

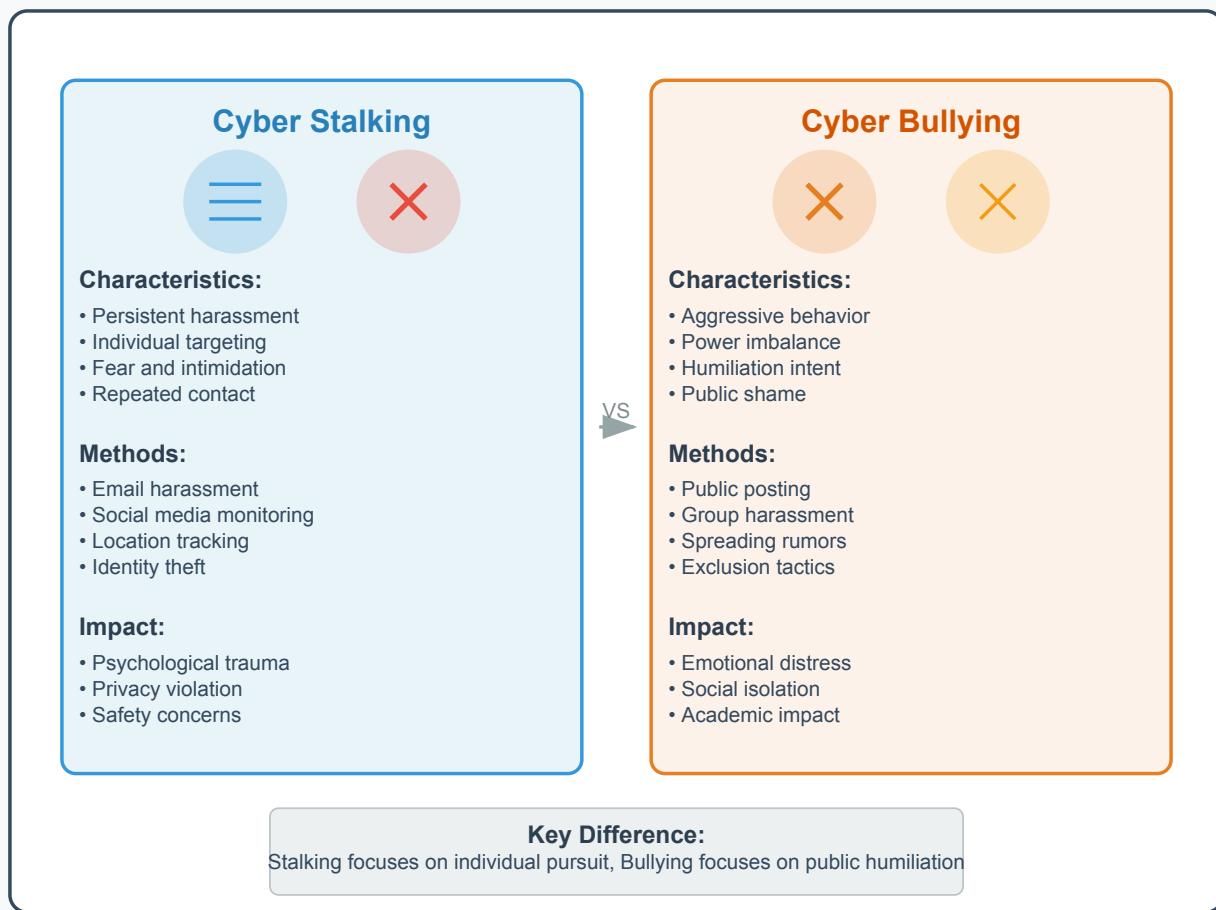
Question 1 [4 marks]

Describe cyber stalking and cyber bullying in detail.

Answer:

Digital Harassment Comparison:

Cyber Stalking vs. Cyber Bullying



Aspect	Cyber Stalking	Cyber Bullying
Target	Specific individual	Often minors
Duration	Persistent, long-term	Can be episodic
Intent	Intimidation, control	Harassment, humiliation
Platform	Social media, email	Schools, gaming platforms

Cyber Stalking Characteristics:

- Persistent unwanted contact
- Monitoring victim's online activity
- Threatening messages or behavior

- Identity theft or impersonation

Cyber Bullying Forms:

- Public humiliation online
- Exclusion from digital groups
- Spreading false information
- Sharing private content without consent

Prevention Measures:

- Privacy settings on social media
- Reporting harassment to platforms
- Legal action when necessary
- Digital literacy education

Mnemonic: "Stop Bullying, Report Stalking"

Question 2 [3 marks]

Explain Property based classification in cybercrime.

