R1087	Sub. Code
	556201

M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Cyber Forensics

DISTRIBUTED OPERATING SYSTEM IN CYBER SPACE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. What is an operating system? (CO1, K1)

   (a) interface between the hardware and application programs

   (b) collection of programs that manages hardware resources

   (c) system service provider to the application programs

   (d) all of the mentioned

2. Which one of the following errors will be handle by the operating system? (CO1, K1)

   (a) lack of paper in printer

   (b) connection failure in the network

   (c) power failure

   (d) all of the mentioned

3. Where is the operating system placed in the memory? (CO2, K1)

(a) either low or high memory (depending on the location of interrupt vector)

(b) in the low memory

(c) in the high memory

(d) none of the mentioned

4. If a process fails, most operating system write the error information to a ————————. (CO2, K1)

(a) new file (b) another running process

(c) log file (d) none of the mentioned

5. In a timeshare operating system, when the time slot assigned to a process is completed, the process switches from the current state to? (CO3, K1)

(a) Suspended state (b) Terminated state

(c) Ready state (d) Blocked state

6. For an effective operating system, when to check for deadlock? (CO3, K1)

(a) every time a resource request is made at fixed time intervals

(b) at fixed time intervals

(c) every time a resource request is made

(d) none of the mentioned

7. A deadlock avoidance algorithm dynamically examines the ———————— to ensure that a circular wait condition can never exist. (CO4, K1)

(a) operating system

(b) resources

(c) system storage state

(d) resource allocation state

8. The operating system and the other processes are protected from being modified by an already running process because ————————. (CO4, K1)

(a) every address generated by the CPU is being checked against the relocation and limit registers

(b) they have a protection algorithm

(c) they are in different memory spaces

(d) they are in different logical addresses

9. In real time operating system ————————. (CO5, K1)

(a) process scheduling can be done only once

(b) all processes have the same priority

(c) kernel is not required

(d) a task must be serviced by its deadline period

10. The priority of a process will ———————— if the scheduler assigns it a static priority. (CO5, K1)

(a) depends on the operating system

(b) change

(c) remain unchanged

(d) none of the mentioned

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Briefly describe about the Distributed operating systems. (CO1, K2)

Or

(b) Discuss how you would evaluate the performance and scalability of a distributed OS that can expand the available data within the entire system. (CO1, K1)

12. (a) Difference between Unstructured and Structured Communication. (CO2, K5)

Or

(b) Define process and Explain process states in details with diagram. (CO2, K4)

13. (a) Explain Logical time and logical clocks. (CO3, K5)

Or

(b) Explain about Vector Clock in detail. (CO3, K2)

14. (a) Explain the concept of distributed shared memory in detail. (CO4, K2)

Or

(b) Illustrate some techniques for handling data conflicts in distributed systems. (CO4, K4)

15. (a) Write in detail about DNS in Linux. (CO5, K6)

Or

(b) Describe in detail about User administration in Linux. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Describe how you would implement a distributed OS that can enable the sharing of various resources across different sites without compromising the security and privacy of the data. (CO1, K5)

Or

(b) Consider an online banking system where users perform transactions and check their account balances. How can a distributed system handle server failures to ensure uninterrupted service for customers? (CO1, K6)

17. (a) Illustrate the Distributed operating system and list the basic services provided by Distributed operating system. (CO2, K2)

Or

(b) Imagine you are part of a team responsible for optimizing video streaming services. The current system experiences buffering delays during high- demand periods. How would you analyze the streaming pipeline and propose improvements to ensure smooth video playback for users? (CO2, K2)

18. (a) State the problems in cristians algorithm. Explain how Berkeley algorithm overcomes the problems of cristians algorithm with neat sketch. (CO3, K4)

Or

(b) Describe about Network Time Protocol in detail. Mention its aims and features. (CO3, K2)

19. (a) Discuss the impact of cache coherence mechanisms on system performance, including overhead, latency, and scalability. How can designers strike a balance between maintaining coherence and achieving high throughput? (CO4, K2)

Or

(b) Describe the role of trust management in ensuring secure communication among distributed nodes. (CO4, K6)

20. (a) Explain how the Linux kernel differs from the operating system. Justify your answer. (CO5, K2)

