Test 2: NET3012 – IP Architectures & Solutions

Winter 2014

Time: 50 minutes; Test scored out of: 43 Total Marks available: 46
(Allocation of marks is shown beside each question)

Instructions:

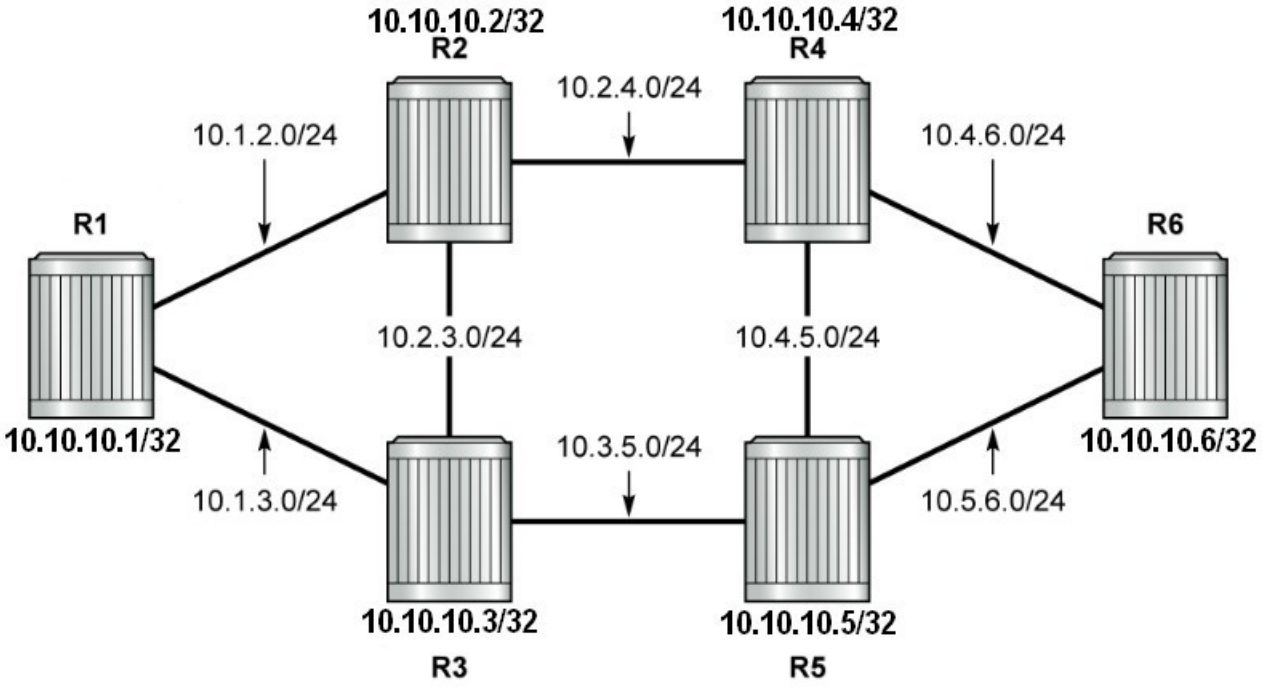
1. BEFORE answering any questions, please check that your copy of the test has all pages (as indicated in the footer at the bottom of each page). Please **read all questions** carefully, then answer question 0 first!
2. This is a **closed book** test. No textbooks, notes, electronic devices, or any other aids are permitted.
3. If you are uncertain what a question is asking, make reasonable assumptions, write those assumptions down on this test paper, and continue answering the question.

0. What is your:

NAME? _____

Reference Topology

Use the topology below for questions which refer to R1-R6 but do **not** have a topology diagram. Note that this is the standard topology we have been using throughout the course.



1. [1 mark] What is the *one* parameter for RSVP path selection that is included in the "path" specification?

2. [5 marks] Name and **clearly** describe five (5) other parameters which can be used for Traffic Engineering.

3. [1 mark] Which of the above five parameters can also be used for path selection with LDP?

4. [1 mark] When explicit routing is used for path selection, what mechanism (or object) does RSVP use to communicate the path to downstream routers?

5. [1 mark] What parameter must be specified/configured for TE parameters to actually be <u>used</u> in determining the LSP path?

