2023-Malav

Seat No.: _____ Enrolment No.

NATIONAL FORENSIC SCIENCES UNIVERSITY
M Tech Cyber Security/M.Sc Cyber Security
Semester - I
TA-I Examination

Subject Code: CTMTCS SI P4/CTMSCS SI P3 **Date: 19/09/2023**
Subject Name: Application Security and VAPT/Web Application Security
Time:12:30 to 01:15 PM **Total Marks: 25**

		Marks
	Section -A (Any Three)	
(a)	Define terms: - -Vulnerability -Threat -Attack -Shellcode	**5**
(b)	What is Information Gathering? And its type?	**5**
(c)	Explain Google dork with example and prevention against sensitive data leak with google dork.	**5**
(d)	Explain AAA.	**5**
	Section -B	
(e)	What is VAPT and Importance of vulnerability assessments.	**10**

National Forensic Sciences University
School of Cyber Security and Digital Forensics

Course Name: M.Sc. Cyber Security (Batch: 2023-25)

Semester - I

Subject Code: CTMSCS SI P2 **Time:** 04.00 pm to 04.45 pm

Subject Name: Cyber Security Audit and Compliance

Exam: TA - I (SEP - 2023) **Date:** 18-09-2023

Q1. Answer the following questions in short. (Attempt any 5) **[25 Marks]**

1) Discuss a real-world case study related to non-compliance of any organization against the applicable standards / compliance.

2) Write the importance of Cyber Security Audit in the organization in your words.

3) What are the needs and requirements of assessment or audit in an organization.

4) If you are an auditor then what advises you should keep in your mind.

5) Draw 7 domains of IT Infrastructure and explain any 2 domains briefly.

6) What do you mean by risk and control? Explain the audit as risk-based approach to manage information security.

National Forensic Sciences University
School of Cyber Security and Digital Forensics

Course Name: M.Sc. Cyber Security (Batch: 2023-25)
Semester - I Exam: TA - I (September - 2023)
Subject Code: CTMSCS SI P1 Time: 12:45 pm to 0:.30 pm
Subject Name: Essentials of Cyber Security and Cyber Warfare Date: 18-09-2023

Q:1 Multiple Choice Questions (1 Mark Each) 10 Marks

1 API is stand for
a. Application Programming Interface b. All Programming Interface
c. Application Programming Info d. None of This

2 Bitlocker use which algorithm for Encryption?
a. Symmetric b. Asymmetric c. Round Robin d .None of this

3 TPM is snad for
a. Trusted Platform Module b. Trusted Platform Meta
c .Trusted Program Module d. None of This

4 Which other tools we can use as Bitlocker alternative
a. File Vault b. veraCypt c. True Crypt d. All of the above

5 where your computer temporarily stores all information and instructions?
a. RAM b.ROM c.HDD d. None of this

6 PCI is stand for
a. Peripheral Component Interconnect b. Peripheral Component Init
b. Peripheral Component Interconnect d.None of This

7 Who allocate the Kernel's processing time to various processes.
a. Scheduler b. Supervisor c. Memory Manager d. None of This

8 Which is client OS.
a. Windows XP b. Windows 7 c.Mac OS d.All of Above

9 DNS Stand for
a. Domain Name Server b. Domain Name Software
c. Domain Number System d. None of this

10 GPO is stand for
a. Group Policy Object b. Group Project Object
c. Great Policy Object d. None of this

Q:2 Answer the Following Questions [Any 3] 15 Mark

1 Explain the Active Directory Components.
2 Write a note on Bit Locker
3 Explain Computer Structure.
4 Explain any 3 Email Threats.

National Forensic Sciences University
School of Cyber Security and Digital Forensics

Course Name: M.Sc. Cyber Security (Batch: 2023-25)
Semester - I

Subject Code: CTMSCS SI P2 **Time:** 11.00 am to 12.30 pm
Subject Name: Cyber Security Audit and Compliance
Exam: Mid Semester Examination (Oct - 2023) **Date:** 30-10-2023

Q1. Answer in one word or line (Attempt All) **[09 Marks]**

1) If you are a mutual fund company in India then you need to follow the regulations/guidelines given by _____.

2) If you are a Cyber Security Auditor then you need to take empanelment from _____ in India.

3) Complying internal policy of an organization is required to be in compliance? True OR False?

4) If an attacker steals the information of an organization, then this type of attack is known as _____.

5) Arrange the following activities of implementation control in proper sequence.

