R0307	Sub. Code
	546101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Information Technology

MATHEMATICS FOR COMPUTING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

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

1. $(P \vee Q) \wedge (P \to R) \wedge (Q \to R)$ is equivalent to (CO1, K3)

   (a) P (b) Q

   (c) R (d) True = T

2. The functionally complete set is (CO1, K1)

   (a) $\{\neg, \wedge, \vee\}$ (b) $\{\downarrow, \wedge\}$

   (c) $\{\uparrow\}$ (d) None of these

3. What is the Cartesian product of $A = \{1,2\}$ and $B = \{a,b\}$? (CO1, K3)

   (a) $\{(1,a)(1,b)(2,a)(b,b)\}$

   (b) $\{(1,1)(a,a)(2,2)(b,b)\}$

   (c) $\{(1,a)(2,a)(1,b)(2,b)\}$

   (d) $\{(1,1)(a,a)(2,a)(1,b)\}$

4. Determine the characteristic of the relation aRb if $a^2 = b^2$. (CO1, K2)

(a) Transitive and symmetric

(b) Reflexive and asymmetry

(c) Trichotomy, anti-symmetry and irreflexive

(d) Symmetric, Reflexive and transitive

5. The process of arranging n object in a particular order is know as ———————— of object? (CO1, K1)

(a) r-permutation (b) Permutation of r objects

(c) Both (a) and (b) (d) None of the above

6. A pigeonhole is occupied by more than one pigeon if n pigeonholes are occupied by ———————— or more pigeons. (CO1, K1)

(a) n (b) $n+1$

(c) $n-1$ (d) None of the above

7. A event in the probability that will never be happened is called as (CO1, K1)

(a) unsure event (b) sure evet

(c) possible evet (d) impossible

8. Which measure of central tendency includes the magnitude of scores? (CO1, K1)

(a) Mean (b) Mode

(c) Median (d) Range

9. If a tree has 12 vertices then the number of edges are (CO1, K1)

(a) 11 (b) 13

(c) 12 (d) 10

10. A simple graph with n vertices $(n \geq 3)$ in which each vertex has degree at least $n/2$ has a Hamiltonian cycle. (CO1, K3)

(a) Euler's theorem (b) Dirac's theorem

(c) Grinberg theorem (d) Handshaking theorem

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

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

11. (a) Show that the statement formula $Q \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$ is tautology. (CO2, K1)

Or

(b) Prove that $(\exists x)[P(x) \wedge Q(x)] \rightarrow (\exists x)P(x) \wedge \exists x Q(x)$. (CO2, K4)

12. (a) If (A, R) is a partially ordered set then show that the set (A, R^{-1}) is also a partially ordered set where $R^{-1} = \{(a,b)/(b,a) \in R\}$. (CO2, K4)

Or

(b) Consider the set $D_{50} = \{1,2,5,10,25,50\}$ and the relation (divides) be a partial order relation on D_{50}. (CO2, K2)

(i) Draw the Hasse diagram of D_{50}.

(ii) Determine all the upper bound of 5 and 10.

(iii) Determine all Lower bound of 5 and 10.

13. (a) Using Mathematical induction prove that $1^2+2^2+3^2+\cdots n^2 = n(n+1)(2n+1)/6$ for $n \geq 1$. (CO2, K5)

Or

(b) Find the number of Integer solution of the equation $x_1+x_2+x_3+x_4+x_5 = 30$ Where $x_1 \geq 2$, $x_2 \geq 3$, $x_3 \geq 4$, and $x_5 \geq 0$. (CO3, K5)

14. (a) Calculate the coefficient of correlation (CO3, K5)

x	1	3	4	5	7	8	10
y	2	6	8	10	14	16	26

Or

(b) Let A be the event of getting the sum of the point on the face is odd and B be the event that atleast one face is 1 when throwing dice. Find $P(A/B)$. (CO2, K3)

15. (a) In a graph *G*, every u-v path contains a simple u-v path. (CO2, K2)

Or

(b) Prove that complete graph k_n is planar iff $n \leq 4$. (CO2, K3)

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

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

16. (a) Obtain the principal conjunctive normal form of the formula *S* is given by $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$. (CO3, K5)

Or

(b) Show that the following premises are inconsistent. (CO3, K2)

(i) If jack misses many classes through illness then he fails high school.

(ii) If jack fails high school, then he is uneducated.

(iii) If jack read a lot of books, then he is not uneducated.

