

Câu 1:

a. User: 07cm

Vì request commad: USER nó mô tả đây là username

✓ USER 07cm\r\n

Request command: USER

Request arg: 07cm

Password: 654321

Vì request commad: PASS nó mô tả đây là password

✓ PASS 654321\r\n

Request command: PASS

Request arg: 654321

b. Địa chỉ IP client: 10.0.0.1

Vì client gửi request lên nên IP nguồn chính là IP client

6	4.932741	10.0.0.1	10.0.0.123	FTP	65	Request: USER 07cm
---	----------	----------	------------	-----	----	--------------------

Địa chỉ IP server: 10.0.0.123

Vì client trả phản hồi về nên IP nguồn chính là IP server

7	4.938077	10.0.0.123	10.0.0.1	FTP	90	Response: 331 User name okay, need password.
---	----------	------------	----------	-----	----	--

c. Client truy xuất lên Server theo mode: active

Vì client gửi gói PORT lên server

64	25.253959	10.0.0.1	10.0.0.123	FTP	76	Request: PORT 10,0,0,1,194,69
65	25.254698	10.0.0.123	10.0.0.1	FTP	84	Response: 200 PORT Command successful.

d. Port FPT server: 20

Server mở truyền dữ liệu sử dụng port: 20

75	25.262435	10.0.0.123	10.0.0.1	FTP	107	Response: 150 Opening ASCII mode data connection for /bin/ls.
76	25.272864	10.0.0.1	10.0.0.123	TCP	60	49733 → 20 [FIN, ACK] Seq=1 Ack=1672 Win=64240 Len=0

Port Client: 49733

Client dùng port 49733 để gửi dữ liệu đến server

75	25.262435	10.0.0.123	10.0.0.1	FTP	107	Response: 150 Opening ASCII mode data connection for /bin/ls.
76	25.272864	10.0.0.1	10.0.0.123	TCP	60	49733 → 20 [FIN, ACK] Seq=1 Ack=1672 Win=64240 Len=0

Câu 2:

a. FTP sử dụng giao thức TCP

6	11.428823	10.0.0.1	10.0.0.224	TCP	66	49788 → 21 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1
7	11.428985	10.0.0.224	10.0.0.1	TCP	66	21 → 49788 [SYN, ACK] Seq=0 Ack=1 Win=16384 Len=0 MSS=1460 WS=1 SACK_PERM=1
8	11.429211	10.0.0.1	10.0.0.224	TCP	60	49788 → 21 [ACK] Seq=1 Ack=1 Win=65700 Len=0

b. Port mặc định của 21

6	11.428823	10.0.0.1	10.0.0.224	TCP	66	49788 → 21 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1
7	11.428985	10.0.0.224	10.0.0.1	TCP	66	21 → 49788 [SYN, ACK] Seq=0 Ack=1 Win=16384 Len=0 MSS=1460 WS=1 SACK_PERM=1
8	11.429211	10.0.0.1	10.0.0.224	TCP	60	49788 → 21 [ACK] Seq=1 Ack=1 Win=65700 Len=0

c. User: cm07

Vì request command: USER nó mô tả đây là username

```
✓ USER cm07\r\n
  Request command: USER
  Request arg: cm07
```

Password: 123654

Vì request command: PASS nó mô tả đây là password

```
✓ PASS 123654\r\n
  Request command: PASS
  Request arg: 123654
```

d. 49788

6	11.428823	10.0.0.1	10.0.0.224	TCP	66	49788 → 21	[SYN]	Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1
7	11.428985	10.0.0.224	10.0.0.1	TCP	66	21 → 49788	[SYN, ACK]	Seq=0 Ack=1 Win=16384 Len=0 MSS=1460 WS=1 SACK_PERM=1
8	11.429211	10.0.0.1	10.0.0.224	TCP	60	49788 → 21	[ACK]	Seq=1 Ack=1 Win=65700 Len=0

e. Passive

Vì client gửi gói PASV

38	21.990088	10.0.0.1	10.0.0.224	FTP	60	Request: PASV
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f. Bước 1: Client bắt đầu connection với máy chủ bằng cách gửi một packet với cờ "SYN" đến máy chủ. Chương trình trên máy con sẽ hỏi hệ điều hành cung cấp cho một cổng là 49788 để mở connection với máy chủ. Tương tự như vậy, máy chủ sẽ hỏi hệ điều hành để nhận được quyền chờ tín hiệu trong máy chủ cổng 21

2. SYN/ACK: khi yêu cầu mở connection được máy chủ nhận được tại cổng đang mở, server sẽ gửi lại packet chấp nhận với 2 bit cờ là SYN và ACK.

