

1707

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- (b) (i) What are the security threats to wireless network? What are the techniques recommended for wireless network security?
- (ii) Describe the principle elements of a mobile device security strategy. (7)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1707

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Unique Paper Code : 2342014801

Name of the Paper : Information Security

Name of the Course : **B.Sc. (H) CS**

Semester : VIII

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has **two** sections.
3. **Section A** is compulsory.
4. Attempt any **four** questions from **Section B**.
5. Parts of a question must be answered together.

SECTION A

1. (a) Briefly explain the three core objectives of computer security and why are they essential?
(3)
- (b) How is cryptanalysis different from brute-force attack?
(3)
- (c) Compare Symmetric Block Ciphers and stream ciphers.
(3)
- (d) Define three classes of subject in an access control system.
(3)
- (e) Discuss the SQLi in band attack types with suitable examples.
(3)
- (f) What are the typical phases of operation of a virus?
(3)

6. (a) Explain the role of the sensors, analyzers, and user interface in a standard Intrusion Detection System (IDS) architecture. What is a Honeypot? Distinguish between low-interaction and high-interaction honeypots in terms of risk and information gathering.
(8)
- (b) Explain the working of a packet filtering firewall.

What is the difference between application-level gateway and circuit-level gateway? Describe the situations where application-level gateway can be used and where circuit-level gateways can be used.
(7)
7. (a) (i) Define the five major actors in terms of the roles and responsibilities in the cloud computing reference architecture.

(ii) Describe Internet of Things (IoT) security environment and secure IoT framework.
(8)

of funding to be provided. Using an ABAC approach, write policy rules for each of the following scenarios:

(i) If the applicant's age is more than 40, only "Research Grants (RG)" can be provided.

(ii) If the applicant's age is less than or equal to 40, both "RG and Travel Grants (TG)" can be provided. (7)

5. (a) What is a logic bomb? Explain the differences between a zombie, bot, and botnet. How are botnets used to launch DDoS attacks? (8)

(b) (i) Explain the fundamental mechanism of Stack Buffer Overflow attacks.

(ii) Draw a detailed diagram of a Stack Frame before and after a successful overflow attack. Contrast compile-time defenses with run-time defenses with suitable examples. (7)

(g) Define a Denial-of-Service (DoS) attack. What are the three primary system resources typically targeted to restrict or refine a service? (3)

(h) List and explain the key elements of the Public Key Infrastructure X.509 (PKIX). (3)

(i) What are the key factors contributing to higher security risk of wireless networks compared to wired networks? (3)

(j) What is cross-site scripting (XSS)? How does it differ from SQL injection? (3)

SECTION B

2. (a) List and briefly define the kind of threat consequences and the types of threat actions which cause these consequences. (8)

(b) Explain the step involved in a typical SQLi attack with a suitable diagram. (7)

3. (a) For the access matrix shown below make access control lists and capability lists. (8)

			OBJECTS		
		File 1	File 2	File 3	File 4
	User X		Own Read Write	Own Read Write	
SUBJECTS	User Y	Own Read Write	Read	Read	Write
	User Z	Read Write		Own Read Write	Read

- (b) Draw a step-by-step diagram of how a sender creates a digital signature and how the receiver verifies it. Discuss how Public-Key Certificates are used to distribute symmetric keys securely between two parties. (7)

4. (a) Define Role-Based Access Control (RBAC) Reference Models. (8)

Assume that a bank defines access based on Branch (20 branches), Employee Rank (5 levels), and Employment Type (Full-time, Part-time, Contract).

- Calculate the number of roles required for RBAC.
 - If the bank adds a “Day of the Week” (7 values) constraint to the access policy, how many total roles will exist now?
 - Comment on the feasibility of this growth.
- (b) Describe the different types of attributes in the Attribute-Based Access Control (ABAC) model.

Assume that an application requires access control policies based on the applicant’s age and the type