R2046	Sub. Code
	546101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

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 type questions by choosing the correct option.

1. The negation of $\exists m(m+3=7)$ and $\forall n(n+3<7)$ are (CO1, K2)

   (a) $\forall m(m+3 \neq 7)$ and $\forall n(n+3 \geq 7)$

   (b) $\forall m(m+3 \neq 7)$ and $\exists n(n+3 \geq 7)$

   (c) $\exists m(m+3 \neq 7)$ and $\forall n(n+3 \geq 7)$

   (d) $\exists m(m+3 \neq 7)$ and $\exists n(n+3 \geq 7)$

2. The arguments $P \wedge \sim P \rightarrow Q$ and $\sim P \rightarrow (P \rightarrow Q)$ are (CO1, K2)

   (a) Both valid

   (b) Both invalid

   (c) The first alone is valid

   (d) The second alone is valid

3. The number of relations from m - element set A to an n - element set B is (CO2, K1)

(a) mn (b) m^n

(c) n^m (d) 2^{mn}

4. $A \times B = B \times A$ if and only if (CO2, K3)

(a) $A = \phi$ or $B = \phi$ or $A = B$

(b) $A = B = \phi$ and $A = B$

(c) A or B is equal to ϕ

(d) $A = B$

5. The number of nine-digit numbers in which no digit is repeated is (CO3, K2)

(a) $P(10, 9)$ (b) $9!$

(c) $10!–9!$ (d) $9 \times 9!$

6. If n pigeonholes are occupied by $n+1$ or more pigeons, then the number of pigeonholes occupied by more than one pigeon is (CO3, K1)

(a) Exactly one (b) At least one

(c) At most one (d) None of these

7. If two events A and B are Mutually exclusive, what is $P(A \cup B)$? (CO4, K2)

(a) $P(A) + P(B)$

(b) $P(A) \times P(B)$

(c) $P(A) + P(B \mid A)$

(d) $P(A) - P(B)$

8. The Chi-square distribution becomes similar to the normal distribution as (CO4, K1)

(a) The sample size increases

(b) The degree of freedom increases

(c) The sample mean approaches the population mean

(d) The variance increases

9. If G has 21 edges, 3 vertices of degree 4 and remaining vertices of degree 3, then the number of vertices of G is (CO5, K3)

(a) 13 (b) 17

(c) 18 (d) 12

10. A tree with 3 or more vertices (CO5, K2)

(a) Has an Euler line and a Hamilton circuit

(b) Has an Euler line but not a Hamilton circuit

(c) Has neither an Euler line nor a Hamilton circuit

(d) Has a Hamilton circuit but not an Euler line

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

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

11. (a) Construct a truth table for $[P \vee (Q \rightarrow R)] \leftrightarrow [(P \vee \sim R) \rightarrow Q]$. (CO1, K3)

Or

(b) Obtain the Principal DNF of α given by $\alpha = \sim P \vee Q$. (CO1, K4)

12. (a) If R and S are Relation in a set A, Prove that $R \cap S$ is reflexive. If R and S are reflexive. (CO2, K3)

Or

(b) Check f is one-to-one and onto $f : R \to R', f(x) = x^2 - 1$. (CO2, K4)

13. (a) There is a direct flight from Trichy to Delhi and two direct trains. There are 6 trains from Trichy to Chennai and 4 trains from Chennai to Delhi. Also there are 2 trains from Trichy to Mumbai and 8 flights from Mumbai to Delhi. In how many ways can a person travel from Trichy to Delhi? (CO3, K3)

Or

(b) How many different 9 digit numbers can be formed from the Number 223355888 by rearranging its digits so that odd digits occupy Even positions? (CO3, K4)

14. (a) Write the Merits of Goodness of fit. (CO4, K3)

Or

(b) A bag holds 4 balls. Two balls are drawn at random without replacement And both are found to be Blue. What is the probability that all balls in the bag Are Blue? (CO4, K3)

15. (a) Construct two non isomorphic simple graphs with 6 vertices of degrees 1, 1, 2, 2, 3 and 3. (CO5, K3)

Or

(b) Determine $|V|$ if G has 10 edges, 2 vertices of degree 4 and remaining vertices of degree 3. (CO5, K3)

Part C

$(5 \times 8 = 40)$

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

16. (a) Show that $\alpha = \sim(P \vee Q \vee \sim R) \wedge ((R \to P) \vee (R \to Q))$ is a Contradiction. (CO1, K3)