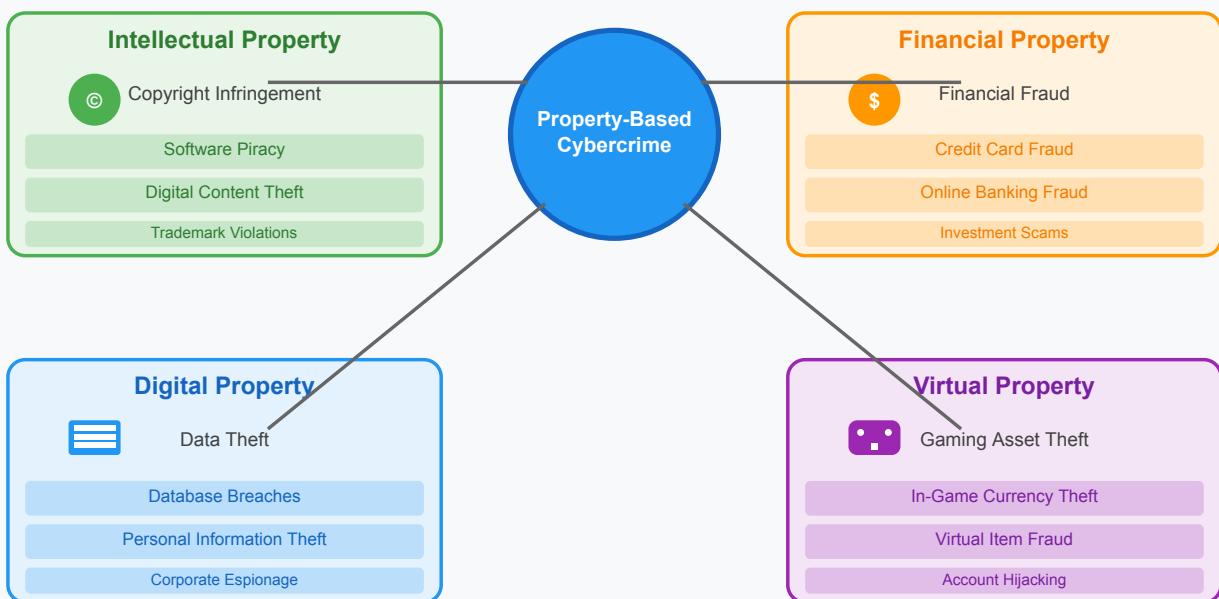
Answer:

Property-Based Cybercrime Categories:

Category	Crime Type	Description	Example
Intellectual Property	Copyright infringement	Unauthorized use of copyrighted material	Software piracy
Financial Property	Credit card fraud	Unauthorized use of financial information	Online shopping fraud
Digital Property	Data theft	Stealing digital information	Database breaches
Virtual Property	Gaming asset theft	Stealing virtual goods	Online game currency theft

Diagram:

Property-Based Cybercrime Classification



Economic Impact on Industries

Software Industry

\$90B+ annually

Banking Sector

\$18B+ annually

Gaming Industry

\$3B+ annually

Media & Entertainment

\$52B+ annually

Legal Protection Mechanisms

Copyright Laws

Trademark Laws

Patent Laws

Trade Secret Laws

Cyber Crime Laws

Legal Aspects:

- Copyright Laws:** Protect creative works
- Trademark Laws:** Protect brand identity
- Patent Laws:** Protect inventions
- Trade Secret Laws:** Protect confidential information

Impact on Economy:

- Revenue loss for legitimate businesses
- Reduced innovation incentives
- Consumer trust erosion
- Legal enforcement costs

Prevention Strategies:

- Digital rights management (DRM)
- Watermarking and tracking
- Legal enforcement mechanisms
- Public awareness campaigns