I. Discover and classify data and information systems, II. Select security controls, III. Implement security controls, IV. Monitor the controls, V. Authorize the controls, VI. Assess security controls

6) Full form of CIS benchmark is _____.

7) What an auditor should check to assess LAN domain?

8) Full form of ISMS is _____.

9) An information security policy should be _____, _____, and _____ to employees and relevant external parties.

Q2. Answer the following questions in short (Attempt any 4) **[20 Marks]**

1) What security controls you will take care of for access control point?

2) Explain Asset Management control.

3) Discuss the points for the bankruptcy of Enron in 2001.

4) *"According to a report Malicious cyber actor, hackers, have developed methods of identifying and exploiting vulnerable Remote Desktop Protocol (RDP) sessions via the Internet to steal identities, login credentials and install and launch ransomware attacks. First, they may exploit the system themselves. The other option is to sell the stolen RDP login credentials on the Dark Web."* What security controls can be used to mitigate these problems?

5) List the 7 domains of IT infrastructure.

Q3. Answer the following questions in short. (Attempt any 3) **[21 Marks]**

1) Explain the HR Security control according to ISO 27000.

2) *"An attacker spoofed the packets and try to bypass the firewall and tried to create a C2 server communication to exfiltrate the sensitive data after successful network device access."* Which control should we put? Explain all related sub-controls in detail with justified reason.

3) In case of natural disaster like flood at Head-Quarter and its data-center of an organization. Which control of ISO 27000 should be used? Explain that in detail.

4) Illustrate the importance and need of baseline security controls in an IT infrastructure. Explain its consequences as well.

All the Best

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National Forensic Sciences University

School of Cyber Security and Digital Forensics

Course Name: M.Sc. Cyber Security (Batch: 2023-25)

Semester - I

Subject Code: CTMSCS SI P4 **Time:** 11.00 am to 12.30 pm

Subject Name: Artificial Intelligence

Exam: Mid Semester Examination (September - 2023) **Date:** 02-11-2023

Q1. Answer the following questions in short. (Attempt any 5) **[25 Marks]**

1) Discuss the ~~importance of Data pre-processing~~ challenges & issues in ML in ML.
Data Pre-processing.

2) How to evaluate binary classification ML model performance?

3) Explain Decision Tree algorithm.

4) Define following terms.

a) Supervised Machine learning b) Unsupervised Machine learning

c) Classification d) Regression e) Clustering

5) Explain ~~K means algorithm~~. Discuss issues & challenges in ML

6) In a group of 100 sports car buyers, 40 bought alarm systems, 30 purchased bucket seats, and 20 purchased an alarm system and bucket seats. If a car buyer chosen at random bought an alarm system, what is the probability they also bought bucket seats?

~~7.) Discuss~~

Q2. Answer the following questions in detail. (Attempt any 2) **[16 Marks]**

1) Explain KNN algorithm and calculate Euclidian distance of data points P(3, 2) and Q(4, 1).

2) How Support Vector Machine algorithm work?

3) Explain Linear and Logistic Regression work.

Q3. Select the Correct answer from the options (Attempt any 9) **[09 Marks]**

1) Which of the following is NOT a step in data pre-processing?

A. Feature engineering B. Data cleaning

C. Model training D. Data scaling

2) Which of the following is a supervised learning task?

A. Predicting the price of a house

B. Clustering customers into different groups

C. Recommending movies to users

D. Identifying transactions Association.

~~Discuss~~

3) Which of the following is an unsupervised learning task?

A. Predicting the risk of a customer defaulting on a loan

B. Grouping products into different categories

C. Classify image having cat or dog

D. Detecting anomalies in data

4) Which of the following machine learning algorithms is used for classification tasks?

A. PCA B. Linear regression

C. K-means clustering D. Support vector machines

5) Which of the following metrics is used to evaluate the performance of a classification model?

A. Accuracy B. F1 score

C. Confusion matrix D. All of the above

6) Which of the following metrics is used to evaluate the performance of a classification model when the classes are imbalanced?

A. Accuracy B. F1 score

C. Confusion matrix D. All of the above

7) Which of the following matrices shows the number of correct and incorrect predictions made by a classification model?

A. Accuracy matrix B. F1 score matrix

C. Confusion matrix D. All of the above

8) Which of the following is NOT a hyperparameter of an SVM?

A. Kernel function B. C-value

C. Learning rate D. Number of trees

9) Which of the following is NOT a type of decision tree splitting criterion?