Or

(b) Explain key components of Predicate calculus. (CO1, K2)

17. (a) Explain the procedure for constructing a Hasse Diagram. (CO2, K2)

Or

(b) Let $A = R - \{-4\} = B$ and $f : A \to B, f(x) = \dfrac{2x+1}{x+4}$,

Check f is one-to-one and onto and find f^{-1}. (CO2, K4)

18. (a) Using Generating function, Solve the recurrence relation (CO3, K4)

$a_n - a_{n-1} - 6a_{n-2} = 0,$
$a_0 = 5,\ a_1 = 0.$

Or

(b) A teacher wish to give a question paper of 60 marks with 10 questions So that each question carries 3 or more marks. Find the number of Ways of such a question paper. (CO3, K4)

19. (a) Find the rank correlation coefficient for the rank of 10 students assigned By two teachers (CO4, K3)

Students:	1	2	3	4	5	6	7	8	9	10
Rank (Teacher I):	8	7	6	3	2	1	4	9	10	5
Rank (Teacher II):	10	8	5	2	1	3	6	9	7	4

Or

(b) Properties of Good Measures of Central Tendency. (CO4, K3)

20. (a) Draw all non isomorphic Binary Trees with four vertices. (CO5, K4)

Or

(b) Explain Hamilton graph with example. (CO5, K2)

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R2047	Sub. Code
	546102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

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 type questions by choosing the correct option.

1. Processes on the remote systems are identified by ————————. (CO1, K2)

   (a) Host ID

   (b) Host name and identifier

   (c) Identifier

   (d) Process ID

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

   (a) Scalability (b) Tolerance

   (c) Capacity (d) Transpose

3. A logical clock is associated with ————————. (CO2, K3)

   (a) Each instruction (b) Each process

   (c) Each register (d) Each thread

4. What is the key difference between a process and a thread? (CO2, K3)
   (a) Processes run in separate memory spaces, while threads run in a shared memory space
   (b) Processes are independent entities while threads are part of a process and share its resources
   (c) Processes have their own program counter, register set, and stack space, while threads do not
   (d) Both (a) and (b)

5. ———————— is not possible in distributed file system. (CO1, K4)
   (a) File replication (b) Migration
   (c) Client interface (d) Remote access

6. What is networked virtual memory? (CO1, K3)
   (a) Caching (b) Segmentation
   (c) RAM Disk (d) ROM

7. In ———————— execution is the same as if all read/write ops were executed in some global ordering. (CO1, K1)
   (a) Sequential Consistency
   (b) Strict Consistency
   (c) Weak Consistency
   (d) Casual Consistency

8. Cache memory is used to reduce network traffic in (CO2, K4)
   (a) Bus-base Multiprocessor
   (b) Switched Multiprocessor
   (c) NUMA Multiprocessor
   (d) Ring-Based Multiprocessor

9. Which one of the following is a process that uses the spawn mechanism to ravage the system performance? (CO2, K4)
   (a) Worm (b) Trojan
   (c) Threat (d) Virus

10. Which proxy cache Acts as an intermediary between client devices and the internet. (CO3, K2)

(a) Forward Proxy Cache

(b) Reverse Proxy Cache

(c) Transparent Proxy Cache

(d) Distributed Proxy Cache

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

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

11. (a) Write Short notes on Group communication. (CO2, K2)

Or

(b) Explain in detail about the process of RPC. (CO2, K2)

12. (a) List and explain the types of Election algorithm. (CO3, K3)

Or

(b) Write short notes on hybrid system model. (CO3, K3)

13. (a) Explain the concept of fault tolerance. (CO2, K4)

Or

(b) How replications handled in file system? Explain. (CO3, K3)

14. (a) Write short notes on Release consistency. (CO3, K2)

Or

(b) What is a shared variable? Explain its types. (CO3, K3)

15. (a) Expand CDN. How to estimate its metric? (CO3, K4)

Or

(b) Explain in detail on JAVA RMI. (CO3, K3)

Part C (5 × 8 = 40)

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

16. (a) Illustrate the networks of Asynchronous transfer mode. (CO2, K2)

Or

(b) What are the design issues to be considered in designing Distributed system? Explain in detail about each of them. (CO3, K4)

17. (a) Give the distributed algorithm for deadlock detection and illustrate with an example. (CO3, K4)

Or

(b) Describe the issues in designing thread packages. (CO5, K3)

18. (a) Explain File system Interface and SUN network file system with suitable sketch. (CO3, K4)

Or

(b) Discuss the design principles of distributed file system. (CO3, K3)

19. (a) Elaborate the concept of NUMA multiprocessor. (CO5, K4)

Or

(b) What is MACH microkernel? Analyse the concept of memory management in MACH. (CO4, K4)

20. (a) Illustrate in detail different protocols used for message exchange. (CO2, K3)

Or

(b) Explain in detail about secure channels. (CO4, K4)

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R2048	Sub. Code
	546103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

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 type questions by choosing the correct option.