3. ACK: khi client nhận được SYN/ACK packet thì sẽ trả lời bằng ACK packet.

6	11.428823	10.0.0.1	10.0.0.224	TCP	66	49788 → 21	[SYN]	Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1
7	11.428985	10.0.0.224	10.0.0.1	TCP	66	21 → 49788	[SYN, ACK]	Seq=0 Ack=1 Win=16384 Len=0 MSS=1460 WS=1 SACK_PERM=1
8	11.429211	10.0.0.1	10.0.0.224	TCP	60	49788 → 21	[ACK]	Seq=1 Ack=1 Win=65700 Len=0

g. SYN : Client bắt đầu connection với máy chủ bằng cách gửi một packet với cờ "SYN" đến máy chủ. Chương trình trên máy con sẽ hỏi hệ điều hành cung cấp cho một cổng là 49792 để mở connection với máy chủ. Tương tự như vậy, máy chủ sẽ hỏi hệ điều hành để nhận được quyền chờ tín hiệu trong máy chủ cổng 5002

2. SYN/ACK: khi yêu cầu mở connection được máy chủ nhận được tại cổng đang mở, server sẽ gửi lại packet chấp nhận với 2 bit cờ là SYN và ACK.

3. ACK: khi client nhận được SYN/ACK packet thì sẽ trả lời bằng ACK packet.

45	22.006724	10.0.0.1	10.0.0.224	TCP	66 49792 → 5002	[SYN]	Seq=0 Win=8192 Len=0 MSS=1460 WS=4 SACK_PERM=1
46	22.006758	10.0.0.224	10.0.0.1	TCP	66 5002 → 49792	[SYN, ACK]	Seq=0 Ack=1 Win=16384 Len=0 MSS=1460 WS=1 SACK_PERM=1
47	22.006960	10.0.0.1	10.0.0.224	TCP	60 49792 → 5002	[ACK]	Seq=1 Ack=1 Win=65700 Len=0