A. Gini index B. Information gain

C. Entropy D. Mean squared error

Seat No.:_____ Enrolment No._____013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security / M.Tech Cyber Security - Semester - I

Mid Semester Examination

Subject Code: CTMSCS SI P3/CTMTCS SI P4 **Date: 11/01/2023**

Subject Name: Web application Security/Application Security, Vulnerability Assessment and Penetration Testing

Time:11.00 AM to 12.20 PM **Total Marks: 50**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

	Write any five questions	**Marks**
1.	What is VAPT and Importance of vulnerability assessments.	10
2.	Explain Email Security with Importance of Header Analysis.	10
3.	Explain Google dork with example and prevention against sensitive data leak with google dork.	10
4.	Explain NMAP and Its Scanning Techniques.	10
5.	Define terms with Example: - -Vulnerability -Threat -Attack -Shellcode -Reverse Shell	10 10
6.	Discuss CMS Security and Threat Modelling Process.	10
7.	Explain HTTP and its methods.	10

013

National Forensic Sciences University
School of Cyber Security and Digital Forensics
Course Name: M.Sc. Cyber Security (Batch: 2023-2025)
Semester – I Exam: Mid Semester Examination (Nov - 2023)
Subject Code: CTMSCS SI P1 **Time:** 11:00 pm to 12.30 pm
Subject Name: Essential of Cyber Security and Cyber Warefare **Date:** 31-10-2023

Q1. Answer the following questions in brief. (Attempt any 5) **[30 Marks]**

1) Write a note UAC.(User Account Control)
2) Explain GPO password policy.
3) Write a note on Firewall.
4) Explain Type of OS.
5) Write a note on process hacker tool.
6) Explain windows Registry in detail.

Q2. Answer the following MCQ questions . (Attempt any 15) **[15 Marks]**

1 What is the first step in hardening a Windows system?

a) Install additional software for added security
b) Apply all available software updates
c) Create user accounts with full administrative privileges
d) Disable the firewall

2 Which Group Policy setting allows you to define specific security settings for websites in Internet Explorer?

a) Windows Update policy.
b) Custom Security Zones.
c) Firewall settings.
d) Smart Screen Filter.

3 Which type of malware aims to trick users into revealing confidential information, such as passwords or credit card details?

a) Worm
b) Trojan horse
c) Ransomware
d) Phishing

4 Which feature can you use to automatically install security updates in Windows?

a) Windows Defender
b) Microsoft Edge
c) Windows Update
d) Group Policy

5 Which of the following is a key reason for hardening a Windows system?

a) To increase system performance
b) To make the system easier to use

c) To enhance system security
d) To add new features

6 In Windows hardening, what is the primary purpose of strong password policies?

a) To make it easy for users to remember their passwords
b) To disable user accounts
c) To prevent unauthorized access to user accounts
d) To enhance system performance

7 Which of the following is a common method to restrict physical access to a Windows system?

a) Strong password policy.
b) Firewall configuration
c) Data encryption
d) Locking server room doors

8 What is the primary role of Active Directory in a Windows network?

a) Managing hardware resources
b) Managing software applications
c) Managing user accounts, resources, and security policies.
d) Managing network routing

9 In Active Directory, what is the purpose of Group Policy?

a) To manage user accounts.
b) To configure network hardware.
c) To manage file.
d) To define security and configuration settings for users and computers

10 What is the purpose of device drivers in an operating system?

a) To manage memory
b) To control the CPU
c) To facilitate communication with hardware devices.
d) To run applications

11 In an operating system, what is the purpose of the scheduler?

a) To manage hardware resources
b) To create documents and files
c) To control the CPU and allocate processor time to tasks
d) To provide a graphical user interface (GUI)

12 What is the primary role of an operating system's memory manager?

a) To store and manage data files
b) To optimize CPU performance
c) To allocate and deallocate memory resources for processes
d) To provide a user interface

13 What is the main purpose of an embedded operating system?

a) To provide a user-friendly interface.
b) To support general-purpose computing tasks.
c) To run applications.
d) To manage specific hardware devices or systems.

14 What does BIOS stand for in the context of the startup process of a computer?

a) Basic Input/Output System.
b) Binary Input/Output System.
c) Boot Input/Output System.
d) Basic Internal Operating System.