Or

(b) Explain about challenges arise when designing security for large-scale distributed systems compared to smaller-scale systems. (CO5, K5)

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R1088

Sub. Code
556202

M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Cyber Forensics

PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Is Python code compiled or interpreted? (CO1, K1)

   (a) Python code is both compiled and interpreted

   (b) Python code is neither compiled nor interpreted

   (c) Python code is only compiled

   (d) Python code is only interpreted

2. What will be the value of the following Python expression? 4 + 3 % 5 (CO1, K1)

   (a) 7 (b) 2

   (c) 4 (d) 1

3. Which keyword is used for function in Python language? (CO2, K1)

   (a) Function (b) def

   (c) Fun (d) Define

4. What will be the output of the following Python code? (CO2, K1)

```
i = 1
while True:
    if i%3 = 0:
        break
print(i)
i+=1
```

(a) 1 2 3 (b) error

(c) 1 2 (d) none of the mentioned

5. What is the order of precedence in python? (CO3, K1)

(a) Exponential, Parentheses, Multiplication, Division, Addition, Subtraction

(b) Exponential, Parentheses, Division, Multiplication, Addition, Subtraction

(c) Parentheses, Exponential, Multiplication, Division, Subtraction, Addition

(d) Parentheses, Exponential, Multiplication, Division, Addition, Subtraction

6. Which of the following is true for variable names in Python? (CO3, K1)

(a) underscore and ampersand are the only two special characters allowed

(b) unlimited length

(c) all private members must have leading and trailing underscores

(d) none of the mentioned

7. Which of the following functions is a built-in function in python? (CO4, K1)

(a) factorial() (b) print()

(c) seed() (d) sqrt()

8. Which of the following is not a core data type in Python programming? (CO4, K1)

(a) Tuples (b) Lists

(c) Class (d) Dictionary

9. Which of these is the definition for packages in Python? (CO5, K1)

(a) A set of main modules

(b) A folder of python modules

(c) A number of files containing Python definitions and statements

(d) A set of programs making use of Python modules

10. What will be the output of the following Python function?

len(["hello", 2, 4, 6]) (CO5, K1)

(a) Error (b) 6

(c) 4 (d) 3

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Explain about the input and output statements or methods with example. (CO1, K2)

Or

(b) Evaluate the different values (data types) and types of values that can be used in Python. (CO1, K1)

12. (a) Discuss about regular expression in detail. (CO2, K5)

Or

(b) Explain about Mathematics function in python. (CO2, K4)

13. (a) Explain about reading and writing files in python. (CO3, K5)

Or

(b) Discuss the different modes for opening a file and closing a file. (CO3, K2)

14. (a) Write a program to print *n* numbers iteratively using function. (CO4, K2)

Or

(b) Write Python Program to Demonstrate polymorphism. (CO4, K4)

15. (a) Discuss how you handle errors or exceptions that occur while executing queries using a cursor object. (CO5, K6)

Or

(b) Explain how you create a connection object that represents the database. (CO5, K6)

Part C ($5 \times 8 = 40$)

Answer **all** questions not more than 1000 words each.

16. (a) List various types of operators in Python and write any four types of operators. (CO1, K5)

Or

(b) Explain break and continue statement with the help of for loop with an example. (CO1, K6)

(i) for loop

(ii) while loop

(iii) if- else

17. (a) Explain expressions in python with order of evaluation with example. (CO2, K2)

Or

(b) What is function? How a function is define and called in python? Explain with a simple program. (CO2, K2)

18. (a) Consider a line "From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008" in the file email.txt. Write Pythonic code to read the file and extract email address from the lines starting from the word "From". Use regular expressions to match email address. (CO3, K4)

Or

(b) Assume you are working on a project where you need to read data from a text file containing customer reviews. The file is named customer_reviews.txt. You want to open the file and extract the information for analysis. How would you use Python's open() function to open the customer_reviews.txt file in read mode? (CO3, K2)

19. (a) Discuss inheritance in Python programming language. Write a Python program to demonstrate the use of super() function. (CO4, K6)

Or

(b) Describe the need for catching exceptions using try and except statements. (CO4, K6)

20. (a) Explain how you use Python to update or delete a record from the Hospital or Doctor tables. (CO5, K2)

