Duration: 3 Hours   **Maximum Marks: 80**

N.B.: -

1. **Question No 1 is Compulsory**
2. **Solve any three questions out of remaining questions**
3. **Assume suitable data if required and mention it clearly**
4. **Figures to right indicate full marks.**

Q1	Solve **any four** of following: -	
[A]	What is a Vigenere Cipher? Explain the rules to encrypt a message using a Vigenere Cipher	**5**
[B]	How are C-Ciphertext and P-Plaintext expressed in Caesar Cipher? Encrypt the plaintext message **"Meet me after the toga party"** using it.	**5**
[C]	What is the significance of HTTPS?	**5**
[D]	Compare block and stream Cipher.	**5**
[E]	What is a Rootkit? How are they used to launch an attack on computer networks, cite examples.	**5**
[F]	List various services provided by IPsec.	**5**
Q2	**[A]** What are traditional ciphers? Discuss Hill Cipher substitution method with example.	**10**
	[B] Explain the Key Transformation Phase of Advanced Encryption Standard in detail. Illustrate how the 44 Word keys are generated from the 4 word key.	**10**
Q3	**[A]** Elaborate the steps of key generation using the RSA algorithm. In the RSA system, What is the public key (E, n) and private key (D, n) and Ø (n) of this user if n=187. is defined. If the plaintext input M=88, What is Ciphertext? Explain various kinds of attacks on the RSA algorithm.	**10**
	[B] What is a Secure Socket Layer (SSL)? Explain the SSL Header Format in detail.	**10**
Q4	**[A]** Explain the working of an Intrusion Detection System in detail. How does it differentiate normal traffic from anomalous traffic?	**10**
	[B] Explain Kerberos protocol with a simplified overview.	**10**
Q5	**[A]** What is meant by Malicious software? What are its various types? Explain DOS attack.	**10**
	[B] You have been assigned the task of monitoring and organizing information about the devices on an IP network. How will you make use of the SNMP Protocol?	**10**
Q6	**[A]** Discuss what do you mean by Email Security and how it can be achieved	**10**
	[B] Discuss in detail the various phishing techniques. How to protect ourselves against those.	**10**

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(Duration : 3 Hours)   **(Total Marks: 80)**

N.B : 1. Question No 1 is **compulsory**
2. Solve **any three** questions from the remaining questions
3. Assume suitable data if required

1.	a	Explain how the convergence of IT and OT in IoT impacts industrial processes,	10
	b	Explore the Purdue Model for Control Hierarchy and its implications for security practices in OT.	10
2.	a	Explain the importance of the physical layer and MAC (Medium Access Control) layer in IoT access technologies	10
	b	Explain AMQP protocol	10
3.	a	Examine the considerations for adopting or adapting the Internet Protocol in IoT applications	10
	b	Differentiate between fog computing and edge computing in the IoT context.	10
4.	a	State characteristics, advantages and disadvantages of FoG computing.	10
	b	Examine the impact of legacy systems on OT security. Discuss how the continued use of outdated technologies poses challenges in terms of vulnerabilities, patching, and overall security management.	10
5.	a	Explain the concepts of objective function rank, RPL headers, and metrics in the context of RPL.	10
	b	State and Explain the most well-known protocol stacks based on 802.15.4	10
6.		Write short notes on **any 4** of the followings	20
	a	OCTAVE	
	b	LoRaWAN	
	c	RPL Metrics	
	d	MQTT	
	e.	NFC	

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Duration: 3hrs   **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
       (2) Attempt any three questions out of the remaining five.
       (3) All questions carry equal marks.
       (4) Assume suitable data, if required and state it clearly.