15 What is the primary role of a boot loader in the startup process of an operating system?

a) To provide a graphical user interface.
b) To create and manage user accounts.
c) To load the operating system into memory from storage.
d) To manage hardware resources

Q3. Write the full form given **[05 Marks]**

1. UAC
2. MTP
3. LGPO
4. DMARC
5. MFA

Seat No.: _____ Enrolment No. 013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security

Semester – I – January - 2024

Subject Code:CTMSCS SI P1 **Date: 11/01/2024**

Subject Name: Essentials of Cyber Security and Cyber Warfare

Time: 11:00 AM to 2:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

Q.1 **Give the answer for following Question(Attempt any three)** **24**

(a) **Answer in Short. (1 mark each. All are compulsory)** **08**

I Give the name of algorithm use by BitLocker for Encryption.

II LGPO is stand for?

III Which feature can you use to automatically install security updates in Windows?

IV Which component ensures that specified services start automatically during the boot process.

V Which OS is used in ATM machine.

VI What is the primary role of an operating system's memory manager?

VII In Windows hardening, what is the primary purpose of strong password policies?

VIII which command is use in Linux for checking IP ?

(b) Examine the role of User Account Control (UAC) in Windows OS security. Describe the key features that contribute to preventing unauthorized changes and enhancing system integrity. 08

(c) Explain Linux Directory Structure in Details. 08

(d) Differentiate the Userspace and Kernal Spaces. 08

Q.2 **Give the answer in Brief. (Attempt any three)** **24**

(a) What is BitLocker Drive Encryption in Windows, and what is its primary purpose in enhancing data security? Provide a concise overview of how BitLocker works and its implementation requirements. 08

	(b)	Explain any 4 commands of Linux with Syntax and Example. 1.sed 2.CHROOT 3.chmod. 4.awk 5.CHOWN	08
	(c)	Explain any case study on cyber warfare like critical infrastructure information breach incident by state sponsor attack groups.	08
	(d)	Explain E-mail Security with possible threats.	08
Q.3		**Write Code for Given Questions. (Attempt any three)**	**24**
	(a)	What is OS? Explain classification of OS.	08
	(b)	Explain windows Registry in detail.	08
	(c)	Explain the Active Directory Components.	08
	(d)	Write a note on sysinternals suite. Explain any 3 tools.	08
Q.4		**Give the answer in Brief. (Attempt any two)**	**14**
	(a)	Discuss the primary functions of Group Policy Objects (GPOs) in a Windows network environment. Explain how GPOs can be effectively used to manage security settings and configurations across multiple computers in an organization.	07
	(b)	What is SIEM? List out Components of SIEM and explain any 3 Component of SIEM.	07
	(c)	Discuss Network Information Security Operations Center (NISOC).	07
Q.5		**Give the answer in Brief. (Attempt any two)**	**14**
	(a)	What is Psychological Warfare? Also explain three types of propaganda.	07
	(b)	What are different file permissions in the windows OS?	07
	(c)	Explain Process Hacker with at least 3 functionalities.	07

--- End of Paper---

Seat No.: _____ Enrolment No. 013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security
Semester – I – January - 2024

Subject Code: CTMSCS SI P5 **Date: 10/01/2024**
Subject Name: Introduction to Forensic Science and Cyber Law
Time: 2:00 PM to 5:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

			Marks
Q.1		**Attempt any three.**	
	(a)	Enlist various tools and techniques in different fields of forensic science.	**08**
	(b)	Write short notes on (a) NIA (b) CCTNS	**08**
	(c)	Describe different fields of forensic science with relevant examples of evidences and cases received in them.	**08**
	(d)	How can data be represented in different forms? Explain with examples.	**08**
Q.2		**Attempt any three.**	
	(a)	Describe hierarchical setup of Central and State Forensic Science Laboratories.	**08**
	(b)	Explain all the fundamental principles of forensic science and their respective significance in detail.	**08**
	(c)	Write short notes on (a) Bureau of Police Research and Development (b) Fingerprint Bureaus	**08**
	(d)	Discuss the difference between Civil and Criminal Justice.	**08**
Q.3		**Attempt any three.**	
	(a)	Explain Copyright and Copyright infringement with appropriate case-study.	**08**
	(b)	Explain Patent and Discuss what cannot be patented under Section 3 and 4 of Patents Act 1970.	**08**
	(c)	Discuss Trademarks.	**08**
	(d)	Explain the following terms: Cognizable Offences, Non-Cognizable Offences, Bailable Offences, Non-Bailable Offences.	**08**

Q.4 **Attempt any two.**

(a)	Discuss Section 43 of IT Act 2000 with appropriate case-study.	07
(b)	Discuss Section 66A,66B,66C,66D,66E.	07
(c)	Explain the following terms: Plaintiff, Defendant, Litigation, Verdict, Appeal, Evidence, Trial.	07