Or

(b) Imagine you are building a Python application that needs to interact with a MySQL database. You want to establish a connection between your application and the database. Which method would you use to achieve this? (CO5, K5)

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R1089

Sub. Code
556204

M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Cyber Forensics

ML FOR DIGITAL FORENSICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. If machine learning model output involves target variable, then that model is called as (CO1, K1)

   (a) descriptive model

   (b) predictive model

   (c) reinforcement learning

   (d) all of the above

2. Which of the following is the best machine learning method? (CO1, K1)

   (a) scalable

   (b) accuracy

   (c) fast

   (d) all the above

3. Which of the following is not a supervised machine learning algorithm? (CO2, K1)

(a) K-means

(b) Naïve Bayes

(c) SVM for classification problems

(d) Decision tree

4. What is the key difference between supervised and unsupervised learning? (CO2, K1)

(a) Supervised learning requires labeled data, while unsupervised learning does not

(b) Supervised learning predicts labels, while unsupervised learning discovers patterns

(c) Supervised learning is used for classification, while unsupervised learning is used for regression

(d) Supervised learning is always more accurate than unsupervised learning

5. Which type of machine learning algorithm falls under the category of "unsupervised learning"? (CO3, K1)

(a) Linear Regression (b) K-means Clustering

(c) Decision Trees (d) Random Forest

6. What elements describe the Candidate-Elimination algorithm? (CO3, K1)

(a) depends on the dataset

(b) just a set of candidate hypotheses

(c) just a set of instances

(d) set of instances, set of candidate hypotheses

7. What is the objective of backpropagation algorithm? (CO4, K1)

(a) to develop learning algorithm for multilayer feedforward neural network

(b) to develop learning algorithm for single layer feedforward neural network

(c) to develop learning algorithm for multilayer feedforward neural network, so that network can be trained to capture the mapping implicitly

(d) none of the mentioned

8. Which of the following statements is not true about neural networks? (CO4, K1)

(a) They are class of very powerful machine learning classifiers

(b) Neural networks are a class of computationally inexpensive algorithms

(c) These are capable of fitting almost any hypotheses

(d) NN has lots of interconnected nodes which are organized in layers

9. What characterize is hyperplance in geometrical model of machine learning? (CO5, K1)

(a) a plane with 1 dimensional fewer than number of input attributes

(b) a plane with 2 dimensional fewer than number of input attributes

(c) a plane with 1 dimensional more than number of input attributes

(d) a plane with 2 dimensional more than number of input attributes

10. What characterize unlabeled examples in machine learning? (CO5, K1)

(a) there is no prior knowledge

(b) there is no confusing knowledge

(c) there is prior knowledge

(d) there is plenty of confusing knowledge

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Examine in detail about machine learning process with an example. (CO1, K4)

Or

(b) Differentiate between supervised and unsupervised training. Explain with suitable examples. (CO1, K5)

12. (a) Explain regression with an example. (CO2, K5)

Or

(b) Recall the benefits and drawbacks of dimensionality reduction. (CO2, K1)

13. (a) State the mathematical formulation of the SVM problem. Give an outline of the method for solving the problem. (CO3, K4)

Or

(b) Explain K-nearest Neighbor algorithm with suitable example. (CO3, K5)

14. (a) Summarize and explain various types of artificial neural network. (CO4, K2)

Or

(b) Explain the concept of Hypothesis Testing. (CO4, K6)

15. (a) Explain in detail, how can mobile forensics be use to solve real-world cases and scenarios. (CO5, K1)

Or

(b) Give some real-world examples of how network intrusion detection can detect and respond to malicious network activity. Explain how they work and why they are effective. (CO5, K2)

Part C ($5 \times 8 = 40$)

Answer **all** questions not more than 1000 words each.