(iv) Jack misses many classes through illness and reads a lot of books.

17. (a) Let R denote a relation on the set of ordered pair of positive integers such that (x, y) $R(u, v)$ iff $xv = yu$ show that R is an equivalence relation. (CO2, K4)

Or

(b) Show that $f(x, y) = x * y$ is primitive recursion. (CO2, K4)

18. (a) If there are 200 faculty members who speaks French, 50 who speaks Russian, 100 who speaks Spanish, 20 who speaks French and Russian, 60 who speaks French and Spanish, 35 who speaks Russian and Spanish, while only 10 speak French, Russian, Spanish, how many speak either French or Russian or Spanish? (CO3, K5)

Or

(b) Solve the Recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ for $n \geq 2$. (CO3, K5)

19. (a) State and prove Baye's theorem. (CO2, K2)

Or

(b) Random sample of 400 men and 600 women where asked whether the would like to have a fly over near their residence. 200 men and 325 women where in fever of the proposal. Test he hypothesis that proportion of men and women in fever of the proposal are same 5% level. (CO3, K4)

20. (a) State and prove Euler"s formula. (CO2, K2)

Or

(b) Let G be a critical graph. Then prove that (CO2, K2)

(i) G is connected.

(ii) The degree of each vertex of G is atleast $k-1$.

(iii) G cannot be expressed in the form $G_1 \cup G_2$ where G_1 and G_2 are graphs which intersect in a complete graph.

———————

R0308	Sub. Code 546102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Information Technology

DISTRIBUTED OPERATING SYSTEM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. In distributed system, each processor has its own _____ (CO1, K1)

   (a) local memory

   (b) clock

   (c) both local memory and clock

   (d) none of the mentioned

2. Which routing technique is used in a distributed system? (CO1, K1)

   (a) fixed routing

   (b) virtual routing

   (c) dynamic routing

   (d) all of the mentioned

3. In distributed systems, link and site failure is detected by ———— (CO2, K2)

(a) polling

(b) handshaking

(c) token passing

(d) none of the mentioned

4. The capability of a system to adapt the increased service load is called ———— (CO2, K2)

(a) scalability

(b) tolerance

(c) capacity

(d) none

5. Internet provides ———— for remote login. (CO3, K3)

(a) telnet (b) http

(c) ftp (d) rpc

6. The file once created can not be changed is called ————. (CO3, K3)

(a) immutable file

(b) mutex file

(c) mutable file

(d) none of the mentioned

7. ———— is not possible in distributed file system. (CO4, K4)

(a) File replication

(b) Migration

(c) Client interface

(d) Remote access

8. In a distributed file system, ———— is mapping between logical and physical objects. (CO4, K4)

(a) client interfacing

(b) naming

(c) migration

(d) heterogeneity

9. In distributed file system, file name does not reveal the file's ———— (CO5, K5)

(a) local name

(b) physical storage location

(c) both local name and physical storage location

(d) none of the mentioned

10. Which one of the following is a distributed file system? (CO5, K5)

(a) andrew file system

(b) network file system

(c) novel network

(d) all of the mentioned

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

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

11. (a) List some most important functions of distributed computing. (CO1, K1)

Or

(b) Outline some advantages and disadvantages of Remote Procedure Call. (CO1, K1)

12. (a) Outline some requirements of Mutual Exclusion Algorithm. (CO2, K2)

Or

(b) Summaries any five purpose of Load Balancing in Distributed System. (CO2, K2)

13. (a) Mention some of the important benefits of Distributed File System. (CO2, K2)

Or

(b) Explain briefly about Active Directory Service Interfaces. (CO5, K5)

14. (a) Identify some advantages of Distributed shared memory. (CO3, K3)

Or

(b) Predict the major issues in Design and Implementation of DSM. (CO3, K3)

15. (a) Summarize some features of Service Oriented architecture. (CO2, K2)

Or

(b) Compare Proxy Server and VPN. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) Explain about : (CO1, K1)

(i) Two-Tier Client/Server Architecture.

(ii) Three-Tier Client/Server Architecture.

Or

(b) Describe Message Passing System and its types. (CO1, K1)

17. (a) Explain about (CO2, K2)

(i) Hardware Fault tolerance techniques.

(ii) Software fault tolerance techniques.