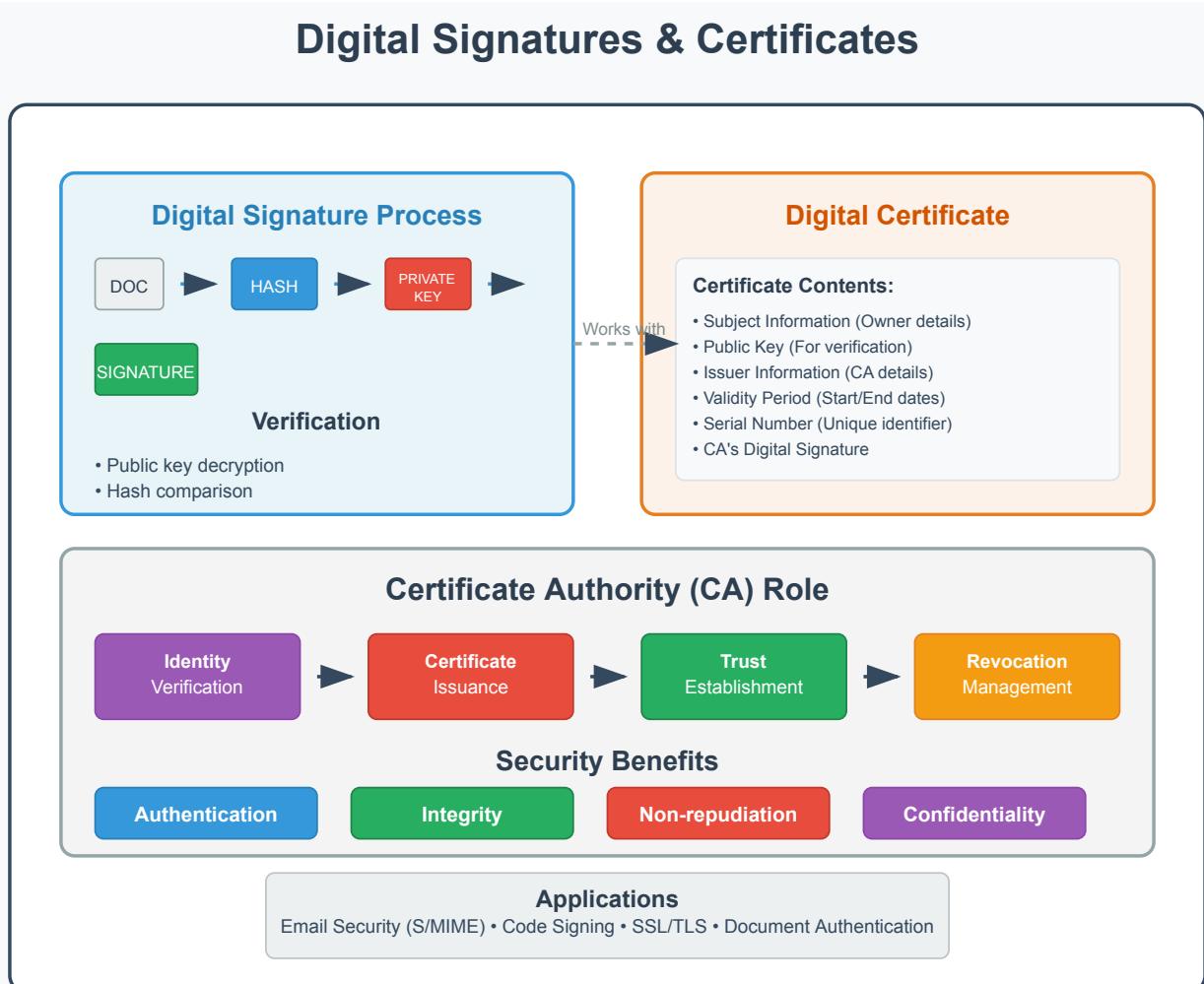
Mnemonic: "Property Protection Prevents Piracy"

Question 3 [7 marks]

Explain the role of digital signatures and digital certificates in cybersecurity.

Answer:

Digital Security Components:



Component	Purpose	Function	Benefit
Digital Signature	Authentication	Proves sender identity	Non-repudiation
Digital Certificate	Verification	Validates public keys	Trust establishment

Digital Signature Process:



Digital Certificate Components:

- Subject Information:** Certificate owner details
- Public Key:** For encryption/verification

- **Digital Signature:** CA's signature
- **Validity Period:** Certificate expiration date

Certificate Authority (CA) Role:

- Issues digital certificates
- Verifies identity before issuance
- Maintains certificate revocation lists
- Provides trust infrastructure

Applications in Cybersecurity:

- Email security (S/MIME)
- Code signing for software
- SSL/TLS certificates for websites
- Document authentication

Security Benefits:

- **Authentication:** Verifies sender identity
- **Integrity:** Ensures data hasn't been modified
- **Non-repudiation:** Prevents denial of actions
- **Confidentiality:** Enables secure communication

Mnemonic: "Digital Signatures Authenticate Documents Securely"

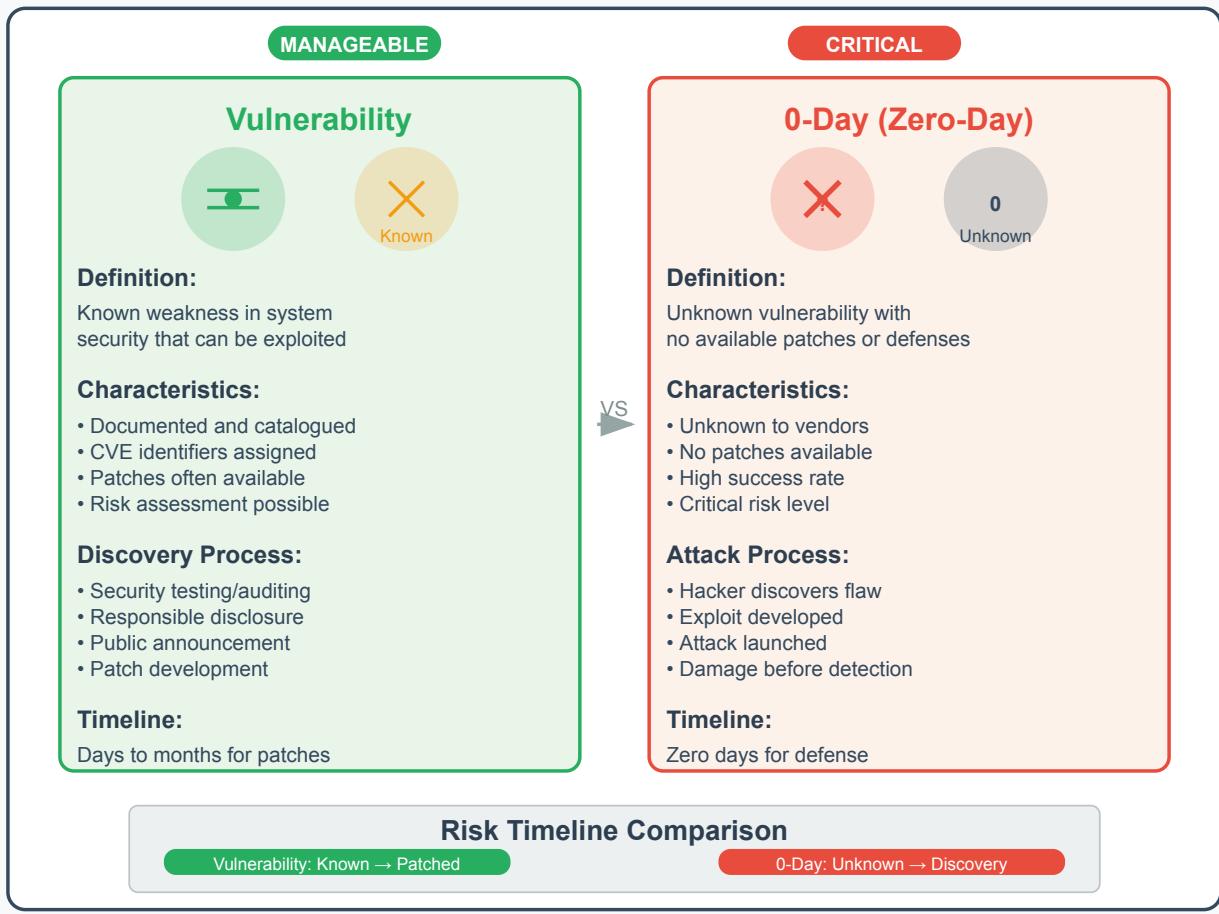
Question 4 [4 marks]

