**Exam (Appeal Season) – Networks and Systems Management**

**M.EIC017– Duration: 1h45 min. No memory help allowed. Always justify your answers.**

**Instructions:**

This exam consists of multiple-choice and short answers.

1. Read each question carefully and answer in the designated space.
2. The exam is worth a total of 20 points.
3. Write your answers clearly and legibly.
4. Manage your time effectively to complete the exam within the given duration.
5. Avoid discussing the exam questions with your classmates until after the exam.

## Section A: Multiple Choice Questions (8 points)

Choose the most appropriate answer and mark it on the answer sheet provided.

1. **Which of the following IP addresses is a private IP address? (Select all that apply)**
   a) 12.0.0.1
   b) 168.182.19.39
   c) 172.40.14.36
   d) 172.31.194.30
   e) 10.0.255.4

2. **What protocol allows multiple hosts to dynamically obtain IP addresses from a server?**
   a) DNS
   b) DHCP
   c) WINS
   d) ARP
   e) ICMP

3. **What is the range of assignable IP addresses for a subnet containing an IP address of 172.16.1.10 /19?**
   a) 172.16.0.1 – 172.16.31.254
   b) 172.16.0.1 – 172.16.63.254
   c) 172.16.0.0 – 172.16.31.255
   d) 172.16.0.1 – 172.16.31.255
   e) 172.16.0.0 – 172.16.63.254

4. **You assign IP addresses to hosts in the 192.168.4.0 /26 subnet. Which two of the following IP addresses are assignable IP addresses that reside in that subnet?**
   a) 192.168.4.0
   b) 192.168.4.63
   c) 192.168.4.62
   d) 192.168.4.32
   e) 192.168.4.64

5. **A host in your network has been assigned an IP address of 192.168.181.182 /25. What is the subnet to which the host belongs?**
   a) 192.168.181.128 /25
   b) 192.168.181.0 /25
   c) 192.168.181.176 /25
   d) 192.168.181.192 /25
   e) 192.168.181.160 /25

6. **In the network shown below, what is the most efficient summarization/aggregation that Router in Winnipeg can use to advertise its networks to Router in Vancouver?**
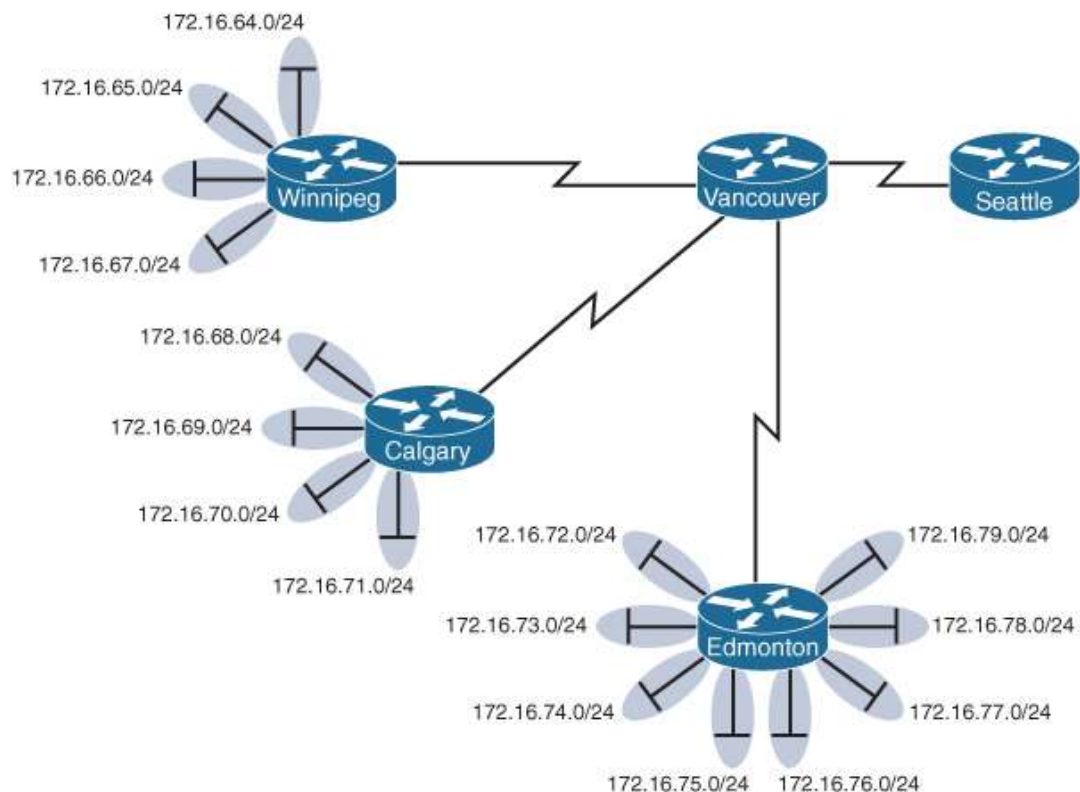


   a) 172.16.64.0/22 172.16.66.0/22
   b) 172.16.32.0/22
   c) 172.16.64.0/24 172.16.65.0/24 172.16.66.0/24 172.16.67.0/24
   d) 172.16.64.0/22
   e) 172.16.64.0/21