Or

(b) Illustrate various deadlock handling strategies in the distributed system. (CO2, K2)

18. (a) Categories some the important requirements of the File services. (CO4, K4)

Or

(b) Explain briefly about the File Caching in Distributed File Systems. (CO5, K5)

19. (a) Classify important the types of Distributed shared memory. (CO3, K3)

Or

(b) Describe in detail about the structure and granularity of a DSM System. (CO1, K1)

20. (a) Explain about (CO5, K5)

(i) Thin-Client Model

(ii) Thick Client Model.

Or

(b) Illustrate with a neat diagram about the mechanism of Proxy Server. (CO1, K1)

———————

R0309	Sub. Code 546103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Information Technology

WEB TECHNOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. In distributed system, each processor has its own _____ (CO1, K1)

   (a) local memory

   (b) clock

   (c) both local memory and clock

   (d) none of the mentioned

2. Network operating system runs on ———— (CO1, K1)

   (a) server

   (b) every system in the network

   (c) both server and every system in the network

   (d) none of the mentioned

3. Logical extension of computation migration is _____ (CO2, K2)

(a) process migration

(b) system migration

(c) thread migration

(d) data migration

4. Processes on the remote systems are identified by (CO2, K2)

(a) host ID

(b) host name and identifier

(c) identifier

(d) process ID

5. Which touting technique is used in a distributed system? (CO3, K3)

(a) fixed routing

(b) virtual routing

(c) dynamic routing

(d) all of the mentioned

6. In distributed systems, link and site failure is detected by _____. (CO3, K3)

(a) polling

(b) handshaking

(c) token passing

(d) none of the mentioned

7. The capability of a system to adapt the increased service load is called ———— (CO4, K4)

(a) scalability

(b) tolerance

(c) capacity

(d) none

8. Internet provides ———— for remote login. (CO4, K4)

(a) telnet (b) http

(c) ftp (d) rpc

9. A Parallel computer is the computer system capable of (CO5, K5)

(a) Parallel Computing

(b) Centralized Computing

(c) Decentralized Computing

(d) Distributed Computing

10. Lamport's algorithm is used for ———— synchronization. (CO5, K5)

(a) Deadlock

(b) Physical Clock

(c) Logical Clock

(d) Election process

Part B (5 × 5 = 25)

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

11. (a) Summaries some important advantages of HTML5. (CO2, K2)

Or

(b) Explain briefly about the building blocks of HTML. (CO1, K1)

12. (a) Express any five important characteristics of PHP. (CO1, K1)

Or

(b) Identify any five categories of PHP Scripts. (CO3, K3)

13. (a) Outline the syntax and flow diagram of do while loop. (CO2, K2)

Or

(b) Summaries the types of Loops and give its description. (CO2, K2)

14. (a) Justify accessing array elements with a sample program. (CO5, K5)

Or

(b) Describe about PHP Functions and its type. (CO1, K1)

15. (a) List any five Superglobal Variables in PHP. (CO1, K1)

Or

(b) How to run PHP programs in XAMPP? (CO1, K1)

Part C (5 × 8 = 40)

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

16. (a) Identify the important features and advantages of CSS3. (CO3, K3)

Or

(b) Explain briefly about structure and properties of DOM. (CO1, K1)

17. (a) Describe the importance of PHP and its Features (CO1, K1)

Or

(b) Explain in detail about the important things in PHP Web Development. (CO5, K5)

18. (a) Explain about (CO5, K5)

(i) Sequence logic

(ii) Selection logic

(iii) Iteration logic

Or

(b) Outline a sample program for break and continue inside Nested Loops. (CO1, K1)

19. (a) Explain in detail about the types of PHP Arrays. (CO2, K2)

Or

(b) Explain in detail about PHP Switch Statement and its flowchart. (CO5, K5)

20. (a) Explain briefly about File handling in PHP. (CO5, K5)

Or

(b) Explain in detail about the directories of PHP. (CO5, K5)

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R0310	Sub. Code
	546104

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Information Technology

PYTHON PROGRAMMING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

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

1. Which character is used in Python to make a single line comment? (CO1, K2)

   (a) / (b) //

   (c) # (d) !

