocol update on interface Serial 0/0/0. The update contains a route to 0.0.0.0, 3 hops away. Please answer the following questions:



- (a) Which router command will show if Windhoek uses this route to forward traffic? (1)
- (b) If Windhoek is using this route, how will be listed in its routing table? Be specific in your answer and consider at least: (4)
- How it was learned (S—static route, C—connected, E—external, R—RIP, O—OSPF)
  - Network number
  - Subnet mask
  - Exit interface
  - Metric
- (c) Even if Windhoek does not use this route (because it learned a better one from somewhere else): Which router command will show if Windhoek learned this route? (1)



- (d) What is the name of this route to 0.0.0.0? (1)
  - (e) What is the purpose of a route to 0.0.0.0? (2)
  - (f) After Windhoek has learned the route to 0.0.0.0, a packet with destination address of 0.0.0.0 arrives on interface Ethernet 1. What will Windhoek do with that packet, and why? (2)
3. Explain the operation of a router in terms of the OSI model of computer networking. (4)
- (a) On what layers of the OSI model does a router operate, and what are its responsibilities per layer? (4)
  - (b) What types of encapsulation and decapsulation does a router perform, and why? (4)
4. Consider the topology below. All routers run OSPF and have been correctly configured. (4)



- (a) List all the neighbour relationships that will be formed (write for instance “A–B” if you think A and B will become neighbours). (2)
  - (b) Which router wins the Designated Router Election on the LAN, and why? (3)
  - (c) Which router wins the Designated Router Election on the WAN, and why? (5)
  - (d) If a new router (Router E) is attached to the switch but configured to run RIP instead of OSPF, what will happen – (2 marks each) (6)
    - 1. Will a new Designated Router Election be conducted on the LAN? Why / Why not?
    - 2. What kind of routing protocol information will router E send?
    - 3. What kind of routing protocol information will router E receive?
5. What protocols (list two) do switches use when communicating with other switches, and what is the purpose of each protocol you listed? (4)

*End of question paper*