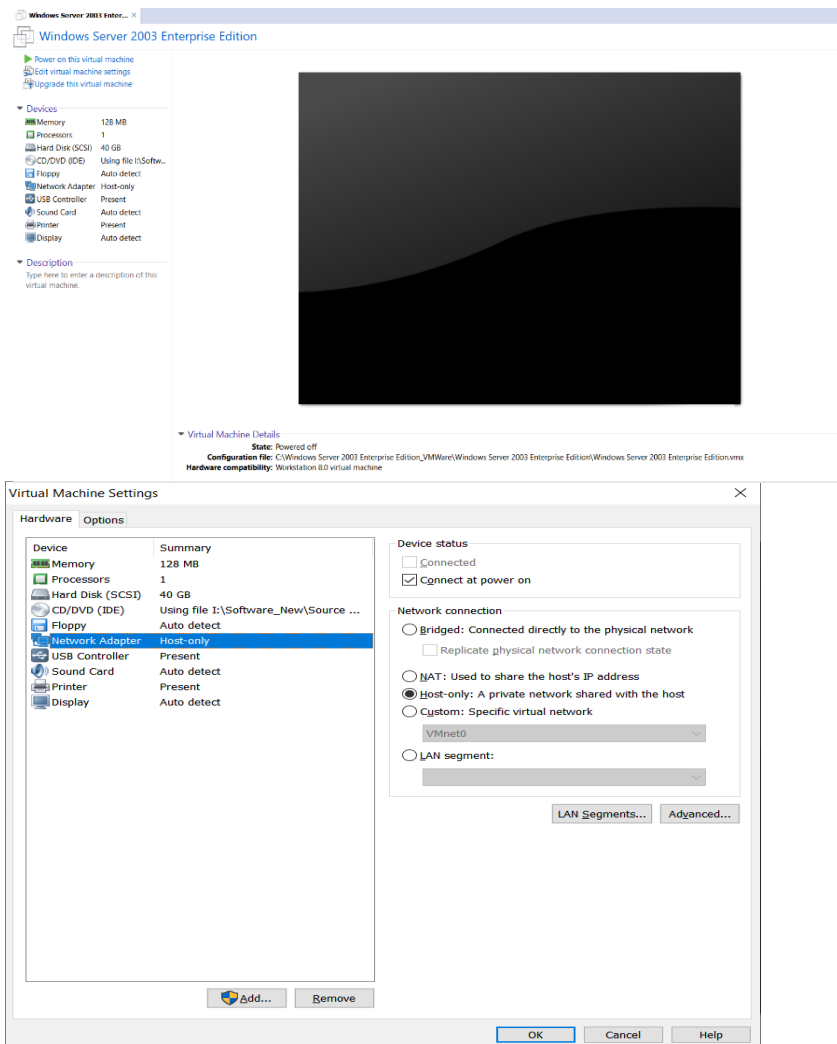
h. Client: 49792

Server: 5002

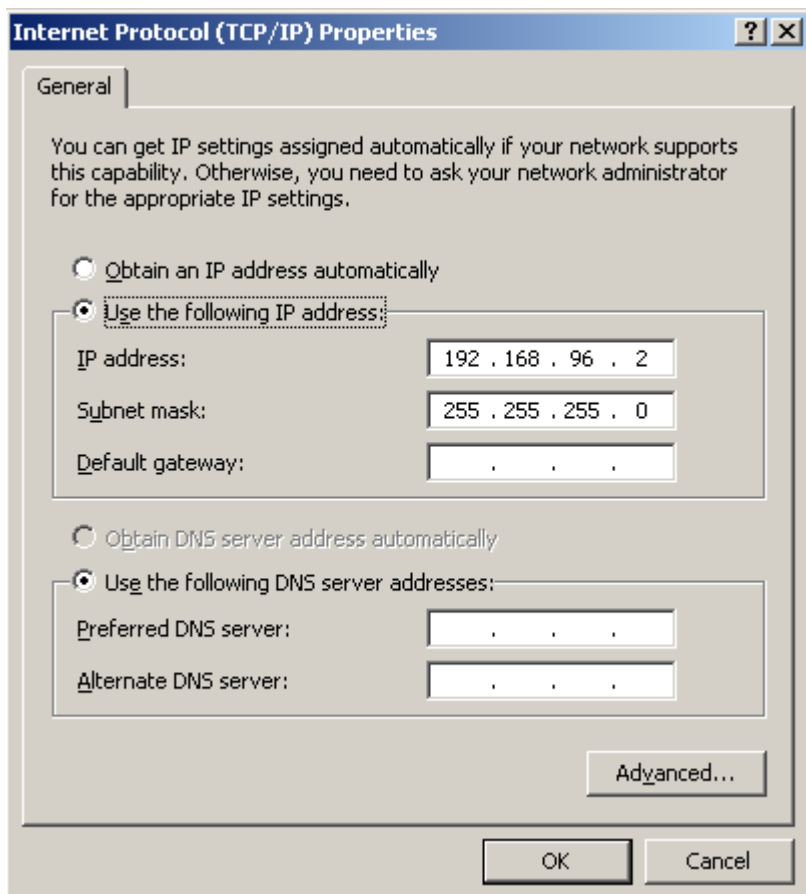
```
> Transmission Control Protocol, Src Port: 5002, Dst Port: 49792, Seq: 1, Ack: 1, Len: 1460
  FTP Data (1460 bytes data)
    [Setup frame: 43]
    [Setup method: PASV]
    [Command: CWD /]
    Command frame: 44
    [Current working directory: /]
  Line-based text data (21 lines)
```

Câu 3:

a. Dùng máy ảo window server 2003 và thiết lập card mạng host-only



b. Cấu hình địa chỉ IP tĩnh cho máy làm DHCP server



The image shows the 'Internet Protocol (TCP/IP) Properties' dialog box. The 'General' tab is selected. It contains instructions about automatic IP assignment. Two radio buttons are present: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below the selected option are three text boxes: 'IP address:' with '192 . 168 . 96 . 2', 'Subnet mask:' with '255 . 255 . 255 . 0', and 'Default gateway:' with three empty boxes. Another set of radio buttons is for DNS: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). Below this are 'Preferred DNS server:' and 'Alternate DNS server:' text boxes, each with three empty boxes. An 'Advanced...' button is at the bottom right of the main area. 'OK' and 'Cancel' buttons are at the very bottom.