1. Which is not a core component of Web application? (CO1, K2)

   (a) UI (Front End (DOM, Framework))

   (b) Back End (Database, Logic)

   (c) Request Layer (Web API)

   (d) Applications

2. Web Workers are exclusively designed to (CO1, K1)

   (a) Background work (b) Website work

   (c) Front End Work (d) Designing work

3. A script is a set of programming instructions that is interpreted at ————————. (CO2, K2)

   (a) Coding time (b) Runtime

   (c) Designing time (d) Scripting time

4. Converting a variable or value into a desired data type is said as ————————. (CO2, K2)

(a) Casting (b) Explicit Casting

(c) Implicit Casting (d) Type casting

5. To pass a character in switch, the expression is (CO3, K1)

(a) switch($num) (b) switch($car)

(c) switch($ch) (d) switch($model)

6. To end the execution of the loop immediately, the keyword used is (CO3, K1)

(a) End (b) Break

(c) Terminate (d) Close

7. To store tabular data in an array, ———————— array is used. (CO4, K2)

(a) Multidimensional Array

(b) Single Dimensional

(c) Associative Array

(d) Array

8. To split arrays into chunks ———————— function is used. (CO4, K1)

(a) array $array

(b) array array_change

(c) array_chunk( )

(d) array_array

9. A function reads a file and writes it to the output buffer. (CO5, K2)

(a) Inputfile( ) (b) Outputfile( )

(c) Writefile( ) (d) Readfile( )

10. GET method may be used for sending ———————— data. (CO5, K2)

(a) Non-sensitive (b) Important

(c) Sensitive (d) Unimportant

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

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

11. (a) Write in detail about features of HTML 5. (CO1, K1)

Or

(b) Write in detail about Selectors in CSS3. (CO1, K2)

12. (a) Write about basic PHP Development. (CO2, K2)

Or

(b) Write in detail about PHP Scripts. (CO2, K1)

13. (a) Explain with example about the if statement of PHP. (CO3, K2)

Or

(b) Explain with example about the Switch statement of PHP. (CO3, K2)

14. (a) Discuss about sorting arrays of PHP. (CO4, K5)

Or

(b) Explain in detail about Functions of PHP. (CO4, K2)

15. (a) Write a PHP script to acquire user input. (CO5, K1)

Or

(b) Write in detail about File upload and scripts. (CO5, K3)

Part C (5 × 8 = 40)

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

16. (a) Discuss about Migrating from HTML 4 to HTML 5. (CO1, K5)

Or

(b) Discuss about Overview of DOM. (CO1, K5)

17. (a) Explain in detail about working of PHP with web server. (CO2, K2)

Or

(b) Write in detail about variables and string manipulation of PHP. (CO2, K3)

18. (a) Illustrate with an example about nested if statements of PHP. (CO3, K5)

Or

(b) Write in detail about Loops with an example. (CO3, K2)

19. (a) With an example explain about Associative Arrays of PHP. (CO4, K2)

Or

(b) Explain in detail about user defined functions of PHP. (CO4, K2)

20. (a) Discuss about File Operations. (CO5, K5)

Or

(b) Discuss about working with forms. (CO5, K5)

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R2049

Sub. Code
546104

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Information Technology

PYTHON 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. What is the maximum possible length of an identifier? (CO2, K2)

   (a) 31 characters (b) 63 characters
   (c) 79 characters (d) 86 characters

2. Which of these data types does Python not natively support? (CO1, K2)

   (a) Lists (b) Tuples
   (c) Arrays (d) Dictionaries

3. The output of executing string.ascii_letters can also be achieved by: (CO2, K2)

   (a) string.ascii_lowercase_string.digits
   (b) string.ascii_lowercase+string.ascii_uppercase
   (c) string.letters
   (d) string.lowercase_string.uppercase