2. Which of the following is not a keyword in Python language? (CO1, K1)

   (a) val (b) raise

   (c) try (d) with

3. The output to execute string ASCII_letters can also be obtained from ————————. (CO2, K4)

   (a) Character

   (b) ascii_lowercase_string-digits

   (c) lowercase_string.upercase

   (d) ascii_lowercase+string.ascii_upercase

4. Which of the following is correctly evaluated for POW(X,Y,Z) function? (CO2, K2)

(a) (x**y) / z (b) (x / y) * z

(c) (x**y)% z (d) (x / y) / z

5. The expression : str = [(1, 1), (2, 2), (3, 3)] – What type of data is in 4 this expression? (CO3, K4)

(a) String type (b) Array lists

(c) List of tuples (d) str lists

6. Which of the following code will create a set in python language? (CO3, K2)

(i) thisset ((“apple”, “banana”, “cherry”))

(ii) thisset = (“car”, “bike”, “123”)

(iii) thisset = { }

(a) (i) only

(b) (i) and (ii) both

(c) (i), (ii) and (iii) will create a set

(d) None of the these

7. What will be the output of the following Python code?

(CO4, K4)

```
x = “abcdef”
i = “a”
while i in x[1:]:
print(i, end = “ ”)
```

(a) a a a a a a (b) a

(c) not output (d) error

8. How many control statements python supports? (CO4, K2)

(a) Four (b) Five

(c) Three (d) None of the these

9. Which of the following functions is a built-in function in python? (CO5, K4)

(a) seed( ) (b) sqrt( )

(c) factorial( ) (d) print ( )

10. Which of the following is not a standard exception in Python? (CO5, K2)

(a) NameError (b) IOError

(c) AssignmentError (d) ValueError

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

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

11. (a) Explain briefly about constant, variable and expression available in Python. (CO1, K3)

Or

(b) Write note on applications of Python. (CO1, K3)

12. (a) Discuss about function argument in Python. (CO2, K5)

Or

(b) Elucidate about local and global variables. (CO2, K5)

13. (a) Illustrate about list indexing and splitting. (CO3, K1)

Or

(b) Describe about sets in Python. (CO3, K1)

14. (a) Explain about Nested If Statement in Python. (CO4, K1)

Or

(b) Discuss about The Range of Function in loop statements. CO4, K1)

15. (a) Elucidate Standard Files. (CO5, K4)

Or

(b) Write notes on file Storage Modules. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Discuss about Inheritance and its types in Python. (CO1, K5)

Or

(b) Enumerate about built-in data types. (CO1, K5)

17. (a) Explain call by value and call by reference in Python with suitable example. (CO2, K3)

Or

(b) Write a Python program to make simple calculator using functions. (CO2, K3)

18. (a) Write a Python program to add elements to the Tuple and delete elements from a Tuple. (CO3, K5)

Or

(b) Describe about built-in dictionary functions and methods. (CO3, K5)

19. (a) Enumerate about While Loop and For Loop in Python. (CO4, K4)

Or

(b) Discuss about Control Statements. (CO4, K4)

20. (a) Explain about file Input and Output operations. (CO5, K4)

Or

(b) Illustrate about exceptions in Python. (CO5, K4)

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R0311	Sub. Code 546501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Information Technology

Elective — OBJECT ORIENTED SOFTWARE ENGINEERING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Software is defined as ———— (CO1, K1)

   (a) Set of programs, documentation and configuration of data

   (b) Set of programs

   (c) Documentation and configuration of data

   (d) None of the mentioned

2. What is Software Engineering? (CO1, K2)

   (a) Designing a software

   (b) Testing a software

   (c) Application of engineering principles to the design a software

   (d) None of the above

3. What is the first step of requirement elicitation? (CO2, K3)

(a) Identifying Stakeholder

(b) Listing out Requirements

(c) Requirements Gathering

(d) All of the mentioned

4. What is the first step in the software development lifecycle? (CO2, K2)

(a) System Design

(b) Coding

(c) System Testing

(d) Preliminary Investigation and Analysis

5. Why is decomposition technique required? (CO3, K4)

(a) Software project estimation is a form of problem solving

(b) Developing a cost and effort estimate for a software project is too complex

(c) All of the mentioned

(d) None of the mentioned

6. In Design phase, which is the primary area of concern? (CO3, K3)

(a) Architecture (b) Data

(c) Interface (d) All of the mentioned

7. ———————— is the process of creating a software system or application utilizing an object-oriented paradigm. (CO4, K6)

(a) Object-oriented design

(b) Object-oriented program

(c) Object program

(d) All of the above

8. How many basic types of inheritance are provided as OOP feature? (CO4, K3)

(a) 4 (b) 3

(c) 2 (d) 1

9. A ———————— object maps values of one type (the key type) to arbitrary objects. (CO5, K5)

(a) mapping (b) mutable

(c) arbitrary (d) all of the mentioned

10. Testing a single unit of the software is known as (CO5, K2)

(a) Unit testing

(b) Integrated testing

(c) Acceptance testing

(d) System testing

Part B (5 × 5 = 25)

Answer the questions not more than 500 words each.