Explain Vulnerability and 0-Day terminology of Hacking.

Answer:

Security Terminology:

Vulnerability vs. 0-Day



Term	Definition	Risk Level	Example
Vulnerability	System weakness	Varies	Unpatched software
0-Day	Unknown vulnerability	Critical	Undiscovered flaw

Vulnerability Characteristics:

- Discovery:** Found through security testing
- Disclosure:** Responsible reporting to vendors
- Patching:** Vendor provides security updates
- Window:** Time between discovery and patch

0-Day Attack Process:

- Hacker discovers unknown vulnerability
- Exploits flaw before vendor awareness
- No available patches or defenses
- High success rate due to surprise element

Protection Strategies:

- Regular security updates
- Intrusion detection systems
- Behavioral analysis tools
- Zero-trust security models

Mnemonic: "Vulnerabilities Need Patches, Zero-Days Need Vigilance"

Question 5 [3 marks]

Explain any three basic commands of Kali Linux with suitable example.

Answer:

Essential Kali Linux Commands:

Kali Linux Terminal - Essential Commands

Essential Kali Linux Commands for Penetration Testing

nmap
Function: Network scanning

```
$ nmap -sS 192.168.1.1
```

Stealth SYN scan on target
Discovers open ports

netcat (nc)
Function: Network communication

```
$ nc -l -p 1234
```

Listen on port 1234
Create backdoor connections

hydra
Function: Password cracking

```
$ hydra -l admin -P pass.txt ssh://target
```

Brute force SSH login
Dictionary attack

Typical Penetration Testing Workflow

```
Step 1: Reconnaissance: nmap -sS target_network
         Step 2: Exploitation: nc target_ip target_port
         Step 3: Credential Attack: hydra -L users -P passwords service://target
```

Advanced Usage Examples

nmap Advanced:

```
-sV (version detection)
-0 (OS detection)
```

netcat Advanced:

```
-e (execute program)
-u (UDP mode)
```

hydra Advanced:

```
-t (parallel tasks)
-f (stop on first success)
```

⚠ These tools should only be used on systems you own or have explicit permission to test

Command	Function	Example
nmap	Network scanning	<code>nmap -sS 192.168.1.1</code>
netcat	Network communication	<code>nc -l -p 1234</code>
hydra	Password cracking	<code>hydra -l admin -P passwords.txt ssh://target</code>

- **Nmap:** Discovers hosts and services on network
- **Netcat:** Creates network connections for data transfer
- **Hydra:** Performs brute-force password attacks

Mnemonic: "Network Map, Connect, Crack"

Question 6 [7 marks]

Explain Five Steps of Hacking.