4. Which keyword is used for function? (CO1, K1)

   (a) Fun (b) Define
   (c) Def (d) Function

5. Which of these about a dictionary is false? (CO2, K3)

(a) The values of a dictionary can be accessed using keys

(b) The keys of a dictionary can be accessed using values

(c) Dictionaries aren't ordered

(d) Dictionaries are mutable

6. Which function removes a set's first and the last element from a list? (CO3, K3)

(a) pop (b) remove

(c) dispose (d) discard

7. Which statement immediately terminates a loop in Python? (CO2, K4)

(a) Break (b) Continue

(c) Exit (d) Stop

8. What will happen if the condition in an if statement in Python evaluates to False? (CO2, K3)

(a) The program will stop

(b) It will execute the else block

(c) It will raise an error

(d) It will skip to the next if

9. In Python, the primary use of the tell() method is that : (CO3, K4)

(a) within the file, it tells the end position

(b) within the file, it tells the current position

(c) it tells us if the file is opened

(d) it tells us file is closed

10. Which exception is raised by Python when a file you try to open does not exist? (CO3, K5)

(a) FileNotFoundError

(b) IOError

(c) OSError

(d) ValueError

Part B (5 × 5 = 25)

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

11. (a) Explain briefly constant, variables, expression, keywords and statements available in python. (CO3, K5)

Or

(b) Write short notes on features of python. (CO4, K2)

12. (a) Explain Global and Local variable with suitable example. (CO2, K5)

Or

(b) Write short notes on function prototypes. (CO3, K4)

13. (a) Write a Python program that sorts a dictionary by its values. (CO2, K3)

Or

(b) Write a short note on set data type in Python. (CO2, K4)

14. (a) Write a Python function called 'calculate_factorial' that takes a positive integer as input and returns the factorial of that number using for loops.(CO3, K3)

Or

(b) Write different types of Unconditional looping statement. (CO2, K2)

15. (a) Discuss about persistent storage modules. (CO2, K5)

Or

(b) Write Short notes on Command Line Arguments. (CO4, K3)

Part C (5 × 8 = 40)

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

16. (a) Explain in detail different data types in python. (CO4, K3)

Or

(b) Describe about the concept of precedence and associativity of operators with example. (CO4, K5)

17. (a) Explain call by value and call by reference in python with an example program. (CO3, K4)

Or

(b) Explain string concatenation and string replication with one suitable example for each. (CO2, K5)

18. (a) Explain in brief about Basic list Operations, Indexing, Slicing and Matrixes and Built-in List Functions and Methods. (CO2, K4)

Or

(b) Define python tuples? With program explain the concept of Accessing Values in tuples, updating tuples and deleting tuple elements. (CO3, K4)

19. (a) Explain in detail different flow control statements with example code and syntax. (CO2, K3)

Or

(b) (i) Explain the concept of the nested loop statement.

(ii) Explain the concept of while loop statement. (CO3, K3)

20. (a) Explain in detail about Python Files, its types, functions and operations that can be performed on files with examples. (CO4, K5)

Or

(b) Define exception handling. How exceptions are handled in python? Write a program to solve divide by zero exception. (CO4, K4)

R2050

Sub. Code
546501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Information Technology

Elective – OBJECT ORIENTED SOFTWARE ENGINEERING

(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. What is an actor in a use case? (CO1, K2)

   (a) A component of the system

   (b) A function provided by the system

   (c) An entity that interacts with the system

   (d) A result of the system's functionality

2. What are the four components of a project from developer's perspective? (CO1, K2)

   (a) Work product, activity, participant and budget

   (b) Work product, schedule, participant and task

   (c) Work product, plan, participant and components

   (d) Work product, schedule, customer and resources

3. What is the result of the requirements elicitation activity in software development? (CO2, K2)

(a) A detailed design document

(b) A description of the system in terms of actors and use cases

(c) A prototype of the system

(d) A test plan

4. What is the main focus of the dynamic model in system analysis? (CO2, K2)

(a) Structure of the system

(b) Behavior of the system

(c) User interfaces

(d) Storage of information

5. What is do you mean by cohesion in system design? (CO3, K2)

(a) Number of dependencies within a subsystem

(b) Subsystems interact with each other

(c) Subsystem complexity

(d) Dependencies with outside system

6. Which section of the Software Design Document (SDD) documents the system design model of the new system? (CO3, K2)

(a) Current software architecture

(b) Proposed system architecture

(c) Introduction

(d) Boundary conditions

7. What is delegation in object-oriented design? (CO4, K2)

(a) Delegation is used to implement inheritance by copying the functionality from one class to another

