

BINDURA UNIVERSITY OF SCIENCE EDUCATION  
FACULTY OF SCIENCE AND ENGINEERING  
DEPARTMENT OF COMPUTER SCIENCE  
BSc HONOURS IN NETWORK ENGINEERING  
NWE404-ROUTING AND SWITCHING

DURATION: 2 HOURS 30 MINUTES

TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

Section A carries TEN Multiple Choice Questions

Section B carries TWO questions

Section C Carries TWO questions

You are required to answer all questions.

NOV 2024

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SECTION A (10 MARKS)

1. What must happen if a DHCP IP conflict occurs? [1]  
A. Proxy ARP will fix the issue.  
B. The client uses a gratuitous ARP to fix the issue.  
C. The administrator must fix the conflict by hand at the DHCP server.  
D. The DHCP server will reassign new IP addresses to both computers.
2. Which of the following Application layer protocols sets up a secure session that's similar to Telnet? [1]  
A. FTP  
B. SSH  
C. DNS  
D. DHCP
3. Which of the following mechanisms is used by the client to avoid a duplicate IP address during the DHCP process? [1]  
A. Ping  
B. Traceroute  
C. Gratuitous ARP  
D. Pathping
4. What protocol is used to find the hardware address of a local device? [1]  
A. RARP  
B. ARP  
C. IP  
D. ICMP  
E. BootP

5. What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask? [1]

- A. 14
- B. 15
- C. 16
- D. 30
- E. 31
- F. 62

6. You have a network that needs 29 subnets while maximizing the number of host addresses available on each subnet. How many bits must you borrow from the host field to provide the correct subnet mask? [1]

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6
- F. 7

7. What is the subnetwork address for a host with the IP address 200.10.5.68/28? [1]

- A. 200.10.5.56
- B. 200.10.5.32
- C. 200.10.5.64
- D. 200.10.5.0

8. Which of the following is a standards-based protocol that provides dynamic network discovery? [1]

- A. DHCP
- B. LLDP
- C. DDNS
- D. SSTP
- E. CDP

9. Which command can be used to determine a router's CPU utilization? [1]

- A. show version
- B. show controllers
- C. show processes cpu
- D. show memory

10. You are troubleshooting a connectivity problem in your corporate network and want to isolate the problem. You suspect that a router on the route to an unreachable network is at fault. What IOS user exec command should you issue? [1]

- A. Router>ping
- B. Router>trace
- C. Router>show ip route
- D. Router>show interface
- E. Router>show cdp neighbors

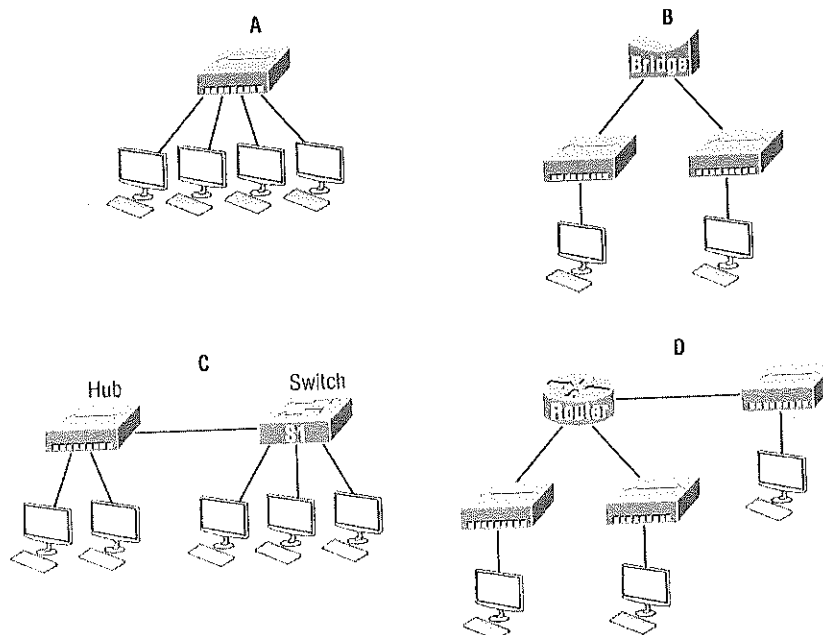
## SECTION B (40 MARKS)

### QUESTION 1

a. In the following exhibit, identify the number of collision domains and broadcast domains in each specified device. Each device is represented by a letter:

[16]

- A. Hub : \_\_\_\_\_ collision domain, \_\_\_\_\_ broadcast domain  
 B. Bridge : \_\_\_\_\_ collision domain, \_\_\_\_\_ broadcast domain  
 C. Switch : \_\_\_\_\_ collision domain, \_\_\_\_\_ broadcast domain  
 D. Router : \_\_\_\_\_ collision domain, \_\_\_\_\_ broadcast domain



b. In the following work area, draw a line from the OSI model layer definition on the left to its description on the right. [4]

Layer

Transport

Physical

Data Link

Network

Description

Framing

End-to-end connection

Routing

Conversion to bits

### QUESTION 2

Match the following terms with their appropriate description

[20]

Problem	Possible Solution
Which two ICMPv6 types are used for testing IPv6 reachability?	33-33-FF-17-FC-0F
What is the corresponding Ethernet address for FF02:0000:0000:0000:0000:0001:FF17:FC0F?	:::1
Which type of address is not meant to be routed?	Anycast
What type of address is this: FE80::/10?	Link-local
Which type of address is meant to be delivered to multiple interfaces?	FE80::/10

Which type of address identifies multiple interfaces, but packets are delivered only to the first address it finds?	128 and 129
Which routing protocol uses multicast address FF02::5?	OSPFv3
IPv4 had a loopback address of 127.0.0.1. What is the IPv6 loopback address?	Multicast
What does a link-local address always start with?	FE02::2
Which IPv6 address is the all-router multicast group?	Link-local

### **SECTION C (50 MARKS)**

#### **QUESTION 1 (25)**

Write the subnet, broadcast address, and a valid host range for question 1 through question 6.

Then answer the remaining questions.

1. 192.168.100.25/30 [2]
2. 192.168.100.37/28 [2]
3. 192.168.100.66/27 [2]
4. 192.168.100.17/29 [2]
5. 192.168.100.99/26 [2]
6. 192.168.100.99/25 [2]
7. You have a Class B network and need 29 subnets. What is your mask? [4]
8. What is the broadcast address of 192.168.192.10/29? [3]
9. How many hosts are available with a Class C /29 mask? [3]
10. What is the subnet for host ID 10.16.3.65/23? [3]

#### **QUESTION 2 (25 MARKS)**

a. Convert from decimal IP address to binary format.

Complete the following table to express 192.168.10.15 in binary format.

128	64	32	16	8	4	2	1	Binary
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b. For each of the following situations, determine whether a straight-through, crossover, or rolled cable would be used. (16)

1. Host to host
2. Host to switch or hub
3. Router direct to host
4. Switch to switch
5. Router to switch or hub
6. Hub to hub
7. Hub to switch
8. Host to a router console serial communication (COM) port

\*\*\*\* END OF PAPER\*\*\*\*