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 96 . 2

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

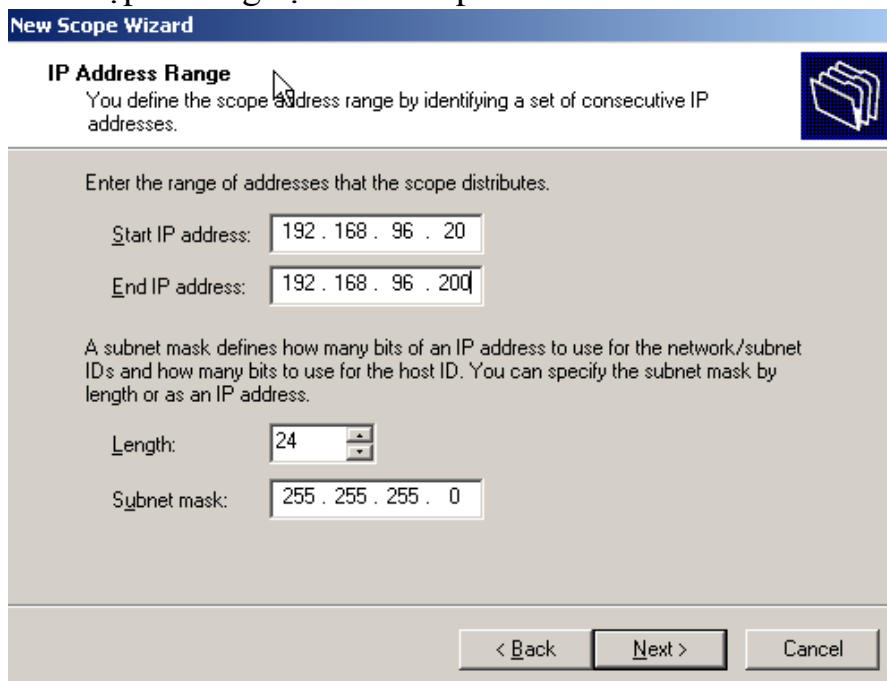
Preferred DNS server: . . .

Alternate DNS server: . . .

Advanced...

OK Cancel

c. Thiết lập khoảng địa chỉ IP cấp cho các clients



The image shows the 'New Scope Wizard' dialog box. The title bar says 'New Scope Wizard'. Below it is the section 'IP Address Range' with a mouse cursor pointing to it. The text says 'You define the scope address range by identifying a set of consecutive IP addresses.' To the right is a folder icon. The main area says 'Enter the range of addresses that the scope distributes.' and has two text boxes: 'Start IP address:' with '192 . 168 . 96 . 20' and 'End IP address:' with '192 . 168 . 96 . 200'. Below this is a paragraph explaining subnet masks. Then there is a 'Length:' label with a spinner box set to '24', and a 'Subnet mask:' label with a text box containing '255 . 255 . 255 . 0'. At the bottom are '< Back', 'Next >', and 'Cancel' buttons.

New Scope Wizard

IP Address Range

You define the scope address range by identifying a set of consecutive IP addresses.

Enter the range of addresses that the scope distributes.

Start IP address: 192 . 168 . 96 . 20

End IP address: 192 . 168 . 96 . 200

A subnet mask defines how many bits of an IP address to use for the network/subnet IDs and how many bits to use for the host ID. You can specify the subnet mask by length or as an IP address.

Length: 24

Subnet mask: 255 . 255 . 255 . 0

< Back Next > Cancel

d. Thiết lập khoảng địa chỉ IP dành riêng

New Scope Wizard

Add Exclusions
Exclusions are addresses or a range of addresses that are not distributed by the server.

Type the IP address range that you want to exclude. If you want to exclude a single address, type an address in Start IP address only.

Start IP address: End IP address:

Excluded address range:

192.168.96.50 to 192.168.96.70	<input type="button" value="Remove"/>
--------------------------------	---------------------------------------

< Back Next > Cancel

e. Thiết lập default gateway cung cấp cho các clients

New Scope Wizard

Router (Default Gateway)
You can specify the routers, or default gateways, to be distributed by this scope.

To add an IP address for a router used by clients, enter the address below.

IP address:

192.168.96.1	<input type="button" value="Remove"/>
--------------	---------------------------------------

< Back Next > Cancel

f. Thiết lập DNS server cung cấp cho các clients

The screenshot shows the 'New Scope Wizard' window with the title 'Domain Name and DNS Servers'. It explains that the Domain Name System (DNS) maps and translates domain names. The wizard allows specifying a parent domain and configuring DNS servers. The 'Parent domain' field is empty. Below, there are fields for 'Server name' and 'IP address'. The 'IP address' field contains '192.168.96.3'. Buttons for 'Add', 'Remove', 'Up', and 'Down' are next to the IP address field. A 'Resolve' button is next to the 'Server name' field. At the bottom are '< Back', 'Next >', and 'Cancel' buttons.