(b) Delegation is an alternative to implementation inheritance and a where a class uses another class to perform an operation by resending a message

(c) Delegation is used for the dependencies between the reused class and the new class

(d) Delegation is the specification for interface specification and optimization in object design

8. What is the purpose of OCL? (CO4, K2)

(a) To define the syntax of UML diagrams

(b) To specify constraints on model elements

(c) To create a new programming language

(d) To replace natural language

9. What is the result of reverse engineering? (CO5, K2)

(a) Source code that corresponds to interface

(b) Model that corresponds to source code

(c) User interface

(d) Database schema

10. What is the purpose of performance testing? (CO5, K2)

(a) To test the system's functionality

(b) To check the nonfunctional requirements and additional design goals

(c) To test the system's integration

(d) To test the system's performance

Part B (5 × 5 = 25)

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

11. (a) What is software engineering? Explain the four key aspects. (CO1, K4)

Or

(b) Explain the types of software engineering participants and roles. (CO1, K4)

12. (a) Explain the different types of scenarios used during requirements elicitation. (CO2, K4)

Or

(b) Discuss the analysis object models and dynamic models. (CO2, K5)

13. (a) Explain the two properties of subsystems: coupling and cohesion. (CO3, K4)

Or

(b) Explain the use of UML Deployment Diagrams in system design. (CO3, K4)

14. (a) What are the main roles involved in reuse? Discuss. (CO4, K4)

Or

(b) Outline the template of Object Design Document. (CO4, K3)

15. (a) Write a note on unidirectional and bidirectional one-to-one association. (CO5, K3)

Or

(b) Discuss the types of tests followed during performance testing. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) What is UML? Explain any two UML diagrams with an example. (CO1, K4)

Or

(b) Explain the key organizational activities a developer must undertake when joining a project organization. (CO1, K4)

17. (a) Discuss the activities of requirement elicitation. (CO2, K5)

Or

(b) How to manage analysis? Explain in detail. (CO2, K4)

18. (a) Explain the goal of system design activities in the context of transforming the analysis model into the design model. (CO3, K4)

Or

(b) Describe a document template that can be used to document the results of system design. (CO3, K5)

19. (a) Describe object design concepts related to reuse. (CO4, K5)

Or

(b) Explain the activities of interface specification. (CO4, K4)

20. (a) Explain the four types of transformations used in improving the design of the system. (CO5, K4)

Or

(b) Discuss the model elements used during testing in detail. (CO5, K5)

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R2051

Sub. Code
546301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

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 type questions by choosing the correct option.

1. In IoT, what does the acronym 'M2M' stand for? (CO1, K2)

   (a) Machine to Machine

   (b) Mobile to Mobile

   (c) Micro to Macro

   (d) Man to Machine

2. Which of the following is a lightweight message protocol based on public-subscribe model? (CO1, K2)

   (a) MQTT (b) SQL

   (c) HTML (d) CSS

3. Which layer of the IoT architecture is responsible for sensing and gathering information about the environment? (CO2, K2)

(a) Network layer (b) Application layer

(c) Perception layer (d) Physical layer

4. In the Publish-Subscribe communication model, what is the primary role of the broker? (CO2, K2)

(a) To directly send requests to a server between publishers and subscribers

(b) To manage and route messages between publishers and subscribers

(c) To pull data from multiple sources

(d) To establish an exclusive communication channel

5. Expand the term SCADA in IoT (CO3, K2)

(a) Smart Control and Data Acquisition

(b) Supervisory Control and Data Acquisition

(c) Systematic Control and Data Analysis

(d) Secure Communication and Data Access

6. Which protocol is designed for longer distances with low power requirements in the unlicensed spectrum? (CO3, K2)

(a) IEEE 1901.2a (b) LoRaWAN

(c) IEEE 802.15.4g. (d) IEEE 802.15.4e

7. What is the primary purpose of the GPIO pins on a Raspberry Pi? (CO4, K2)

(a) To display video output

(b) To connect to the internet

(c) To interface with external hardware

(d) To provide power supply

8. What is a key feature of the Arduino platform in IoT development? (CO4, K2)

(a) High processing power

(b) Extensive built-in storage

(c) Ease of use for prototyping

(d) Advanced graphical user interfaces

9. Which concept in IoT involves using mobile devices to collect and share information about the environment? (CO5, K2)

(a) Smart Cities

(b) Participatory Sensing

(c) Industrial Automation

(d) Cloud Computing

10. Which platform provides cloud storage and communication APIs specifically for IoT applications? (CO5, K2)

(a) Microsoft Excel

(b) Amazon Web Services

(c) Web information

(d) Adobe Photoshop

Part B (5 × 5 = 25)

