STIJ3044 CONFIDENTIAL

UUM
Universiti Utara Malaysia

FINAL EXAM
SECOND SEMESTER SESSION 2011/2012

COURSE CODE / NAME : STIJ3044 ROUTING PROTOCOLS AND CONCEPTS
DATE : 9 JUNE 2012 (SATURDAY)
TIME : 9.00 – 11.30 A.M. (2 ½ HOURS)
VENUE : DTSO

INSTRUCTION :

1. This question booklet contains FOURTEEN (14) questions in ELEVEN (11) printed pages, excluding the cover page.
2. Answer ALL QUESTIONS in the space provided.
3. You are NOT ALLOWED to remove the exam paper from the examination hall.

MATRIC NO : ____________________________ ( with word ) ____________________________ ( with number )

IDENTIFICATION CARD NO : 

LECTURER :

GROUP : TABLE NO : 

DO NOT OPEN THIS EXAMINATION PAPER UNTIL INSTRUCTED

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INSTRUCTION: Answer all the questions.

1. There are four major phases/routines to the router boot-up process. The first one is performing the Power-On Self Test (POST).

   a) Arrange the correct flow of routines for a router start-up.

   (3 marks)

<table>
<thead>
<tr>
<th>Step</th>
<th>Routines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power-On Self Test (POST)</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

   b) What is the default sequence for loading the configuration file?

   (3 marks)

   c) Name TWO (2) location a router load the Cisco IOS during the boot process?

   (2 marks)

2. Refer to the exhibit above. The network administrator has configured the router with the interface IP addresses shown for the directly connected networks. Pings from the router to hosts on the connected networks or pings between router interfaces are not working.

   a) What is the most likely problem?

   (2 marks)
b) Show your CLI command to router B to correct the above network issue. 

Note: Mark also be given to the correct mode prompt. 

(5 marks) 

C# 

3. Static routes are commonly used when routing from a network to a stub network. A stub network is a network accessed by a single route. 

Refer to the exhibit above. Show your CLI command to configure static route on Router1 so that host A will be able to reach host B on the 172.16.0.0 network? 

(4 marks) 

Router1#
b) Explain why it is advisable to enter a next-hop IP address when creating a static route whose exit interface is an Ethernet network? (2 marks)

c) What happens to a static route entry in a routing table when the outgoing interface is not available? (2 marks)

4. Cisco Discovery Protocol (CDP) is a powerful network monitoring and troubleshooting tool. CDP is an information-gathering tool used by network administrators to get information about directly connected Cisco devices.

a) Choose TWO (2) correct statements that describe functions or characteristics of CDP.

<table>
<thead>
<tr>
<th>Statement No.</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It starts up automatically and allows the device to detect directly connected neighbor devices that use CDP.</td>
</tr>
<tr>
<td>2</td>
<td>It operates at the network layer and allows two systems to learn about each other.</td>
</tr>
<tr>
<td>3</td>
<td>It creates a topology map of the entire network.</td>
</tr>
<tr>
<td>4</td>
<td>It allows systems to learn about each other even if different network layer protocols are configured.</td>
</tr>
<tr>
<td>5</td>
<td>It forwards advertisements about routes for faster convergence.</td>
</tr>
</tbody>
</table>

(2 marks)

Statement No: [ ] and [ ]
b) List **FIVE (5)** information that are displayed by the `Router# show cdp neighbors` command?

(5 marks)

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5. To select the best path, the routing protocol must be able to evaluate and differentiate between the available paths. For this purpose a metric is used. A metric is a value used by routing protocols to assign costs to reach remote networks.

a) Complete the table below with the routing protocol that match with the routing protocol metric.

(3 marks)

<table>
<thead>
<tr>
<th>Routing Protocol Metric</th>
<th>Routing Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>A combination of bandwidth and delay</td>
<td></td>
</tr>
<tr>
<td>Bandwidth</td>
<td></td>
</tr>
<tr>
<td>Hop count</td>
<td></td>
</tr>
</tbody>
</table>

b) The following line of code is present in the routing table:

```
   O 10.16.1.0/27 [110/129] via 192.168.1.5, 00:00:05, Serial0/0/1
```

What does the number 129 indicate in this output?

(2 marks)
c) Refer to the exhibit above. If RIP is the routing protocol, what is the value of the metric from router A to network 192.168.5.0/24?