11. (a) Define Software Engineering. Write the Concepts of Software Engineering. (CO1, K1)

Or

(b) Explain about the Project Organization concept. (CO1, K2)

12. (a) What are the Requirements Elicitation Activities? Describe it. (CO2, K3)

Or

(b) Write short notes on : Optical Illusion. (CO2, K2)

13. (a) What is System Design? Explain it. (CO3, K3)

Or

(b) Explain about the UML Deployment diagram. (CO3, K3)

14. (a) Discuss about the Inheritance and Design Patterns. (CO4, K1)

Or

(b) Write short notes on : Reuse Activities. (CO4, K3)

15. (a) Explain detail the Concepts of Mapping. (CO5, K2)

Or

(b) What is the Database? Explain the Database Schema. (CO5, K6)

Part C (5 × 8 = 40)

Answer the following questions not more than 1000 words each.

16. (a) Explain in detail the Unified Modeling Languages. Give example. (CO1, K3)

Or

(b) Describe about the Project Concepts. Explain in detail. (CO1, K2)

17. (a) Write the concept of Requirements Elicitation. Describe it. (CO2, K5)

Or

(b) Explain in detail the Analysis Activities. (CO2, K4)

18. (a) What is system design? Describe it. (CO3, K3)

Or

(b) Explain in detail the System Design Activities. (CO3, K4)

19. (a) Discuss about the Reuse concepts in detail. (CO4, K3)

Or

(b) What is the concept of Interface specification? Explain it. (CO4, K4)

20. (a) Explain in briefly about mapping model. (CO5, K6)

Or

(b) What is meant by Testing? Explain the various Testing activities. (CO5, K5)

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R0312	Sub. Code
	546301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Information Technology

INTERNET OF THINGS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct options.

1. What are IoT protocols used for in IoT ecosystems? (CO1, K2)

   (a) Providing entertainment services

   (b) Standardizing communication between IoT devices

   (c) Calculating mathematical equations

   (d) Managing social media accounts

2. What is NETCONF-YANG used for in IoT system management? (CO1, K2)

   (a) Managing IoT device security

   (b) Monitoring IoT device power consumption

   (c) Configuration management and remote device administration

   (d) Social media integration

3. Which organization is responsible for the development of the M2M High-Level ETSI architecture? (CO2, K1)

(a) IEEE (Institute of Electrical and Electronics Engineers)

(b) ISO (International Organization for Standardization)

(c) ETSI (European Telecommunications Standards Institute)

(d) IETF (Internet Engineering Task Force)

4. Which layer of the IoT reference architecture focuses on routing, addressing, and data forwarding mechanisms? (CO2, K3)

(a) Domain model layer

(b) Communication model layer

(c) Information model layer

(d) Network layer

5. Which type of protocols are commonly associated with Machine-to-Machine (M2M) communications in IoT? (CO1, K2)

(a) Streaming protocols

(b) SCADA protocols

(c) Social media protocols

(d) Email protocols

6. What does Zigbee Architecture emphasize in IoT? (CO1, K2)

(a) High data rates

(b) Long-range communication

(c) Low-power, short-range communication

(d) Data security

7. Which programming language is commonly used for logical design in IoT projects involving Raspberry Pi? (CO1, K2)

(a) Java

(b) C++

(c) Python

(d) JavaScript

8. Which IoT platform is known for its energy-efficient and real-time capabilities making it suitable for battery powered devices? (CO2, K3)

(a) Raspberry Pi

(b) Arduino

(c) ESP8266

(d) BeagleBone Black

9. Which of the following is an example of an IoT application in asset management? (CO2, K2)

(a) Weather forecasting

(b) Inventory tracking

(c) Social Medial marketing

(d) Video streaming

10. What is the role of data analytics in IoT ecosystems? (CO2, K2)

(a) To reduce the amount of data generated by IoT devices

(b) To improve device security

(c) To extract valuable insights from IoT data

(d) To increase data storage costs

Part B (5 × 5 = 25)