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

11. (a) Define the Internet of Things (IoT) and discuss its key characteristics. (CO1, K3)

Or

(b) What do you mean by Software Defined Network and Network Function Virtualization? How do they benefit IoT? (CO1, K3)

12. (a) What is OGC Architecture in IoT? How does it support geospatial data integration. (CO2, K3)

Or

(b) Explain the five layer architecture of IoT. (CO2, K4)

13. (a) How the BACNet protocol works? Explain. (CO3, K3)

Or

(b) What is the use of RFID in IOT? Explain. (CO3, K4)

14. (a) Discuss the key building blocks of an IoT device. (CO4, K4)

Or

(b) What are IoT Physical Devices and Endpoints? Discuss. (CO4, K4)

15. (a) Describe the role of IoT in industrial automation. (CO5, K5)

Or

(b) Discuss some of the IoT cloud storage management tools. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Discuss the concept of IoT levels in detail. (CO1, K4)

Or

(b) Explain any two domain specific IOT applications. (CO1, K4)

17. (a) Explain the ETSI M2M High-Level Architecture and its key components. (CO2, K4)

Or

(b) Discuss the various Domain, Information, Functional, and Communication models of IOT. (CO2, K4)

18. (a) Describe the IEEE 802.15.4 standard and its role in IoT communication. (CO3, K5)

Or

(b) Discuss in detail about the 6LoWPAN and CoAP protocol in IOT. (CO3, K4)

19. (a) How does Linux on Raspberry Pi facilitate IoT development? (CO4, K5)

Or

(b) Compare and contrast Raspberry Pi and Arduino as platforms for IoT development. (CO4, K5)

20. (a) Examine the applications of IoT in asset management. (CO5, K5)

Or

(b) What are the key features of Smart Grid technology in IoT? Explain. (CO5, K5)

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R2052	Sub. Code
	546302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

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. Data that has no inherent structure, which may include text documents, PDFs, images, and video (CO1, K2)

   (a) Data Structure (b) Unstructured

   (c) Structured (d) Semi Structured

2. The process of cleaning data, normalizing datasets, and performing transformations on the data is said as (CO1, K2)

   (a) Data Ecosystem (b) Data System

   (c) Data cleaning (d) Data conditioning

3. A programming language and software framework for statistical analysis and graphics. (CO2, K1)

   (a) Photoshop (b) Multimedia

   (c) SPSS (d) R Programming

4. ———— needs to be performed over the accounts with abnormal age values. (CO2, K2)

   (a) Data (b) Cleaning Data

   (c) Data Cleansing (d) Datasets

5. If an itemset is considered frequent, then any subset of the frequent itemset must also be frequent which is referred as (CO3, K1)

(a) Itemset (b) Subset

(c) Apriori property (d) Closure property

6. The standard deviation of the observed residuals is said as (CO3, K1)

(a) R-squared

(b) Residual standard error

(c) Parameter

(d) Co-efficient

7. A tree structure to specify sequences of decisions and consequences. (CO4, K1)

(a) Decision Tree (b) Root Nodes

(c) Decision Stump (d) Components

8. Large collection of texts used for various purposes in Natural Language Processing. (CO4, K1)

(a) Data Analysis (b) Text Analysis

(c) Corpus (d) Word Analysis

9. A paradigm provides the means to break a large task into smaller tasks, run the tasks in parallel, and consolidate the outputs (CO5, K1)

(a) MapReduce (b) Map

(c) Hadoop (d) Reduce

10. Open source database is (CO5, K2)

(a) NoSQL (b) PHP

(c) PostgreSQL (d) SQL

Part B (5 × 5 = 25)

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

11. (a) Write in detail about Drivers of Big Data. (CO1, K2)

Or

(b) Write in detail about Data Analytics Lifecycle. (CO1, K1)

12. (a) Write about Attribute and Data Types of R Programming. (CO2, K2)