(2 marks)

6. A router using a distance vector routing protocol does not have the knowledge of the entire path to a destination network. Instead the router knows only the direction or interface in which packets should be forwarded and the distance or how far it is to the destination network.

a) Explain TWO (2) characteristics that all distance vector routing protocols share.

(4 marks)
b) Choose THREE (3) problems that can exist in a distance vector network that has not converged.

<table>
<thead>
<tr>
<th>Problem No.</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>routing loops</td>
</tr>
<tr>
<td>2</td>
<td>inconsistent traffic forwarding</td>
</tr>
<tr>
<td>3</td>
<td>no traffic forwarding until system converges</td>
</tr>
<tr>
<td>4</td>
<td>inconsistent routing table entries</td>
</tr>
<tr>
<td>5</td>
<td>routing table updates sent to wrong destinations</td>
</tr>
</tbody>
</table>

(3 marks)

Statement No: [ ] , [ ] and [ ]

7. Refer to the exhibit above. Write the correct CLI command sequence to enable RIP on Router B for all connected networks.

(7 marks)

RouterB#
8. Refer to the exhibit above. A network engineer is summarizing the two groups of routes on router R1 shown in the exhibit. Calculate a summarization that will work for all the subnets.

(7 marks)

```
<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.0.0/30</td>
<td>192.168.4.0/30</td>
</tr>
<tr>
<td>192.168.0.4/30</td>
<td>192.168.5.0/30</td>
</tr>
<tr>
<td>192.168.0.8/30</td>
<td>192.168.6.0/30</td>
</tr>
<tr>
<td>192.168.0.16/29</td>
<td>192.168.7.0/29</td>
</tr>
</tbody>
</table>
```

9. Refer to the exhibit above.

a) Why Router1 debug show the message ‘RIP: ignored v1 packet from 10.0.0.2’?

(2 marks)
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b) Which router is the right router to configure to correct the above problem?
   (1 mark)

c) Write CLI command on the right router that will allow Router1 to learn about the 192.168.0.0/20 network. Start your command line at Global Configuration Mode. (Show your Global Configuration Mode Prompt).
   (4 marks)

10. A level 1 route is a route with a subnet mask equal to or less than the classful mask of the network address.

   a) Differentiate these THREE (3) functions of a level 1 route.
      i. Default route -
      
      ii. Supernet route -
      
      iii. Network route -
      
      (6 marks)

   b) The following entry is displayed in the routing table:

      R 192.168.8.0/24 [120/2] via 192.168.4.1, 00:00:26, Serial0/0/1

      What type of route is this?
      (1 mark)
11. Refer to the exhibit above. This is the debug output from 2 directly connected EIGRP routers. They are not forming an adjacency.

   a) What is the cause of this problem? (2 marks)

   b) How to correct this problem? (2 marks)

   c) From Global Configuration Mode, write Command Line Interface (CLI) command to configure Router C to correct the above problem. (3 marks)

12. Link-state routing protocols are also known as shortest path first protocols and built around Edsger Dijkstra's Shortest Path First (SPF) algorithm.

   a) Give ONE (1) example of Link-state routing protocols. (1 mark)

   b) To achieve network convergence, what THREE (3) steps does each link state router take? (6 marks)
13. The **show ip ospf neighbor** command can be used to verify and troubleshoot Open Shortest Path First (OSPF) neighbor relationships.

   a) What **THREE (3)** parameters must be identical between OSPF routers in order to form an adjacency?

   (3 marks)

   ```
   RI# show ip ospf neighbor
   Neighbor ID     Pri State    Dead Time Address     Interface
   192.168.1.10    0  FULL/    00:00:30  192.168.1.2  Serial0/0/0
   192.168.1.9     0  FULL/    00:00:34  192.168.1.6  Serial0/0/1
   ```

   b) Refer to the exhibit above. What OSPF packets will trigger the reset of the Dead Time counter?

   (2 marks)

   c) List **TWO (2)** other powerful OSPF troubleshooting commands.

   (2 marks)
14. Refer to the exhibit above. Routers R1, R2, and R3 have four Local Area Networks attached. What is a correct set of network commands that will cause OSPF to be enabled for any R1 interface that is connected to its subnets?

(7 marks)

R1(config-router)#