16. (a) Discuss any four examples of machine learning applications. (CO1, K5)

Or

(b) Explain in detail about machine learning. Discuss about learning and machine learning. Choose various types of machine learning. (CO1, K5)

17. (a) Elaborate on logistic regression with an example. Explain the process of computing coefficient. (CO2, K6)

Or

(b) Describe how you perform feature selection and dimensionality reduction in linear classification. (CO2, K5)

18. (a) Explain about Naïve Bayes algorithm for continuous attributes with examples. (CO3, K5)

Or

(b) Discuss how to handle missing values, continuous features in decision tree algorithm. (CO3, K6)

19. (a) Discuss the steps involved in Back propagation algorithm. (CO4, K6)

Or

(b) Draw the structure of artificial single neuron based on biological neuron. Construct and explain Artificial Neural network structure. (CO4, K6)

20. (a) You are a security analyst at a large company. One day, you notice that your computer is running very slowly and displaying unwanted ads. You suspect that your computer is infected with malware. How would you identify and remove the malware from your computer? What type of malware do you think it is and what problems can it cause? (CO5, K5)

Or

(b) Illustrate for this scenario, what did you do as a cybersecurity analyst when a client reported receiving a suspicious email from their bank? (CO5, K5)

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R1090	Sub. Code
	556206

M.Sc. DEGREE EXAMINATION, APRIL 2024.

Second Semester

Cyber Forensics

DIGITAL SIGNATURE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer all the following objective type questions by choosing the correct option.

1. A digital signature is a mathematical technique which validates? (CO1, K1)

   (a) authenticity (b) integrity

   (c) Non-repudiation (d) All of the above

2. _____ is a process which verifies the identity of a user who wants to access the system. (CO1, K1)

   (a) Authentication (b) Non-repudiation

   (c) Integrity (d) None of the above

3. _____ ensures that the message is real, accurate and safeguards from unauthorized user modification during the transmission. (CO2, K1)

   (a) Authentication (b) Non-repudiation

   (c) Integrity (d) None of the above

4. How many algorithms digital signature consists of? (CO2, K1)

(a) 2 (b) 3

(c) 4 (d) 5

5. A _____ produces a signature for the document. (CO3, K1)

(a) Key generation algorithm

(b) Signature verifying algorithm

(c) Signing algorithm

(d) Authentication

6. Which algorithm provides the private key and its corresponding public key? (CO3, K1)

(a) Key generation algorithm

(b) Signature verifying algorithm

(c) Signing algorithm

(d) None of the above

7. Which of the following is not a type of digital signature? (CO4, K1)

(a) Approval Signatures

(b) Non-Certified Signatures

(c) Visible Digital Signature

(d) Invisible Digital Signature

8. SHA-1 produces a hash value of (CO4, K1)

(a) 256 bits (b) 160 bits

(c) 180 bits (d) 128 bits

9. What is the term for any action that compromises the security of information owned by an organization? (CO5, K1)

(a) Security breach

(b) Security attack

(c) Security violation

(d) Security compromise

10. In an RSA system the public key of a given user is e = 31, n = 3599. What is the private key of this user? (CO5, K1)

(a) 3031 (b) 2412

(c) 2432 (d) 1023

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Illustrate the two common techniques used to protect a password file. (CO1, K4)

Or

(b) Explain in detail about Encryption and Decryption in detail. (CO1, K5)

12. (a) Write a detailed note on Digital signatures standard with necessary diagram in detail. (CO2, K5)

Or

(b) Describe ECDSA algorithm with neat diagram and explain the steps. (CO2, K6)

13. (a) What are the requirements and applications of public key? Compare conventional with public key encryption. (CO3, K4)

Or

(b) Explain the key management of public key encryption in detail. (CO3, K5)

14. (a) Describe some challenges you have encountered in verifying the authenticity of digital signatures. (CO4, K2)

Or

(b) Describe your experience with digital evidence preservation in detail. (CO4, K6)

15. (a) Discuss about the summary of quantum computing and impacts of Digital signatures. (CO5, K1)

Or

(b) A government agency investigates a case involving fraudulent digital signatures. The suspect claims their quantum computer-generated signature is untraceable. How would you approach this challenge? (CO5, K2)

Part C (5 × 8 = 40)

Answer all questions not more than 1000 words each.