Or

(b) Write in detail about Common Tools for the Data Preparation Phase. (CO2, K2)

13. (a) Explain about Clustering. (CO3, K1)

Or

(b) Explain Apriori Algorithm. (CO3, K2)

14. (a) Discuss about naïve Bayes. (CO4, K1)

Or

(b) Explain in detail about the Text Analysis steps with example. (CO4, K1)

15. (a) Discuss about Hadoop Ecosystem. (CO5, K1)

Or

(b) Discuss SQL Joins with example. (CO5, K1)

Part C (5 × 8 = 40)

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

16. (a) Discuss about key roles for the New Big Data Ecosystem. (CO1, K5)

Or

(b) Write in detail about Data Preparation Phase. (CO1, K1)

17. (a) Explain in detail about Exploratory Data Analysis (CO2, K2)

Or

(b) Write in short notes about Statistical Methods of Evaluation. (CO2, K1)

18. (a) Illustrate with an example about K-means. (CO3, K1)

Or

(b) Write in detail about Logistics Regression. (CO3, K1)

19. (a) With an example explain about Decision tree algorithms. (CO4, K1)

Or

(b) Explain in detail about the Naïve Bayes in R. (CO4, K2)

20. (a) Discuss HBase. (CO5, K1)

Or

(b) Discuss : NoSQL. (CO5, K2)

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R2053	Sub. Code
	546303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

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 type questions by choosing the correct option.

1. Which type of machine learning involves a decision-making agent interacting with an environment to maximize cumulative reward? (CO1, K2)

   (a) Supervised Learning

   (b) Unsupervised Learning

   (c) Semi-Supervised Learning

   (d) Reinforcement Learning

2. Which of the following best describes feature selection in machine learning? (CO1, K2)

   (a) Transforming the data into a lower-dimensional space

   (b) Selecting a subset of relevant features for model construction

   (c) Combining multiple models to improve performance

   (d) Assigning weights to different features based on their importance

3. Which of the following is a characteristic of linear discrimination? (CO2, K2)

(a) It assumes non-linear separation between classes

(b) It directly estimates class densities

(c) It assumes linear separability between classes

(d) It does not use discriminant functions

4. What is the primary goal of Self-Organizing Maps? (CO2, K2)

(a) To perform parametric discrimination

(b) To cluster similar data points in a lower-dimensional space

(c) To separate classes using linear boundaries

(d) To predict future data points

5. What is the primary criterion used by the ID3 algorithm to split nodes in a decision tree? (CO3, K2)

(a) Gini impurity

(b) Mean squared error

(c) Information gain

(d) Cross-entropy

6. What is the primary purpose of the bagging ensemble method? (CO3, K2)

(a) To reduce model variance

(b) To increase model bias

(c) To enhance over fitting

(d) To decrease the number of features

7. In the context of neural networks, what is the role of a synapse? (CO4, K2)

(a) To process inputs

(b) To connect neurons and store memory

(c) To output the final result

(d) To perform back propagation

8. What is a key feature of deep learning that differentiates it from traditional machine learning methods? (CO4, K2)

(a) Use of linear regression

(b) Use of decision trees

(c) Ability to learn complex patterns and representations through multiple layers

(d) Use of simple neural networks

9. What is the primary purpose of using attention models in computer vision? (CO5, K2)

(a) To enhance the resolution of images

(b) To focus on relevant parts of the input data

(c) To generate high-quality captions for images

(d) To classify images into different categories

10. In Generative Adversarial Networks, what are the two main components? (CO5, K2)

(a) Encoder and Decoder

(b) Generator and Discriminator

(c) Predictor and Evaluator

(d) Classifier and Regenerator

Part B (5 × 5 = 25)

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

11. (a) What is feature selection and why is it important in machine learning? (CO1, K3)

Or

(b) Define pattern recognition and its role in machine learning. (CO1, K3)

12. (a) What is K-Nearest Neighbor algorithm, and how does it make predictions? (CO2, K3)

Or

(b) Discuss the concept of pairwise separation in the context of multi-class classification. (CO2, K4)

13. (a) Discuss the concept of Random Forests. (CO3, K4)

Or

(b) Explain the concept of least squares estimation method used in linear regression. (CO3, K5)

14. (a) Explain the role of probability theory in deep learning. (CO4, K5)

Or

(b) Explain the architecture of a Convolutional Neural Network. (CO4, K5)

15. (a) Describe the concept of image segmentation. (CO5, K5)

