



# PRESIDENCY UNIVERSITY

BENGALURU

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## End - Term Examinations – December 2025

Date: 17 – 12- 2025

Time: 01:00pm – 04:00pm

<b>School:</b> SOCSE	<b>Program:</b> B. Tech		
<b>Course Code:</b> CSN2500	<b>Course Name:</b> Firewalls and Internet Security		
<b>Semester:</b> V	<b>Max Marks:</b> 100	<b>Weightage:</b> 50%	

CO - Levels	C01	C02	C03
Marks	33	33	34

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

Q.No.	Question	Marks	Level	CO
1.	Define a Firewall and explain its primary purpose in a network.	2 Marks	L1	C01
2.	Differentiate between Positive Bias and Negative Bias firewall policies.	2 Marks	L2	C01
3.	List the three core goals of the CIA Triad in computer security.	2 Marks	L1	C02
4.	Explain the purpose of a Hash Function in the creation of a Digital Signature.	2 Marks	L2	C03
5.	What is a Demilitarized Zone (DMZ) in firewall architecture?	2 Marks	L2	C01
6.	State the primary service (Confidentiality or Integrity) provided by IPsec's AH protocol.	2 Marks	L1	C03
7.	Give one example of a real-world threat to system Availability.	2 Marks	L3	C02
8.	What is Non-Repudiation, and which element of PKI ensures it?	2 Marks	L2	C03
9.	Define Computer Security and state its main goal concerning data.	2 Marks	L3	C02
10.	Which section of the IT Act, 2000 primarily addresses unauthorized computer access and data theft?	2 Marks	L1	C03

## Part B

### Answer the Questions.

**Total Marks 80M**

<b>11.</b>	<b>a.</b>	Compare and contrast the working mechanisms of Packet Filtering Firewalls and Stateful Inspection Firewalls. Explain why one offers better security than the other.	<b>10 Marks</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Explain the working principle of a Proxy Firewall. Discuss one major benefit and one drawback of this type of firewall.	<b>5 Marks</b>	<b>L3</b>	<b>CO1</b>
	<b>c.</b>	Describe the three main Firewall Deployment Architectures.	<b>5 Marks</b>	<b>L1</b>	<b>CO1</b>
<b>Or</b>					
<b>12.</b>	<b>a.</b>	Detail the Next-Generation Firewall (NGFW). Explain its advantages over traditional Packet Filtering firewalls.	<b>10 Marks</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Explain the working principle of a Proxy Firewall. Discuss one major benefit and one drawback of this type of firewall.	<b>5 Marks</b>	<b>L2</b>	<b>CO1</b>
	<b>c.</b>	Describe the three main Firewall Deployment Architecture.	<b>5 Marks</b>	<b>L2</b>	<b>CO1</b>
<b>Or</b>					
<b>13.</b>	<b>a.</b>	Illustrate the CIA Triad. Explain how a security attack targeting each component would lead to a "Loss of Confidentiality," "Loss of Integrity," and "Loss of Availability."	<b>10 Marks</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain the need for security based on the four key areas mentioned - Protect data, Prevent tampering, Compliance & trust, Business continuity.	<b>5 Marks</b>	<b>L2</b>	<b>CO2</b>
	<b>c.</b>	Define Computer Security and explain the relationship between a firewall and the overall objective of computer security.	<b>5 Marks</b>	<b>L2</b>	<b>CO2</b>
<b>Or</b>					
<b>14.</b>	<b>a.</b>	Describe the main principles of the Biba Security Model and how it primarily focuses on preventing a Loss of Integrity. Explain its two main rules.	<b>10 Marks</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain the concept of Polymorphic Attacks.	<b>5 Marks</b>	<b>L2</b>	<b>CO2</b>
	<b>c.</b>	What are the three common Web Security Considerations (vulnerabilities)? Explain the mechanism of Cross-Site Scripting (XSS).	<b>5 Marks</b>	<b>L2</b>	<b>CO2</b>
<b>Or</b>					
<b>15.</b>	<b>a.</b>	Explain the step-by-step process of establishing a secure connection using SSL/TLS. Discuss how it ensures both confidentiality and authenticity of communication.	<b>10 Marks</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	In simple terms, explain how a Digital Signature works. Describe the three main steps: 1) making the unique fingerprint (hashing), 2) locking the fingerprint (signing with private key), and 3) checking the signature (verification with public key).	<b>5 Marks</b>	<b>L2</b>	<b>CO3</b>

	<b>c.</b>	Explain the two main Modes of Operation in IPsec: Transport Mode and Tunnel Mode. Detail their usage scenarios.	<b>5 Marks</b>	<b>L2</b>	<b>C03</b>
<b>Or</b>					
<b>16.</b>	<b>a.</b>	Discuss the Information Technology Act, 2000 (IT Act, 2000), by explaining its primary purpose and the digital elements it made official.	<b>10 Marks</b>	<b>L2</b>	<b>C03</b>
	<b>b.</b>	What is Public Key Infrastructure (PKI)? Explain how it uses digital keys to provide two main services for secure email: Confidentiality (privacy) and Authentication (proving identity).	<b>5 Marks</b>	<b>L2</b>	<b>C03</b>
	<b>c.</b>	IPsec uses two main security tools: AH (Authentication Header) and ESP (Encapsulating Security Payload). What is the main security job of each of these tools?	<b>5 Marks</b>	<b>L2</b>	<b>C03</b>

<b>17.</b>	<b>a.</b>	Firewall Principles: Explain the difference in packet inspection between a firewall operating at the Network Layer (Layer 3) and one at the Application Layer (Layer 7).	<b>10 Marks</b>	<b>L2</b>	<b>C01 +2</b>
	<b>b.</b>	Security Models: Explain the need for security based on the four key areas mentioned - Protect data, Prevent tampering, Compliance & trust, Business continuity.	<b>5 Marks</b>	<b>L1</b>	<b>C02 +3</b>
	<b>c.</b>	Secure Remote Access: Explain the role of Secure Shell (SSH) in secure remote server administration, highlighting why it is preferred over Telnet.	<b>5 Marks</b>	<b>L2</b>	<b>C03</b>
<b>Or</b>					
<b>18.</b>	<b>a.</b>	Describe the three main Firewall Deployment Architectures and state a scenario for each.	<b>10 Marks</b>	<b>L2</b>	<b>C01 +2</b>
	<b>b.</b>	Define Polymorphic Attacks and explain why they are a threat to system Availability and Integrity.	<b>5 Marks</b>	<b>L2</b>	<b>C02 +3</b>
	<b>c.</b>	List and briefly explain the four Main Goals of Cyber Laws as defined in the course material.	<b>5 Marks</b>	<b>L1</b>	<b>C03</b>