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

11. (a) Illustrate the characteristics of IoT. (CO1, K2)

Or

(b) Difference betweeh SDN and NFV. (CO1, K2)

12. (a) Describe the key principles and steps involved for designing IoT platforms. (CO2, K3)

Or

(b) Explain the significance of the Open Geospatial Consortium (OGC) architecture in IoT. (CO5, K2)

13. (a) Discuss about SCADA protocols in IoT. (CO5, K2)

Or

(b) Explore the 6LoWPAN standards. (CO4, K2)

14. (a) Describe the types of physical devices and endpoints commonly used in IoT projects. (CO1, K2)

Or

(b) Elaborate on the programming aspects of Raspberry Pi using Python. (CO5, K5)

15. (a) What are some common real-world design constraints that IoT projects face? (CO2, K2)

Or

(b) How does Amazon Web Services cater to IoT applications and solution? (CO4, K3)

Part C (5 × 8 = 40)

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

16. (a) Explain the functions blocks of IoT. (CO1, K2)

Or

(b) What is the role of Simple Network Management Protocol (SNMP) in IoT system management? Explain. (CO2, K2)

17. (a) Explore the Internet Engineering Task Force (IETF) architecture for IoT. (CO4, K3)

Or

(b) Discuss various communication models and protocols commonly used in IoT architectures. (CO4, K2)

18. (a) Explore the IEEE 802.15.4 standard and its relevance in IoT communication. (CO2, K3)

Or

(b) Explain the BACNet protocol and its role in building automation. (CO4, K3)

19. (a) Discuss the role of Python in logical design for IoT applications. (CO1, K2)

Or

(b) Discuss the role of Arduino in IoT projects. How does it differ from Raspberry Pi in terms of hardware and programming? (CO4, K2)

20. (a) Describe how IoT is applied in commercial building automation systems. (CO5, K3)

Or

(b) Explain the importance of data analytics in IoT ecosystems. (CO4, K3)

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R0313	Sub. Code 546302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Information Technology

BIG DATA ANALYTICS AND R PROGRAMMING

(CBCS – 2022 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. The Process of describing the huge and complex data to store and process is known as ————————. (CO1, K2)

   (a) Analytics mining (b) Data cleaning

   (c) Big data (d) None of the above

2. Data Analytics uses ———————— to get Sights from data. (CO1, K1)

   (a) Statistical figures

   (b) Numerical aspects

   (c) Statistical methods

   (d) None of the mentioned above

3. Data visualization is defined as ————————. (CO2, K4)

(a) the graphical representation of information and data

(b) the numerical representation of information and data

(c) the character representation of information and data

(d) none of the above

4. Hypothesis is defined as ————————. (CO2, K2)

(a) A statement that the researcher wants to test through the data collected in a study

(b) A research question the results will answer

(c) A theory that underpins the study

(d) A statistical method for calculating the extent to which the results could have happened by chance

5. Clustering belongs to ————— data analysis. (CO3, K4)

(a) Supervised (b) Unsupervised

(c) Both (a) and (b) (d) None of the above

6. A Linear Regression model is used to find the best fit linear line and the ———————— of intercept and coefficients such that the error is minimized. (CO3, K2)

(a) Optimal values

(b) Linear line

(c) Linear polynomial

(d) None of the mentioned above

7. ———————— is a category of supervised learning methods in which the data is split on two parts. (CO4, K4)

(a) Classification (b) Clustering

(c) Data mining (d) None of the above

8. Naive Bayes pays attention to complex interactions and Options. (CO4, K2)

(a) Local Structure (b) Statistical Model

(c) Both (a) and (b) (d) None of these

9. ———————— part of the MapReduce is responsible for processing one or more chunks of data and producing the output results. (CO5, K4)

(a) Maptask (b) Mapper

(c) Task execution (d) All of the mentioned

10. Which of the following is also called an INNER JOIN? (CO5, K2)

(a) SELF JOIN (b) EQUI JOIN

(c) NON-EQUI JOIN (d) None of the above

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

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

11. (a) Enumerate about Current Analytical Architecture of Big Data. (CO1, K3)

Or

(b) Differentiate business Intelligence and data science. (CO1, K3)

12. (a) Explain the importance of R-GUI. (CO2, K5)

Or

(b) Describe about Analysis of Variance (ANOVA) statistical model. (CO2, K5)

13. (a) Illustrate about Validation and Testing. (CO3, K1)