Or

(b) Describe the architecture of a basic image captioning model. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) Explain the types of machine learning in detail. (CO1, K5)

Or

(b) Explain the role of decision theory in machine learning. (CO1, K5)

17. (a) Explain the logistic discrimination technique and how it differs from linear discrimination. (CO2, K5)

Or

(b) Compare and contrast Learning Vector Quantization and Locally Weighted Learning. (CO2, K5)

18. (a) Explain the concept of boosting and how it differs from bagging. Explain with an example. (CO3, K5)

Or

(b) Explain ID3 decision algorithm with an example. (CO3, K5)

19. (a) Discuss the concept of semi-supervised learning. Explain with an example. (CO4, K4)

Or

(b) Discuss the basic structure and function of an artificial neuron in a neural network. (CO4, K4)

20. (a) Discuss how LSTM models can be utilized for generating textual descriptions from video sequences. (CO5, K4)

Or

(b) Discuss about the object detection with deep learning. (CO5, K4)

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R2054	Sub. Code
	546509

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

Third Semester

Information Technology

Elective – ADVANCED NETWORK SECURITY

(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 ———————— cipher is the simplest monoalphabetic cipher. It uses modular arithmetic with modulus 26. (CO2, K1)

   (a) Transposition (b) Additive

   (c) Shift (d) Round

2. In Cryptography, the original message, before being transformed, is called (CO1, K1)

   (a) Simple Text (b) Plain Text

   (c) Empty Text (d) Filled Text

3. What is 11 mod 7 and -11 mod 7? (CO2, K3)

   (a) 4 and 5 (b) 4 and 4

   (c) 5 and 3 (d) 4 and –4

4. What is the block size in the Simplified AES lgorithm? (CO1, K2)

(a) 8 bits (b) 40 bits

(c) 16 bits (d) 36 bits

5. The ———————— method provides a one-time session key for two parties. (CO3, K3)

(a) Diffie-Hellman (b) RSA

(c) DES (d) AES

6. In Elgamal cryptosystem given the prime p = 31. (CO3, K2)

What is the respective plaintext character for C = (27, 20)?

(a) H (b) L

(c) O (d) M

7. Message authentication is a service beyond (CO1, K1)

(a) Message Confidentiality

(b) Message Integrity

(c) Message Splashing

(d) Message Sending

8. A digitally signs a message and sends it to S. Verification of the signature by S requires (CO1, K2)

(a) A's Public Key (b) S's Public Key

(c) S's Private Key (d) A's Private Key

9. What is the PGP stand for? (CO2, K2)

(a) Permuted Gap Permission

(b) Permuted Great Privacy

(c) Pretty Good Permission

(d) Pretty Good Privacy

10. Which of the following is a general term for malicious software that pretends to be harmless so that a user willingly allows it to be downloaded onto the computer? (CO2, K3)

(a) Spware (b) Virus

(c) Trojan Horse (d) Botnets

Part B (5 × 5 = 25)

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

11. (a) What is a security attacks? List its types. (CO1, K1)

Or

(b) Write short notes on Cryptanalysis. (CO1, K2)

12. (a) Write short note on AES. (CO2, K2)

Or

(b) Discuss about congruence and Matrices. (CO2, K4)

13. (a) Write short note on Exponentiation and algorithm. (CO3, K1)

Or

(b) Write short notes on Miller Rabin algorithm. (CO4, K4)

14. (a) Write short notes on Digital Signature. (CO4, K4)

Or

(b) Explain about Challenge response protocols. (CO4, K3)

15. (a) Write short notes on security issues in E-Mail. (CO5, K2)

Or

(b) Explain the need for Firewall. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Describe in detail about OSI Security architecture. (CO1, K3)

Or

(b) Explain in detail the Substation encryption techniques. (CO1, K4)

17. (a) Describe in detail about DES? List some strength of DES. (CO2, K5)

Or

(b) Explain in brief about Euclid's Algorithm. (CO2, K3)

18. (a) Explain in detail about Diffie Hellman Key exchange. (CO3, K2)

Or

(b) Describe in detail about Fermat's Theorem. (CO3, K3)

19. (a) Discuss in detail about Message authentication code. (CO4, K5)

Or

(b) Illustrate in detail about security of hash function and MAC. (CO4, K4)

20. (a) Explain in detail about web security. (CO5, K4)

Or

(b) Illustrate various types of malicious software's. (CO5, K5)

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