Answer:

Hacking Methodology:



Detailed Steps:

Step	Description	Tools/Methods	Objective
Reconnaissance	Information gathering	Google dorking, Social media	Target profiling
Scanning	System enumeration	Nmap, Nessus	Vulnerability identification
Gaining Access	Exploit vulnerabilities	Metasploit, Custom exploits	System compromise
Maintaining Access	Persistent presence	Backdoors, Rootkits	Long-term control
Covering Tracks	Evidence removal	Log cleaning, File deletion	Avoid detection

Information Gathering Types:

- Passive:** No direct target contact
- Active:** Direct interaction with target systems

Scanning Techniques:

- Port scanning for open services
- Vulnerability scanning for weaknesses
- Network mapping for topology

Access Methods:

- Password attacks (brute force, dictionary)
- Exploit vulnerabilities
- Social engineering
- Physical access

Persistence Mechanisms:

- Installing backdoors
- Creating user accounts
- Scheduling tasks
- Registry modifications

Track Covering Methods:

- Clearing system logs
- Deleting temporary files
- Modifying timestamps
- Using encryption

Mnemonic: "Reconnaissance Scans Generate Access, Maintain Coverage"

Question 7 [3 marks]

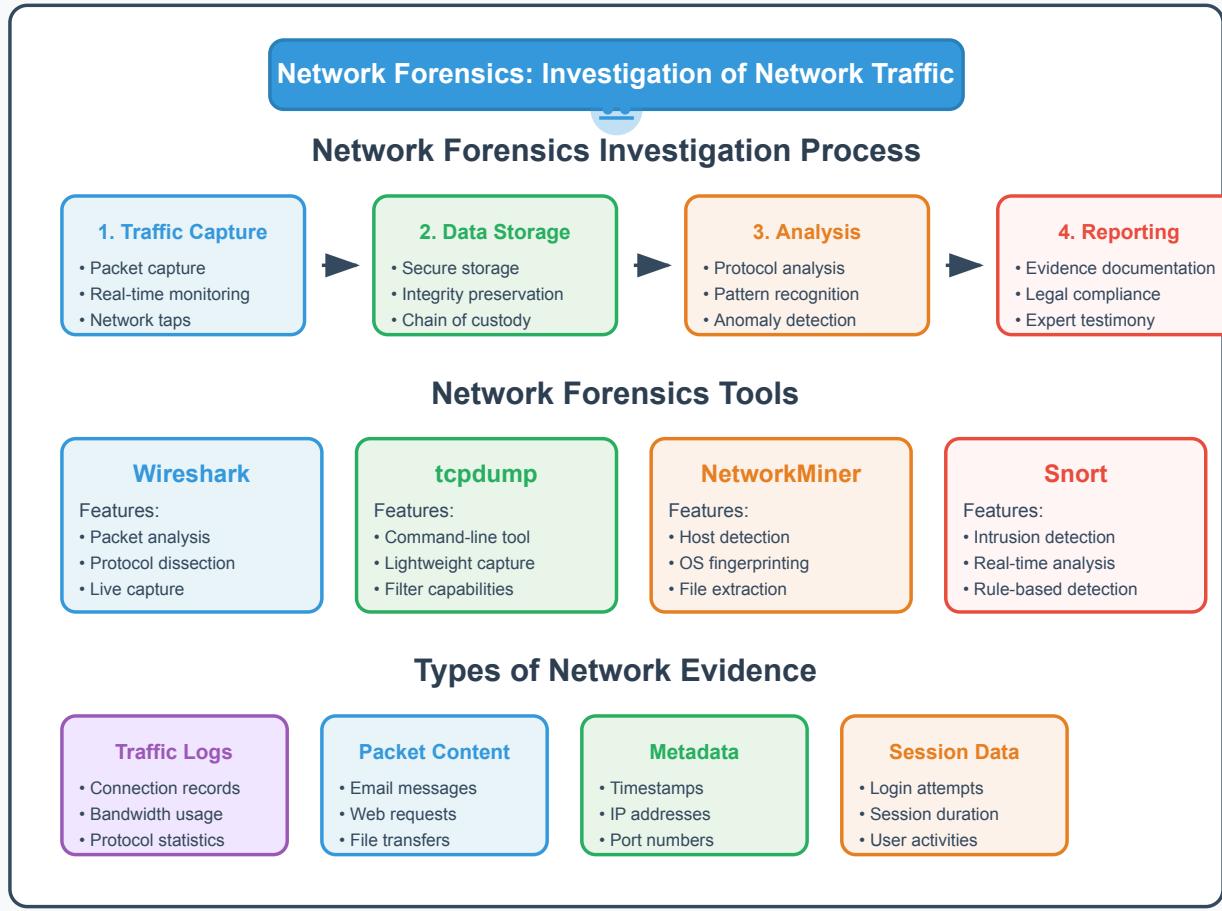
Explain Network forensics.

Answer:

Network Forensics Definition:

Investigation of network traffic to detect and analyze security incidents.

