National Security Agency (NSA) / Central Security Service (CSS)

COMPUTER NETWORKING TEST

PREPARATION GUIDE

Chief of Marketing Outreach and Testing

OVERVIEW

This preparation guide is intended to help you prepare for the NSA\CSS Computer Networking Test (CNT) –multiple-choice test assessing your knowledge of computer networking. The knowledge assessed through the CNT is required of individuals entering into certain Agency jobs.

The CNT content is grouped into five areas: *Computer and Networking Fundamentals and Theory*, *Network Design*, *Networking Applications and Services, Operating Systems*, and *Programming Languages – Scripting and Interpreted*. The first three areas build on each other. That is, knowledge of computer and networking fundamentals is required to understand network design, and knowledge of network design is required to understand networking applications and services. A description of each content area is presented next along with the percentage of questions on the CNT assessing the content area.

CONTENT AREAS

Fundamentals and Theory of Computer Design and Networking (10%)

This content area refers to knowledge of the fundamentals and theory behind computer design, computer networking, and basic computing concepts. Examples of the content in this area include:

a. Math numbering systems and conversions
b. Computer concepts (e.g., CPU architectures, virtualization)
c. Memory organization and layout
d. Storage concepts (e.g., hard disk drives, solid state drives)
e. Differences between kernel and user space

Network Design (25%)

This content area refers to knowledge of the operations, management, and maintenance of computer networks, protocols and standards and how they integrate with one another. Examples of the content in this area include:

a. IP / subnetting
b. Ethernet
c. Routing
d. Network layout and design (i.e., network typology)
e. Networking device concepts (e.g., routers, firewalls, intrusion detection systems)

Networking Applications and Services (30%)

This content area refers to knowledge of the network facing functions on a computer system. Examples of the content in this area include:

a. Protocols, and ports for standard network services
b. Network services and ports on standard Windows/Unix installs
c. Network-related commands (e.g., netstat, ip/ifconfig, route, iptables)
d. Network service administration and configuration

Operating Systems (30% split between Windows and Unix)

This content area refers to knowledge of computer systems administration, software interactions, and I/O interactions in either Windows or Unix implementations. Examples of the content in this area include:

   a. Standard administrative commands (e.g., ps, tasklist, netstat, ifconfig, ipconfig)
   b. Local system configurations (e.g., host file, logging)
   c. Data security and integrity protection (e.g., hashing, encryption, Windows file protection, tripwire)
   d. Antivirus concepts
   e. File systems

Programming – Scripting and Interpreted (5%)

This content area refers to knowledge of basic programming concepts, and reading and interpreting scripts/code. Examples of the content in this area include:

   a. Shell scripting (e.g., cmd, wmic, bash)
   b. Interpreted languages (e.g., Pearl, Python)
   c. Interpretation of source code and scripts (e.g., Flow, variables, loops)

PRACTICE TEST

To help you prepare for the CNT, the NSA\CSS has included a short practice test containing four questions similar to those on the actual test. Read each question, determine which of the four options represents the correct answer, and record your answer in the space provided. Continue until you have recorded your answers for all four questions on the practice CNT. Once you are done, look at the next section and compare your answers to the answers and explanations that we have provided for you. *Although it may be tempting to check an answer before completing the entire practice test, you will receive the most benefit from the practice situations if you answer all questions first.*

TEST TAKING TIPS

Before starting the practice CNT, review these test taking tips:

1. Read each question carefully before determining the correct response.

2. Answer all questions even if you are unsure which option represents the correct answer. You are not penalized for incorrect responses.

3. Finally, take to time study the explanation for each of the questions/answers very carefully. This will help you fine-tune your reasoning on the actual test.

INSTRUCTIONS

This practice test includes 4 questions similar to those included on the computer networking test administered as part of the selection process. Read each question carefully and enter the letter associated with the option that represents the best response in the space provided.

___ **1.** Given that the only values A, B, and C can hold are 0 or 1, simplify the following binary logic problem: ((A OR B) AND (!A OR C)) AND !C

   A. !A OR B AND !C

   B. A AND B AND C

   C. !A AND B AND !C

   D. A OR B AND C

___ **2.** Which routing protocol has an administrative distance of 120?

   A. OSPF

   B. EIGRP

   C. BGP

   D. RIP

___ **3.** Which version of Windows first adopted Kerberos as an authentication policy?

   A. Windows Server 2000

   B. Windows Server 2003 R2

   C. Windows NT

   D. Windows Server 2008

___ **4.** Based on the script and output, what search algorithm is being used?

```
list = [1,2,3,4,5,6,7,8,9]
find = 6
test = False

while not test:
  list_length = len(list) / 2
  print list[list_length]
  if (list[list_length]) == find:
    test = True
  elif (list[list_length]) < find:
    list = list[list_length:]
  elif (list[list_length]) > find:
    list = list[:list_length]

Output:
5
7
6
```

A. interpolation
B. binary
C. linear
D. sequential

1. The correct answer is **C**

This is a step by step process requiring knowledge of binary logic problems, a fundamental when it comes to computer and networking theory. The problem breaks down to:

(A OR B) AND (!A OR C) = !A*A + A*C + !A*B + B*C = A*C + !A*B +B*C
Then,
(A*C + !A*B +B*C) AND !C = A*C*!C + !A*B*!C + B*C*!C = !A*B*!C

In the above rational, * equates to AND and + equates to OR. ! indicates a NOT value, and a !A*A = 0. This is why that removes terms from the problem when next to ORs. The other options are flawed versions of the correct answer – they are mathematical errors.

2. The correct answer is **D**

The correct answer is "D" because RIP has an administrative distance of 120. OSPF is incorrect because it has an administrative distance of 110. EIGRP is incorrect because it has an administrative distance of 90. BGP is incorrect because it has an administrative distance of 200.

3. The correct answer is **A**

Originally developed by MIT in the 1980s, Kerberos was adapted by most Unix-based operating systems as the preferred authentication method by the late 1980s. Microsoft adopted the Kerberos authentication policy as the default authentication method with the release of its Windows Server 2000 operating system.

4. The correct answer is **B**

The script works by cutting the list in half, comparing that value to what is being searched for and then splitting the list in half. The next half is determined based on whether the returned value is less than or greater than the value being searched for. In this stem the first value returned is 5, which is less than 6 so the lower half of the list is cut. The next iteration returns 7, which is greater than 6 so that upper half is cut. The final iteration returns 6, which is a match and the loop is escaped through a bool named 'test'. The other response options are often compared search algorithms that differ in functionality.