16. (a) Describe about Hash Function. How its algorithm is designed? Explain its features and properties. (CO1, K6)

Or

(b) Explain in detail why Asymmetric Cryptography is bad for huge data. Specify the reason. (CO1, K5)

17. (a) Discuss clearly Secure Hash Algorithm (SHA) in detail. Discuss with example. (CO2, K1)

Or

(b) Explain RSA Algorithm and give example of generation of Public and Private keys and generation of cipher text through RSA (CO2, K5)

18. (a) In a financial fraud investigation, you need to verify the timestamp of a critical transaction recorded in a digital document. How can Public Key Infrastructure help you validate the accuracy of the timestamp and ensure its integrity. (CO3, K4)

Or

(b) Describe how cryptographic timestamping can help in validating signatures that were create with a revoked certificate. (CO3, K6)

19. (a) Discuss how you would handle the process of identifying, collecting, and preserving digital evidence. Justify your answer. (CO4, K6)

Or

(b) You are examining a digitally signed email. The sender denies sending it. How do you validate the signature? (CO4, K6)

20. (a) Imagine you work for a financial institution, and a client becomes enraged during an online transaction due to an error. How would you handle this situation while ensuring the security of the digital signature process? Consider communication, problem-solving, and maintaining trust. Give explanation in detail. (CO5, K5)

Or

(b) You are part of a team developing a blockchain-based supply chain solution. The system aims to enhance transparency and traceability for goods moving through the supply chain. However, there have been concerns about the security of smart contracts and consensus mechanisms. How would you address these security challenges? Provide recommendations for ensuring the integrity of smart contracts and preventing attacks on the consensus algorithm. (CO5, K5)

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R1091

Sub. Code
556505

M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Cyber Forensics

Elective — WIRELESS NETWORK SECURITY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. ———— spread spectrum technology uses the chip code to encode the data. (CO1, K3)

   (a) DSSS (b) FHSS

   (c) OFDM (d) Both (a) and (b)

2. OFDM is a technique of ————. (CO1, K3)

   (a) Encrypt data

   (b) 4G mobile communication

   (c) 3G mobile communication

   (d) Both (a) and (b)

3. Strongest wireless security is provided by ————. (CO2, K2)

   (a) WPA (b) WPA 2

   (c) WPA 3 (d) WEP

4. Which one is the central node of 802.11 wireless operations? (CO2, K2)

(a) USB Port (b) Access Port

(c) View Port (d) Access Point

5. Which of the following standard is developed by European Telecommunication Standards Institute? (CO3, K1)

(a) GSM (b) GPRS

(c) UMTS (d) HSDPA

6. Which one is the enhanced 3G mobile communication protocol? (CO3, K1)

(a) HSCSD (b) HSDPA

(c) GSM (d) GPRS

7. Which layer is responsible for routing? (CO4, K5)

(a) Transport (b) Data Link

(c) Network (d) Application

8. Which of the following key is shared among all nodes in Zigbee network? (CO4, K5)

(a) MAC (b) AES

(c) Data Link (d) Network

9. NFC wireless technology shares data within ———— meter. (CO5, K4)

(a) 0.1 (b) 1

(c) 10 (d) 100

10. What is the ISO standard for IT infrastructure? (CO5, K4)

(a) ISO 2008 (b) ISO 27001

(c) ISO 20012 (d) ISO 29001

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) State the difference between active and passive threat. (CO1, K3)

Or

(b) List out some solutions to keep the mobile devices more secure. (CO1, K3)

12. (a) Write down the advantages and disadvantages of collision avoidance in wireless network. (CO2, K2)

Or

(b) What is WPA and explain its versions in detail. (CO2, K2)

13. (a) Explain GPRS architecture in detail. (CO3, K1)

Or

(b) Explain GSM in detail. (CO3, K1)

14. (a) Write down the characteristics of wireless sensor network. (CO4, K5)

Or

(b) Explain RFID technology in detail. (CO4, K5)

15. (a) What is ISO/IEC 13335 standard? (CO5, K4)

Or

(b) Write down the guidelines of ISO/IEC 17799? (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Explain the working principle of orthogonal frequency division multiplexing. (CO1, K3)

Or

(b) Write short notes on spread spectrum technology. (CO1, K3)

17. (a) Explain in detail about WEP. (CO2, K2)

Or

(b) Explain the architecture of 802.11. (CO2, K2)

18. (a) Explain HSDPA in detail. (CO3, K1)

Or

(b) List out the precautionary measures to be taken in wireless wide area network. (CO3, K1)

19. (a) Explain WSN architecture in detail. (CO4, K5)

Or

(b) Explain the security features of Zigbee WSN. (CO4, K5)

20. (a) Why companies need to meet information security standards? (CO5, K4)

Or

(b) Explain ISO 27001 in detail. (CO5, K4)

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