Or

(b) Discuss about Apriori algorithm. (CO3, K1)

14. (a) Write note on decision tree in R. (CO4, K1)

Or

(b) Elucidate about steps of Text Analysis. (CO4, K1)

15. (a) Describe about Apache Hadoop. (CO5, K4)

Or

(b) Write note on difference between Hadoop Pig and Hive. (CO5, K4)

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

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

16. (a) Discuss about data analytics life cycle. (CO1, K5)

Or

(b) Enumerate about Analysis Perspective on Data Repositories. (CO1, K5)

17. (a) Explain about Wilcoxon rank sum test in null hypothesis. (CO2, K3)

Or

(b) Elucidate about examining multiple variables data exploration verses presentation. (CO2, K3)

18. (a) Illustrate about the significance of K-Means algorithm and how the clusters are initialized and choose the value for K. (CO3, K5)

Or

(b) Describe about Linear and Logistic Regression Methods. (CO3, K5)

19. (a) Describe the concept of Genetic Algorithm. (CO4, K4)

Or

(b) Discuss about Naïve Bayes in R. (CO4, K4)

20. (a) Elucidate about MapReduce and Hadoop distributed file system architecture with a neat diagram. (CO5, K4)

Or

(b) Enumerate about NoSQL with suitable examples. (CO5, K4)

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R0314	Sub. Code
	546303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Information Technology

MACHINE LEARNING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Which of the following is an example of a semi-supervised learning problem? (CO1, K4)

   (a) Image classification

   (b) Object detection

   (c) Text clustering

   (d) Speech recognition

2. What is regression? (CO1, K1)

   (a) It is a technique to predict values

   (b) It is a technique to find outliers

   (c) It is a technique to fix data

   (d) It is a Machine Learning algorithm

3. Acronym of LWL is (CO2, K2)

(a) Locally Weighted Learning

(b) Logically Weighted Learning

(c) Legally Weighted Learning

(d) Linearly Weighted Learning

4. Linear discrimination is (CO2, K1)

(a) Unsupervised learning

(b) Supervised learning

(c) Reinforcement learning

(d) Active learning

5. Decision tree is used for (CO3, K1)

(a) Classification

(b) Prediction

(c) Both (a) and (b)

(d) None of the above

6. Converts weak learner to strong learners is called (CO3, K3)

(a) Stacking (b) Boosting

(c) Bagging (d) Tuning

7. Who is the father of deep learning? (CO4, K2)

(a) llya Sutskever

(b) David Rumelhart

(c) Alex Krizhevsky

(d) Frank Rosenblatt

8. Which network has only one hidden layer between the input and output? (CO4, K1)

(a) Shallow neural network

(b) Deep neural network

(c) Recurrent neural network

(d) Convolutional Neural Network

9. Process of identifying and classifying multiple categories of objects (CO5, K4)

(a) Regression

(b) Segmentation

(c) Cluster

(d) Detection

10. What algorithm does LSTM use? (CO5, K4)

(a) Optimization algorithm

(b) Naive Bayes algorithm

(c) K-Means clustering

(d) Random forest algorithm

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

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

11. (a) What are the applications of pattern recognition? (CO1, K2)

Or

(b) How to extract decision rules from decision tree? (CO1, K4)

12. (a) How to encode a large set of input vectors into a code-book vectors using SOM? (CO2, K6)

Or

(b) How to Implement Logistic discrimination algorithm for the single output case with two classes? (CO2, K6)

13. (a) Differentiate linear regression and logistic regression. (CO3, K4)

Or

(b) How to generate decision tree in ML? (CO3, K4)

14. (a) Write the history of deep learning. (CO4, K1)

Or

(b) Write the basic concept of neurons. (CO4, K1)

15. (a) What are the differences between Semantic and Instance Segmentation? (CO5, K4)

Or

(b) How to generate text data using LSTM model? (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1,000 words each.