Network Forensics Process



Key Components:

Component	Purpose	Tools
Traffic Capture	Record network data	Wireshark, tcpdump
Analysis	Examine patterns	NetworkMiner, Snort
Evidence	Document findings	Forensic reports

- **Scope:** Analyzes packets, flows, and network behavior
- **Objective:** Identify security breaches and attack patterns
- **Challenge:** Large data volumes and real-time processing

Mnemonic: "Network Forensics Finds Facts"

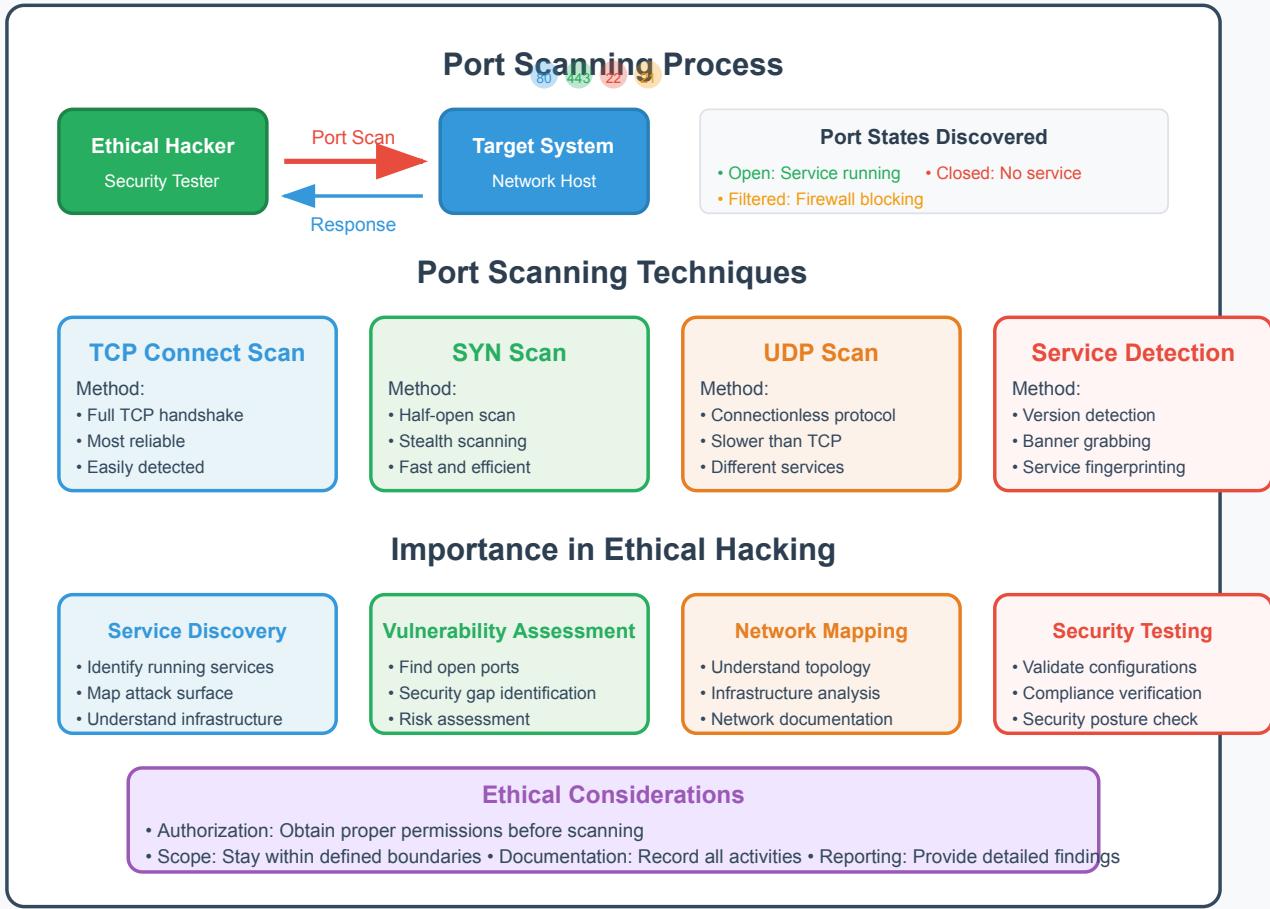
Question 8 [4 marks]

Explain the importance of port scanning in ethical hacking.

Answer:

Port Scanning in Ethical Hacking:

Port Scanning in Ethical Hacking



Aspect	Importance	Benefit
Service Discovery	Identify running services	Attack surface mapping
Vulnerability Assessment	Find open ports	Security gap identification
Network Mapping	Understand topology	Infrastructure analysis
Security Testing	Validate configurations	Compliance verification

Port Scanning Techniques:

- **TCP Connect**: Full connection establishment
- **SYN Scan**: Stealth scanning method
- **UDP Scan**: User Datagram Protocol scanning
- **Service Detection**: Identify service versions

Ethical Considerations:

- **Authorization**: Obtain proper permissions
- **Scope**: Stay within defined boundaries
- **Documentation**: Record all activities