New Scope Wizard

Domain Name and DNS Servers
The Domain Name System (DNS) maps and translates domain names used by clients on your network.

You can specify the parent domain you want the client computers on your network to use for DNS name resolution.

Parent domain:

To configure scope clients to use DNS servers on your network, enter the IP addresses for those servers.

Server name: IP address:

g. Cấu hình một máy ảo khác làm DHCP client. Thiết lập card mạng của máy ảo này là Host-Only.



h. Tắt tính năng DHCP của phần mềm VMWare

Virtual Network Editor

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet1	Host-only	-	Connected	-	192.168.226.0
VMnet8	NAT	NAT	Connected	Enabled	192.168.111.0

< >

Add Network... Remove Network

VMnet Information

☐ Bridged (connect VMs directly to the external network)
Bridged to: Automatic Settings...



☐ NAT (shared host's IP address with VMs) NAT Settings...

☒ Host-only (connect VMs internally in a private network)

☒ Connect a host virtual adapter to this network
Host virtual adapter name: VMware Network Adapter VMnet1

☐ Use local DHCP service to distribute IP address to VMs DHCP Settings...

Subnet IP: Subnet mask:

 Administrator privileges are required to modify the network configuration.  Change Settings

Restore Defaults OK Cancel Apply Help

- i. Thực hiện xin cấp phát địa chỉ IP từ client đến DHCP server và dùng Wireshark để bắt gói tin

```

C:\Users\Administrator>ipconfig/release

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::3cbc:b8ca:7802:aef5%10
    Default Gateway . . . . . : 

Tunnel adapter Local Area Connection* 8:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\Users\Administrator>ipconfig/renew

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::3cbc:b8ca:7802:aef5%10
    IPv4 Address. . . . . : 192.168.96.23
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.96.1

Tunnel adapter Local Area Connection* 8:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\Users\Administrator>ipconfig/renew

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::3cbc:b8ca:7802:aef5%10
    IPv4 Address. . . . . : 192.168.96.23
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.96.1

Tunnel adapter Local Area Connection* 8:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\Users\Administrator>ipconfig/release

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::3cbc:b8ca:7802:aef5%10
    Default Gateway . . . . . : 

Tunnel adapter Local Area Connection* 8:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\Users\Administrator>ipconfig/renew

```

- j. Có 4 gói được truyền và nhận trong quá trình cấp phát địa chỉ IP

36	7.727030	0.0.0.0	255.255.255.255	DHCP	345 DHCP	Discover	- Transaction ID 0x4447e488
37	7.727393	192.168.96.2	255.255.255.255	DHCP	342 DHCP	Offer	- Transaction ID 0x4447e488
38	7.727486	0.0.0.0	255.255.255.255	DHCP	368 DHCP	Request	- Transaction ID 0x4447e488
39	7.728376	192.168.96.2	255.255.255.255	DHCP	342 DHCP	ACK	- Transaction ID 0x4447e488

k.

DHCP DISCOVER

IP nguồn: 0.0.0.0

IP đích: 255.255.255.255

MAC nguồn: 00:0c:29:cb:21:9a

MAC đích: ff:ff:ff:ff:ff:ff

Port nguồn: 68

Port đích: 67

- ▼ Ethernet II, Src: VMware_cb:21:9a (00:0c:29:cb:21:9a), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
 - > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
 - > Source: VMware_cb:21:9a (00:0c:29:cb:21:9a)
 - Type: IPv4 (0x0800)
- > Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
- > User Datagram Protocol, Src Port: 68, Dst Port: 67

DHCP OFFER

IP nguồn: 192.168.96.2

IP đích: 255.255.255.255

MAC nguồn: 00:0c:29:82:63:57

MAC đích: ff:ff:ff:ff:ff:ff

Port nguồn: 67

Port đích: 68

- ▼ Ethernet II, Src: VMware_82:63:57 (00:0c:29:82:63:57), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
 - > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
 - > Source: VMware_82:63:57 (00:0c:29:82:63:57)
 - Type: IPv4 (0x0800)
- > Internet Protocol Version 4, Src: 192.168.96.2, Dst: 255.255.255.255
- > User Datagram Protocol, Src Port: 67, Dst Port: 68