			Marks
Q1.		Attempt any four	
	a.	Discuss the different types of blockchain with suitable examples.	5
	b.	What are cryptocurrencies? List out the different advantages of cryptocurrencies?	5
	c.	Discuss the various benefits of Blockchain in cybersecurity.	5
	d.	What are Merkle trees? How are they useful in bitcoin?	5
	e.	Explain how identity management works in Hyperledger Fabric.	5
Q2.	a.	Describe the Byzantine Generals Problem.	10
	b.	Discuss the steps for creating smart contracts using Remix and Metamask.	10
Q3.	a.	Discuss different components of Ethereum in detail	10
	b	Discuss the different use cases to demonstrate the use of blockchain in digital identity.	10
Q4	a.	Explain the components of a block and blockheader of Ethereum in detail.	10
	b.	Explain the architecture of Hyperledger Fabric Blockchain with a suitable diagram.	10
Q5	a.	Define Fungible token and working of ERC20.	10
	b.	Design a smart contract application that accepts amount in INR from user and returns the equivalent amount in Euro as output.	10
Q6		Write short note on(any 4)	20
	a.	Forks in Blockchain	
	b.	Extended Bitcoin Networks	
	c.	Swarm and Whisper	
	d.	Proof-of-Work Consensus	
	e.	Channels in Hyperledger Fabric	

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(**3 Hours.**)   **Marks = 80**

NB:

1. **Question No. 1 is compulsory and solve any THREE questions from remaining questions**

2. **Assume suitable data if necessary**

3. **Draw clean and neat diagrams**

Q1.   Attempt any 4

    a.   Explain Multilevel Inheritance in Typescript with suitable example   **5**

    b.   Illustrate features of ExpressJS   **5**

    c.   Explain Characteristics of RDF   **5**

    d.   Explain AngularJS expressions with an example   **5**

    e.   Explain Callback function in Nodejs with example   **5**

Q2.   a.   Explain Web Module in Nodejs.   **10**

    b.   Explain MongoDb Data Types along with syntax.   **10**

Q3.   a.   Compare and contrast Web 1.0, Web 2.0 and Web 3.0   **10**

    b   Explain data binding in AngularJS with suitable example   **10**

Q4   a.   Explain Express.js Cookies management with example   **10**

    b.   Differentiate Var v/s Let. and Explain types in typescript with suitable examples.   **10**

Q5   a.   Explain MongoDB CRUD Operations with an example.   **10**

    b.   Explain Streams in Nodejs.   **10**

Q6   a.   Explain Express Router with example.   **10**

    b.   Explain AngularJS $http service in detail with its get() and post() methods.   **10**

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(3 Hours) [Total Marks: 80]

N.B. : (1) Question No 1 is Compulsory.
     (2) Attempt any three questions out of the remaining five.
     (3) All questions carry equal marks.
     (4) Assume suitable data, if required and state it clearly.

1   **Attempt any FOUR.** [20]

a   Differentiate between Hacker, Phreaker and cracker.

b   Define digital forensics? Explain types of digital forensics.

c   Describe the challenges in computer forensic.

d   List and discuss various system hacking tools.

e   What are the key concepts of Ethical Hacking?

2 a   Explain penetration testing with its various phases? Also explain how social engineering [10]
    can be used for penetration testing.

  b   Explain the process of Digital Forensics. [10]

3 a   What do you mean by chain of custody in Digital forensics. What steps should a digital [10]
    forensics investigator take to ensure the integrity of evidence throughout the chain of
    custody?

  b   Explain the guidelines for digital forensics report writing along with its goals. [10]

4 a   Explain the importance of forensics duplication and its methods. [10]

  b   What is FTK Imager and what are its main functionalities in digital forensics? How does [10]
    FTK Imager handle different file systems and partitions during the imaging process?

5 a   Explain the roles of an expert witness and scientific witness with suitable examples? [10]

  b   What is a Faraday bag and how does it work in the context of digital forensics? Can [10]
    Faraday bags also be used to preserve evidence integrity during the collection and
    transportation of electronic devices?

6   Write short note on the following: (any two) [20]

    a) Wireshark tool.
    b) Analysis of forensics data in Linux system
    c) Explain the roles of CSIRT in Handling Incident.

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