- **Reporting:** Provide detailed findings

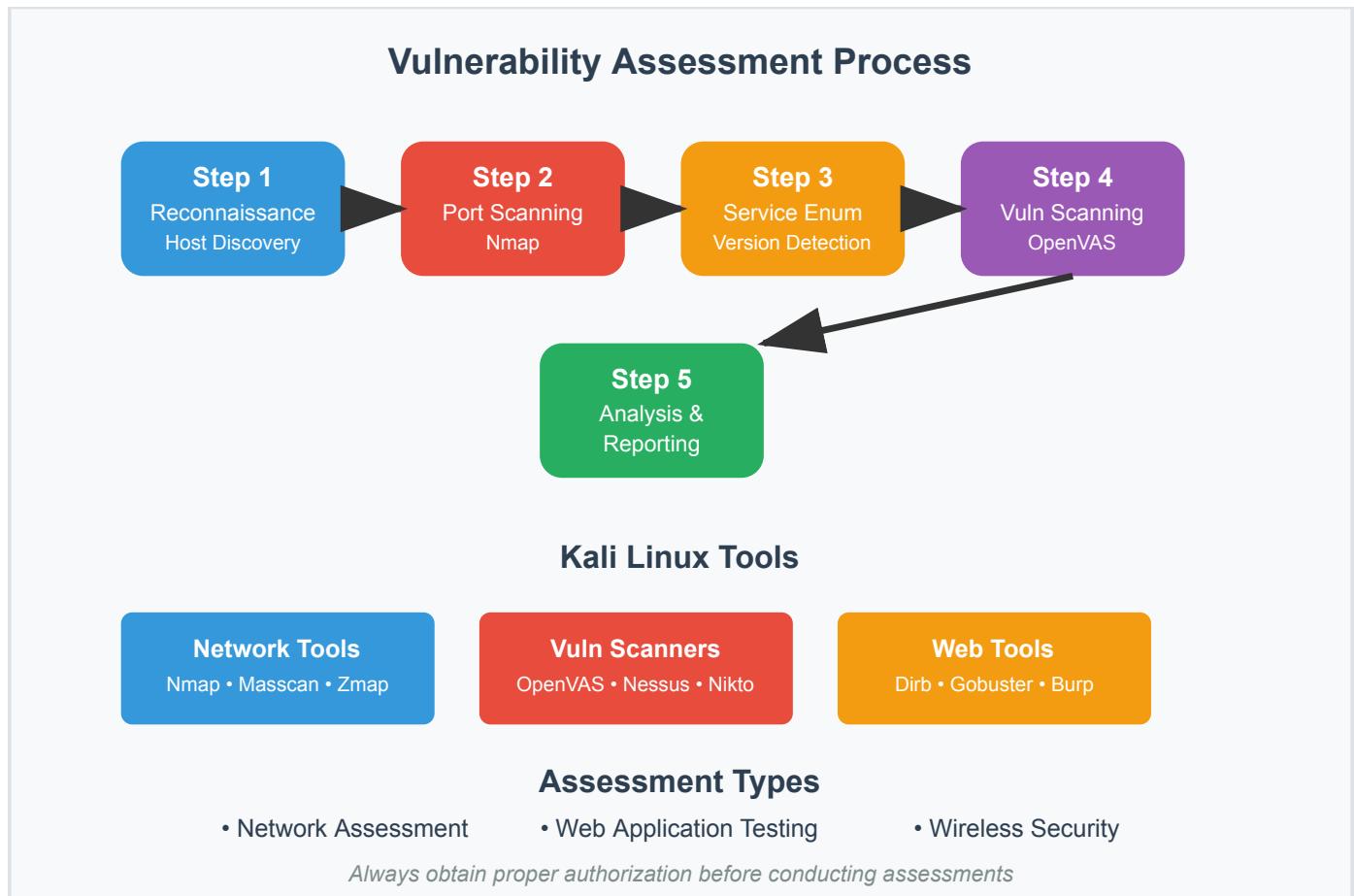
Mnemonic: "Port Scanning Provides Security Insights"

Question 9 [7 marks]

Describe the process of conducting a vulnerability assessment using Kali Linux tools.