DHCP REQUEST

IP nguồn: 0.0.0.0

IP đích: 255.255.255.255

MAC nguồn: 00:0c:29:cb:21:9a

MAC đích: ff:ff:ff:ff:ff:ff

Port nguồn: 68

Port đích: 67

```
✓ Ethernet II, Src: VMware_cb:21:9a (00:0c:29:cb:21:9a), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  > Source: VMware_cb:21:9a (00:0c:29:cb:21:9a)
    Type: IPv4 (0x0800)
  > Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
  > User Datagram Protocol, Src Port: 68, Dst Port: 67
```

DHCP ACK

IP nguồn: 192.168.96.2

IP đích: 255.255.255.255

MAC nguồn: 00:0c:29:82:63:57

MAC đích: ff:ff:ff:ff:ff:ff

Port nguồn: 67

Port đích: 68

```
✓ Ethernet II, Src: VMware_82:63:57 (00:0c:29:82:63:57), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  > Source: VMware_82:63:57 (00:0c:29:82:63:57)
    Type: IPv4 (0x0800)
  > Internet Protocol Version 4, Src: 192.168.96.2, Dst: 255.255.255.255
  > User Datagram Protocol, Src Port: 67, Dst Port: 68
```

1. Thông tin default gateway nằm trong gói tin Offer ở option: (3) Router
Thông tin DNS server nằm trong gói tin Offer ở option: (6) Domain Name Server

```
> Option: (3) Router
> Option: (6) Domain Name Server
```

Câu 4:

- a. Thực hiện lệnh ping từ client đến server

```
Administrator: Command Prompt
Microsoft Windows [Version 6.0.60021]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping 192.168.96.2

Pinging 192.168.96.2 with 32 bytes of data:
Reply from 192.168.96.2: bytes=32 time<1ms TTL=128
Reply from 192.168.96.2: bytes=32 time<1ms TTL=128
Reply from 192.168.96.2: bytes=32 time<1ms TTL=128
Reply from 192.168.96.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.96.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>_
```

- b. Có 4 gói tin trong quá trình thực hiện lệnh ping

5	3.061131	192.168.96.23	192.168.96.2	ICMP	74 Echo (ping) request	id=0x0001, seq=1/256, ttl=128 (reply in 6)
6	3.061404	192.168.96.2	192.168.96.23	ICMP	74 Echo (ping) reply	id=0x0001, seq=1/256, ttl=128 (request in 5)
8	4.072575	192.168.96.23	192.168.96.2	ICMP	74 Echo (ping) request	id=0x0001, seq=2/512, ttl=128 (reply in 9)
9	4.073387	192.168.96.2	192.168.96.23	ICMP	74 Echo (ping) reply	id=0x0001, seq=2/512, ttl=128 (request in 8)
11	5.086185	192.168.96.23	192.168.96.2	ICMP	74 Echo (ping) request	id=0x0001, seq=3/768, ttl=128 (reply in 12)
12	5.086819	192.168.96.2	192.168.96.23	ICMP	74 Echo (ping) reply	id=0x0001, seq=3/768, ttl=128 (request in 11)
13	6.099880	192.168.96.23	192.168.96.2	ICMP	74 Echo (ping) request	id=0x0001, seq=4/1024, ttl=128 (reply in 14)
14	6.100182	192.168.96.2	192.168.96.23	ICMP	74 Echo (ping) reply	id=0x0001, seq=4/1024, ttl=128 (request in 13)

- c. MAC nguồn: 00:0c:29:cb:21:9a

MAC đích: 00:0c:29:82:63:57

```
▼ Ethernet II, Src: VMware_cb:21:9a (00:0c:29:cb:21:9a), Dst: VMware_82:63:57 (00:0c:29:82:63:57)
  > Destination: VMware_82:63:57 (00:0c:29:82:63:57)
  > Source: VMware_cb:21:9a (00:0c:29:cb:21:9a)
  Type: IPv4 (0x0800)
```

- d. IP nguồn: 192.168.96.23

IP đích :192.168.96.2

5	3.061131	192.168.96.23	192.168.96.2	ICMP	74 Echo (ping) request	id=0x0001, seq=1/256, ttl=128 (reply in 6)
---	----------	---------------	--------------	------	------------------------	--

- e. Nội dung phần data của gói tin ICMP:

6162636465666768696a6b6c6d6e6f7071727374757677616263646566676869

▼ Data (32 bytes)

```
Data: 6162636465666768696a6b6c6d6e6f707172737475767761...
[Length: 32]
```