Q.5 **Attempt any two.**

(a)	Elaborate the process of report writing.	07
(b)	Enlighten the importance of ethics in the life of a forensic scientist.	07
(c)	Provide insights into the history of forensic science in India.	07

--- End of Paper---

Seat No.: _____ Enrolment No. 013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security
Semester – I – January - 2024

Subject Code: CTMSCS SI P2 **Date: 12/01/2024**
Subject Name: Cyber Security Audit and Compliance
Time: 11:00 AM to 2:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

		Marks
Q.1	**Attempt any three.**	
(a)	State the importance of Cyber Security Audit in the banking sector.	**08**
(b)	In case of any disaster or manmade attack that disrupts organization's IT infrastructure and critical services. The organization want to continue their business in that situation. What is the solution? Explain that in detail.	**08**
(c)	Discuss the Operations Security controls with respect to ISO 270001/2 standard.	**08**
(d)	Explain remote access domain and discuss how to maximize C-I-A in this domain.	**08**
Q.2	**Attempt any three.**	
(a)	Write a detailed note on Indian IT Act with their important sections.	**08**
(b)	What strategies can be used to minimized the risk? Explain them in detail.	**08**
(c)	How an organization can be in compliance? What they need to do?	**08**
(d)	i) State the difference between Audit and Assessment. ii) State the difference between Qualitative and Quantitative risk analysis methods.	**08**
Q.3	**Attempt any three.**	
(a)	Draw and discuss 7 domains of IT infrastructure in brief.	**08**
(b)	What do you mean by control? Explain that and their various types in detail.	**08**
(c)	Discuss various risk analysis strategies in detail.	**08**
(d)	Explain LAN to WAN domain and also discuss various control.	**08**

Q.4 **Attempt any two.**

(a)	What do you understand by CAAT? Explain it's importance in audit with an example.	07
(b)	Explain various disaster recovery strategies.	07
(c)	Discuss base line security controls and its importance.	07

Q.5 **Attempt any two.**

(a)	You are IT manager in your organization and joined recently. Due to last audit non compliance you have been given charge to select and design proper security controls for your organization. What and How will you complete the task with respect to any applicable law and standard? Explain the process.	07
(b)	Write a detailed note on HIPAA with its rules and safeguards.	07
(c)	How to maximize C-I-A of user and LAN domain.	07

--- End of Paper---

Seat No.: _____ Enrolment No. 013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security

Semester – I – January - 2024

Subject Code: CTMSCS SI P3 **Date: 16.01.24**

Subject Name: Web Application Security

Time: 11:00 AM to 2:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on a separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

			Marks
Q.1		**Attempt any three.**	
	(a)	Write a note on Types of Vulnerability Assessments	**08**
	(b)	Write a note on HTTP, why do we call *HTTP* a stateless protocol?	**08**
	(c)	How TCP is a problem in non-persistent HTTP protocol. Justify your answer with an example.	**08**
	(d)	Explain TCP header and discuss the role of different flags in the TCP header.	**08**
Q.2		**Attempt any three.**	
	(a)	Explain Google dorking in detail with five different examples	**08**
	(b)	Write a note on cross-site scripting attacks and their types and prevention.	**08**
	(c)	Explain the different steps involved in vulnerability life cycle management.	**08**
	(d)	Write a short note on a proxy server. How does it help the security team?	**08**
Q.3		**Attempt any three.**	
	(a)	How Secure Source Code Review helps to get stable products. Explain in detail.	**08**
	(b)	Explain *STRIDE-based* threat modeling and how it is different from the *DREAD* model.	**08**
	(c)	What is Information Gathering? List out different types of information-gathering	**08**
	(d)	Explain OS Command Injection with prevention.	**08**
Q.4		**Attempt any two.**	
	(a)	Explain File upload Vulnerability with mitigation.	**07**

	(b)	What is cookie, why it is required and how do vendors take advantage of it?	07
	(c)	Explain privilege Escalation and its type.	07
Q.5		**Attempt any two.**	
	(a)	Define CVE and CWE. How it helps developers to develop a stable product.	07
	(b)	Explain the *Common Vulnerability Scoring System* in detail.	07
	(c)	Write a short note on injection and its common solution.	07