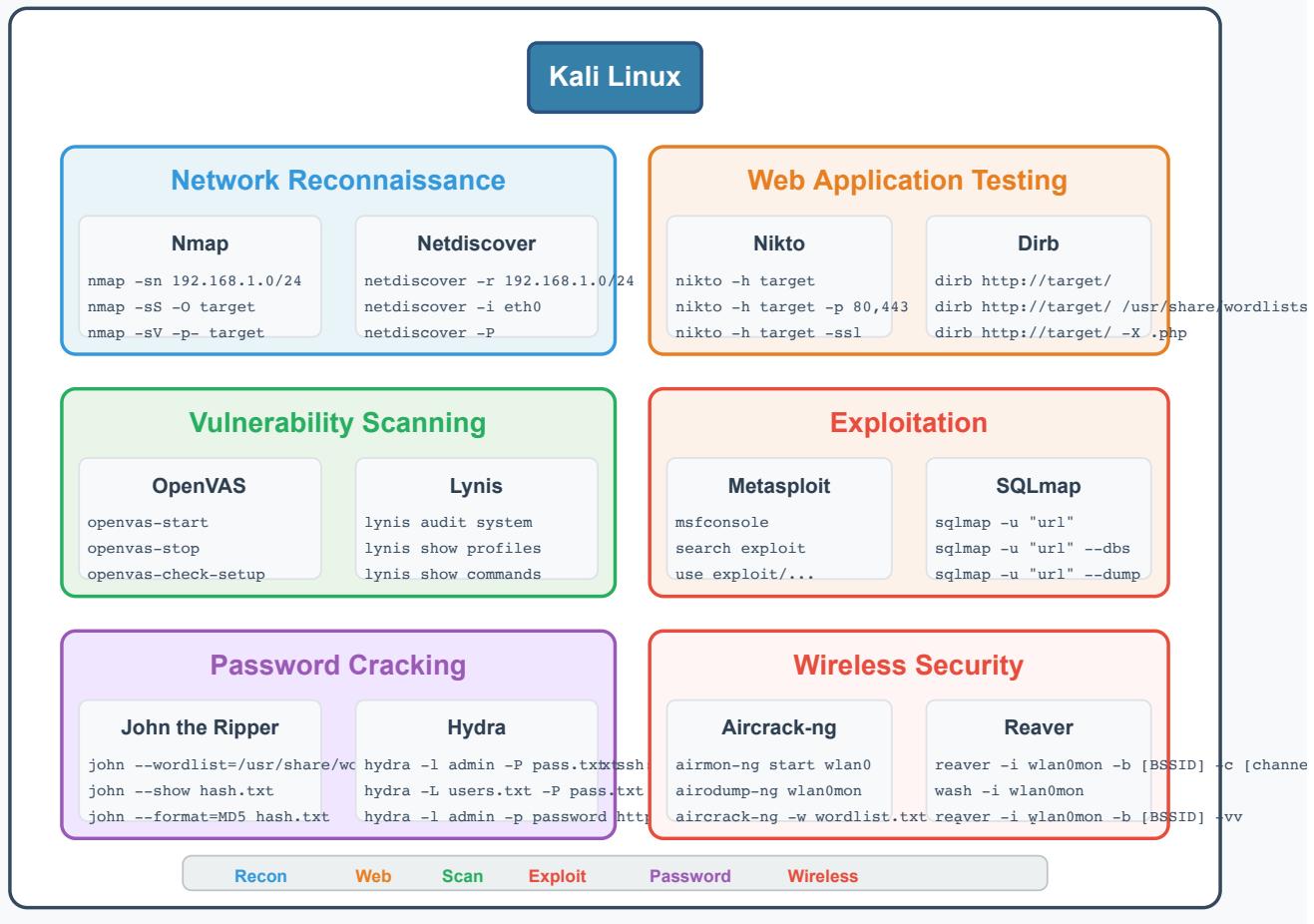
Answer:

Vulnerability Assessment Process:



Kali Linux Tools and Commands:

Kali Linux Commands for Ethical Hacking



Step-by-Step Process:

Step	Kali Tool	Command Example	Purpose
Reconnaissance	Nmap	<pre>nmap -sn 192.168.1.0/24</pre>	Host discovery
Port Scanning	Nmap	<pre>nmap -sS -O target</pre>	Open port identification
Service Enumeration	Nmap, Banner grabbing	<pre>nmap -sV target</pre>	Service version detection
Vulnerability Scanning	OpenVAS, Nessus	<pre>openvas-start</pre>	Automated vulnerability detection
Web Application Testing	Nikto, Dirb	<pre>nikto -h target</pre>	Web vulnerability scanning

Detailed Process:

Phase 1 - Target Identification:

- Use Nmap for network discovery
- Identify live hosts and their IP addresses
- Document network topology

- Determine target scope

Phase 2 - Port and Service Analysis:

- Perform comprehensive port scans
- Identify running services and versions
- Check for default credentials
- Analyze service configurations

Phase 3 - Automated Vulnerability Scanning:

- Configure vulnerability scanners (OpenVAS)
- Run comprehensive scans
- Analyze scan results
- Prioritize findings by severity

Phase 4 - Manual Testing:

- Verify automated findings
- Perform targeted testing
- Test for specific vulnerabilities
- Validate false positives

Phase 5 - Web Application Assessment:

- Use web vulnerability scanners
- Test for OWASP Top 10 vulnerabilities
- Analyze application logic
- Check for misconfigurations

Common Kali Tools:

Tool	Function	Use Case
Nmap	Network scanning	Port and service discovery
OpenVAS	Vulnerability scanning	Automated assessment
Nikto	Web scanning	Web server vulnerabilities
Dirb	Directory brute forcing	Hidden file discovery
SQLmap	SQL injection testing	Database vulnerabilities
Burp Suite	Web proxy	Manual web testing
Metasploit	Exploitation framework	Vulnerability validation

Assessment Methodology:

- **Scope Definition:** Clearly define assessment boundaries
- **Information Gathering:** Collect target intelligence
- **Vulnerability Detection:** Use multiple scanning methods
- **Risk Assessment:** Evaluate impact and likelihood
- **Remediation Planning:** Provide actionable recommendations

Reporting Components:

- **Executive Summary:** High-level findings for management
- **Technical Details:** Detailed vulnerability descriptions
- **Risk Ratings:** CVSS scores and business impact
- **Remediation Steps:** Specific mitigation recommendations
- **Supporting Evidence:** Screenshots and proof-of-concept

Best Practices:

- **Authorization:** Always obtain written permission
- **Documentation:** Maintain detailed logs of all activities
- **Minimal Impact:** Avoid disrupting production systems
- **Confidentiality:** Protect sensitive information discovered

Mnemonic: "Vulnerability Assessment Validates Application Security"