7. **Router is running BGP. What kind of packets does BGP send on this router to keep up connectivity with its neighbouring routers?**
   a) SPF packets
   b) Hello packets
   c) Keepalive packets
   d) Dead interval packets
   e) LSU packets

8. **Which of the following are true statements regarding the characteristics of the OSPF areas? Select all that apply.**
   a) All OSPF networks require the use of multiple areas
   b) Multiple OSPF areas must connect to area 0.
   c) Single-area OSPF networks must be configured in area 1.
   d) Areas may be assigned any number from 0 to 65535.
   e) Area 0 is called the backbone area.
   f) Each OSPF area requires a loopback interface to be configured.

9. **Which aspect of network management does the "C" in FCAPS represent?**
   a) Configuration Management
   b) Connection Management
   c) Capacity Management
   d) Compliance Management

10. **What is DiffServ's (Differentiated Services) purpose in network management?**
    a) To ensure end-to-end encryption of network traffic
    b) To provide Quality of Service (QoS) for different types of network traffic
    c) To establish secure VPN connections between network devices
    d) To monitor and manage network performance using SNMP

11. **Which statement accurately describes the role of Root Authoritative Servers in the DNS (Domain Name System) hierarchy?**
    a) They are responsible for resolving all internet users' domain names to IP addresses.
    b) They store and manage the DNS records for specific domains, such as "example.com".
    c) They maintain the top-level domain (TLD) zone files, such as ".com", ".org", or ".net".
    d) They cache frequently accessed DNS records to improve the performance of DNS lookups.

12. **Which statement accurately describes the role of BGP (Border Gateway Protocol) in network routing?**
    a) BGP is a distance-vector protocol that utilises a complex set of attributes and policies to determine the best path for routing between autonomous systems (ASes).
    b) BGP is a routing protocol to establish secure VPN connections between network devices.
    c) BGP resolves domain names to IP addresses in the DNS hierarchy.
    d) BGP is an exterior gateway protocol to exchange routing information between autonomous systems (ASes).

13. **Which protocol typically uses path vector protocol?**
    a) OSPF (Open Shortest Path First)
    b) BGP (Border Gateway Protocol)
    c) MPLS (Multiprotocol Label Switching)
    d) RIP (Routing Information Protocol)

14. **Which statement accurately describes Software-Defined Networking (SDN)?**
    a) SDN is a networking approach that separates the control plane from the data plane, allowing centralised management and programmability of network resources.
    b) SDN is a protocol for secure communication between servers and clients in a network environment.
    c) SDN is a network security framework that prevents unauthorised access to network devices.
    d) SDN is a protocol used for load balancing and traffic distribution across multiple servers in a data center.

15. **What role does Ansible play in the realm of IT automation?**
    a) Ansible is a scripting language used for developing web applications.
    b) Ansible is a virtualisation platform for managing and orchestrating virtual machines.
    c) Ansible is a configuration management tool that enables automated provisioning, deployment, and IT infrastructure management.
    d) Ansible is a database management system for storing and retrieving structured data.

16. **Which message format is typically used in RESTCONF (RESTful Configuration Protocol) for exchanging data between clients and network devices?**
    a) JSON (JavaScript Object Notation)
    b) XML (eXtensible Markup Language)
    c) YAML (YAML Ain't Markup Language)
    d) HTML (Hypertext Markup Language)

## Section B: Short Answer Questions (12 points)

Answer the following questions briefly and concisely.

1. **Explain the role that monitoring plays in supporting FCAPS.**

2. **Provide two examples of internal and external routing protocols. Briefly describe their differences and why external is more adequate for the Internet.**

3. **What is the role of a DNS resolver in the domain name resolution process?**

4. **Why was DevOps introduced in the software development cycle?**

5. **What are the features of (Software-Defined Networking) SDN?**

6. **Describe the relationship between NETCONF (Network Configuration Protocol) and YANG (Yet Another Next Generation) in the context of network management.**