--- End of Paper---

Seat No.: _____ Enrolment No. 013

NATIONAL FORENSIC SCIENCES UNIVERSITY

M.Sc. Cyber Security
Semester – I – January - 2024

Subject Code: CTMSCS SI P4 **Date: 17/01/2024**
Subject Name: Artificial Intelligence
Time: 11:00 AM to 2:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

Marks

Q.1 **Attempt any three.**

(a) Explain List and Dictionary in python. **08**

a) Syntax b) Accessing value c) updating value d) Deleting value

(b) Calculate the regression coefficient and obtain the lines of regression for the following data. **08**

X	1	2	3	4	5	6	7
Y	9	8	10	12	11	13	14

(c) Explain types of Learning with proper Example. **08**

1) Supervised 2) Unsupervised
3) Semi-supervised 4) Reinforcement

(d) 1) Imagine you are in a grocery store. You want to buy 1 rose, 2 masala, and 3 milk bottle. The unit prices are \$1, \$2, \$0.5, respectively. Generate Dot products of given vector. **08**

2) Do products of given Matrix and Vector

$$A \cdot B = \begin{bmatrix} 1 & 1 & 1 \\ 10 & 10 & 10 \end{bmatrix} \begin{bmatrix} \$1 \\ \$2 \\ \$0.5 \end{bmatrix}$$

Q.2 **Attempt any three.**

(a) Explain Decision Tree classification by considering given example. The training data is as follows. Humidity, sunny and wind are the feature values and Play is a class attribute. The Humidity attribute has values "L" (for low) or "H" (for high), Sunny has values "Y" (for yes) or "N" (for no), Wind has values "S" (for strong) or "W" (for weak), and Play has values "Yes" or "No". Calculate the class label for the day (Humidity=H, Sunny=Y, Wind=W), according to naïve Bayesian classification. **08**

Humidity	Sunny	Wind	Play
L	N	S	NO
H	N	W	YES
H	Y	S	YES
H	N	W	YES
L	Y	S	No

(b) A medical team tests 800 individuals for a particular viral infection. Out of these: **08**

500 people are actually infected with the virus (positive cases).

300 people are actually healthy (negative cases).

For the infected individuals:

The test correctly identifies the infection (true positive) in 400 cases.

The test wrongly identifies a healthy person as infected (false positive) in 100 cases.

For the healthy individuals:

The test correctly confirms they are healthy (true negative) in 250 cases.

The test wrongly identifies a healthy person as infected (false positive) in 50 cases.

1. Construct a confusion matrix for this data.
2. Calculate the accuracy, precision, recall, and F1 score for the test's performance in identifying infected individuals.

(c) Explain working of K-means & Hierarchical clustering. Discuss about pros and cons of both unsupervised algorithm. **08**

(d) Explain KNN algorithm and finds the Euclidian distance between New customers named 'Monica' has height 161cm and weight 61kg and Old customer name 'Rama' has height 158cm and weight 58kg. **08**

Q.3 **Attempt any three.**

(a) Discuss the SVM algorithm working in detail. **08**

(b) Define perceptron neural network. Calculate the output y of three input neurons with a bias. The input feature vector is (x1, x2, x3) = (0.8, 0.4, 0.3) and weight values are [w1,w2,w3, b] =[0.2, 0.1, -0.3, 0.35]. Use binary Sigmoid function as activation function. **08**

(c) Draw and describe ANN Architecture and CNN Architecture and how it's differentiate each other with an example of python code. **08**

(d) What is RNN? Define vanishing gradient descent problem. Why it happens in RNN. How it can be overcomes? **08**

Q.4 **Attempt any two.**

(a) Explain difference between object detection, object localization, object recognition, object segmentation. Write steps to detect face from given image using machine learning classifier. **07**

(b) Explain following Text-prepossessing with appropriate example. **07**

1. Tokenization 2. Stemming 3. Lemmatization

(c) How to generate following output using python & other library from the given text "The quick brown fox jumps over the lazy dog." Explain output as well. 07

OUTPUT

[('The', 'DT'), ('quick', 'JJ'), ('brown', 'NN'), ('fox', 'NN'), ('jumps', 'VBZ'), ('over', 'IN'), ('the', 'DT'), ('lazy', 'JJ'), ('dog', 'NN'), ('.', '.')]

Q.5 **Attempt any two.**

(a) How machine learning can be used to detect phishing attacks and identify fake content. 07

(b) Explain the role of supervised learning algorithms in malware classification. 07

(c) Explain how machine learning can be applied to pen testing, and discuss the benefits and limitations of this approach compared to traditional pen testing methods. 07

--- End of Paper---