6. [3 marks] Refer to the topology diagram on the cover page. For each of the following path specifications, indicate whether or not an LSP **from R1 to R6** can be successfully created using that path as the *primary*. For any that fail, identify the specific node at which it fails.

```
path "test2Q6A"
  hop 10  10.10.10.3 strict
  no shutdown
exit
```

```
path "test2Q6B"
  hop 10  10.10.10.4 strict
  hop 20  10.10.10.6 strict
  no shutdown
exit
```

```
path "test2Q6C"
  hop 10  10.10.10.2 strict
  hop 20  10.2.4.4   strict
  hop 30  10.4.6.6   strict
  no shutdown
exit
```

7. [1 marks] Refer to the topology diagram on the cover page. Give the loose / strict path specification for an LSP from R1 to R6 which goes:
   always from R1 to R3, then any way to R5, and then directly to R6.

8. [3 marks] Prove that you know your troubleshooting tools! Name and **clearly** describe at least three different types of "ping" that could be used in verifying an ePipe service (or a VPLS if you wish). Note that for full marks:
   – the description must indicate whether the ping is a uni- or bi-directional test at that level;
   – you must list your answers in order according to the level of functionality which they test.

9. A. [1 mark] This course covers at least four types of ping commands, but only one MPLS related "xxx-trace" command? What is that command? Hint: It was covered in both theory and lab work.

   B. [1 mark] Referring to TE, clearly explain how the "xxx-trace" command can help humans understand what is happening.

10. [1 mark] By what mechanism are TE properties propagated through an OSPF network?

11. [1 mark] **Clearly** identify any restriction(s) on the propagation of TE properties in a network.

12. [1 mark] Other than OSPF, what other routing protocol is capable of carrying TE properties? (Or, equivalently, identify at least 3 other routing protocols that can **not** propagate TE info.)

13. [1 mark] **Clearly** describe the default mechanism that RSVP uses as a "keep-alive" for the LSPs that it creates.

14. [1 mark] **Clearly** explain the purpose of the command: "tools perform router mpls cspf …"

15. [1 mark] **Clearly** explain who or what is TED, in the context of this course.

16. [3 marks] In the output of the command "show router mpls lsp to_Rx path detail" includes three sections titled "ExplicitHops", "Actual Hops", and "ComputedHops". **Clearly** explain the ***difference*** between these three, eg. by explaining where the information comes from.

17. [3 marks] Name, and **clearly** describe, at least three (3) different uses for MPLS. (Note: you may **not** include VPN services in your answer, even though it's a very common use for MPLS!)

18. [1 mark] In the SR OS, what is the maximum number of link "colours" that may exist?

19. [1 mark; Bonus] Based on lab results with the CLI, what is the maximum number of link "colours" that may be applied to a single link, in the SR OS? (This isn't a trick, although it's a subtle detail.)

20. [1 mark] Refer to the topology diagram on the cover page. An LSP must traverse directly from R1 to R6, **without** going over any vertical links (ie. R2-R3 or R4-R5). What value must be specified for the hop-count in the LSP parameters?

21. [2 marks] For type 10 LSAs, **clearly** explain the two (2) top-level TLV sub-types they contain, and what each TLV specifies.

22. [1 mark: Bonus] **Clearly** explain the difference between the ability to *propagate* Opaque LSAs and the ability to *generate* Opaque LSAs. Hint: refer to lab work!

23. A. [5 marks] Name and **clearly** describe the five (5) numeric items that are necessary when defining a distributed ePipe service. (See part B before you start writing!)

    B. [1 mark] Now go back and c**learly** identify which of the above items are *locally significant* and which are *globally significant*.

24. [1 mark] **Clearly** explain the difference between a *local ePipe* service and a *distributed ePipe* service.

25. [1 mark: Bonus] The course notes use the word "Null" for two different meanings when referring to a SAP. **Clearly** explain the difference between "null encapsulation for a SAP" vs the "Null SAP"

26. [2 marks] Identify something *important* that you learned during the field-trip to Alcatel-Lucent. You must also explain **clearly** *why* it is important! (Continue below if you need more space.)

Extra Work