16. (a) Explain the types of machine learning on the basis of nature of Input. (CO1, K3)

Or

(b) What is decision tree and how Univariate trees can be constructed for classification and regression? (CO1, K3)

17. (a) What is Linear Discrimination and explain Geometry of the Linear Discriminant? (CO2, K1)

Or

(b) What is KNN and explain its algorithm with example. (CO2, K1)

18. (a) How to Evaluate ID3 Algorithm in decision tree? (CO3, K5)

Or

(b) Evaluate random forest using bagging algorithm. (CO3, K5)

19. (a) What is auto encoder and explain its types?(CO4, K1)

Or

(b) Explain the architecture of RNN. (CO4, K2)

20. (a) Explain Object detection concept with example. (CO5, K2)

Or

(b) Explain Attention Models for Computer Vision. (CO5, K2)

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R0315	Sub. Code
	546509

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Information Technology

Elective — ADVANCED NETWORK SECURITY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

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

1. A ———— tool permits security professional or a hacker to embed hidden data within a carrier file like an image or video which can later be extracted from them. (CO1, K1)

   (a) Cryptography (b) Tomography

   (c) Chorography (d) Steganography

2. In cryptography, what is cipher? (CO1, K1)

   (a) Algorithm for performing encryption and decryption

   (b) Encrypted message

   (c) Both algorithm for performing encryption and decryption and encrypted message

   (d) Decrypted message

3. In asymmetric key cryptography, the private key is kept by (CO2, K1)

(a) sender

(b) receiver

(c) sender and receiver

(d) all the connected devices to the network

4. AES uses a ———— bit block size and a key size of ———— bits (CO2, K1)

(a) 128; 128 or 256

(b) 64; 128 or 192

(c) 256; 128, 192 or 256

(d) 128; 128,192, or 256

5. Which encryption algorithm is considered to be the strongest? (CO3, K1)

(a) DES (b) RSA

(c) Blowfish (d) AES

6. Which of the following is not a characteristic of a good key? (CO3, K1)

(a) Length (b) Complexity

(c) Reusability (d) Randomness

7. Hashed message is signed by a sender using (CO4, K1)

(a) His/her private key

(b) His/her public key

(c) Receiver's public key

(d) Receiver's private key

8. In the Password Authentication Protocol (PAP), the value of the protocol field is (CO4, K1)

(a) oxd023 (b) oxc023

(c) oxa023 (d) oxb023

9. S/MIME is abbreviated as ———— (CO5, K1)

(a) Secure/Multimedia Internet Mailing Extensions

(b) Secure/Multipurpose Internet Mailing Extensions

(c) Secure/Multimedia Internet Mail Extensions

(d) Secure/Multipurpose Internet Mail Extensions

10. ———— is the method for keeping sensitive information in email communication and accounts secure against unofficial access, loss, or compromise (CO5, K1)

(a) Email security

(b) Email hacking

(c) Email protection

(d) Email safeguarding

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

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

11. (a) Write a short note on Steganography. (CO1, K1)

Or

(b) Write short notes on : (CO1, K1)

(i) Security Services.

(ii) Security Policies.

12. (a) Explain Data Encryption Standard Algorithm. (CO2, K2)

Or

(b) What are the difference between block cipher and stream cipher? (CO2, K4)

13. (a) Prove Euler's theorem. (CO3, K5)

Or

(b) Solve the following problems : (CO3, K6)

(i) Factor the RSA number n=3844384501 using the knowledge that

$$311776118522 \equiv 1 (\text{mod}\, 3844384501)$$

(ii) Prove that the number 31803221 is not a prime number using the hint $231803212 \equiv 27696377 \pmod{31803221}$.

14. (a) How does the biometric system work? What techniques are involved in biometric systems? Explain. (CO4, K6)

Or

(b) Explain four approaches of challenge response. (CO4, K2)

15. (a) Write a short note on (CO5, K1)

(i) Email Security

(ii) Web security.

Or

(b) Explain Viruses and its types. (CO5, K2)

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

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

16. (a) Discuss in detail about Security Attacks and its Types. (CO1, K6)

Or

(b) Explain modern cryptography system in detail. (CO1, K2)

17. (a) Illustrate Data Encryption Standard Algorithm with an example. (CO2, K2)

Or

(b) Exemplify Differential and Linear Cryptanalysis. (CO2, K5)

18. (a) Explain asymmetric key cipher cryptosystem using Rivest Shamir and Adleman in detail. (CO3, K2)

Or

(b) Describe in detail about ElGamal cryptosystem with suitable example. (CO3, K1)

19. (a) Discuss in detail about Message Authentication Code. (CO4, K6)

Or

(b) How does the SHA-1 Algorithm work? Explain. (CO4, K5)

20. (a) Explain in detail about S/MIME. (CO5, K2)

Or

(b) Describe in detail about firewalls in cryptography. Analyse with suitable example. (CO5, K1)

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