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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Information Technology**

**PYTHON PROGRAMMING**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. What are the different types of comments in Python?

2. List the built-in types of Python objects.

3. What is variable scope?

4. What are formal arguments in Python functions?

5. Discuss encapsulation with an example.

6. What are the different types of errors in Python?

7. Write the properties of generic widgets.

8. List the uses of Scroll Bars in GUI.

9. What is MongoDB?

10. What is the purpose of the INSERT command?

## Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Discuss the working of loops and conditional statements in Python with examples.

Or

(b) Explain how to define and access strings, list and tuples in Python.

12. (a) Explain how functions are created and called in Python. Show with example.

Or

(b) Write a recursive function to calculate the factorial of a number.

13. (a) Write a Python class Rectangle with attributes length and breadth and a method to compute the area.

Or

(b) How does exception handling work in Python? Provide examples.

14. (a) Write a Python program to create a basic GUI application with multiple widgets.

Or

(b) Write a Python program to create a GUI application with a label and a button.

15. (a) Explain database connectivity using Python and MongoDB.

Or

(b) Discuss the steps to create a table in a database using Python.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a program to print all prime numbers within a given range.

17. Explain functional programming concepts in Python. Discuss different types of function arguments with examples.

18. Write a Python program to demonstrate polymorphism.

19. Design a GUI application incorporating radio buttons and check buttons. Describe the steps involved in creating menus for this application using Python.

20. Write a python program to perform CRUD operations in MongoDB.

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Information Technology**

**Elective — DATA STRUCTURES**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** the questions.

1. Define data structure and its significance in programming.

2. What is the purpose of the peek operation in a stack?

3. Define a circular queue and write its advantage over a linear queue.

4. Mention two applications of priority queue.

5. Define a leaf node in a binary tree.

6. What is an expression tree?

7. What is Heap Sort?

8. Write the key difference between bubble sort and insertion sort.

9. What is a graph traversal? Name two types.

10. State the purpose of Kruskal's algorithm.

## Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Explain multidimensional arrays with an example.

Or

(b) How can arithmetic expressions be evaluated using stacks?

12. (a) Discuss the applications of queues in a multiprogramming environment.

Or

(b) Explain how polynomial expressions can he represented using linked lists.

13. (a) Write an algorithm for in order, preorder and postorder traversal of a binary tree.

Or

(b) Explain the concept of a splay tree with an example.

14. (a) Explain the working of quick sort with an example.

Or

(b) Explain the steps involved in selection sort.

15. (a) Describe Prim's algorithm for finding a minimum spanning tree.

Or

(b) Explain the greedy method with an example.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a program to implement stack operations using arrays.

17. Explain the concept of a priority queue and write a program to implement it.

18. Construct a binary search tree using the following values: 50, 30, 70, 20, 40, 60, 80 and show its traversal outputs.

19. Write an algorithm for Shell sort. Sort the following numbers in ascending order 23, 12, 45, 54, 76, 67, 88, 97, 54 using Shell sort. Show the output for each pass.

20. Implement Dijkstra's shortest path algorithm using an adjacency matrix.

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Information Technology**

**Elective — HUMAN COMPUTER INTERACTION**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** the questions.

1. Define ergonomics in the context of human-computer interaction.

2. Mention the common interaction styles in human-computer interaction.

3. What is the purpose of prototyping in interaction design?

4. Give a note on heuristics in usability evaluation.

5. List out the important aspects of programming an application.

6. How does a windowing system allow users work?

7. Why is designing for diversity important?

8. Discuss the primary goal of a user support system.

9. Define linguistic models in the context of HCI.

10. Write a note on device models in HCI.

## Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Explain the different types of memory in human cognition with its example.

Or

(b) Discuss the impact of interactivity on user experience in modern systems.

12. (a) Give a note on the role of scenarios in interface design with an example.

Or

(b) How usability principles affect user interface design?

13. (a) What are User Interface Management Systems (UIMS) and how do they assist in UI development?

Or

(b) Compare the expert analysis with user-based evaluation methods.

14. (a) Write a note on the key principles of Universal Design with examples.

Or

(b) List out the challenges in designing user support systems.

15. (a) What are the roles of cognitive models in human-computer interaction?

Or

(b) Mention the impacts of display-based systems on user cognitive load.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a detailed note on WIMP interface model, its elements and its role in graphical user interfaces.

17. Explain the entire design process in HCI, with its diagram.

18. Discuss how toolkits support UI development with examples of commonly used toolkits.

19. How can Universal Design principles be applied in the development of user support systems?

20. Give a detailed note on the different types of cognitive models and their applications in HCI.

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**S–0953**

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Information Technology**

**ADVANCED JAVA**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. List any four Java buzzwords.

2. What is the purpose of the final keyword in Java?

3. What is the difference between String and StringBuffer in Java?

4. Define an abstract class with an example.

5. What is an exception in Java?

6. Define the synchronized keyword in Java.

7. What is an applet in Java?

8. What is the difference between AWT and Swing?

9. What is a servlet in Java?

10. What is the role of JavaBeans in JSP?

## Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain different types of constructors with examples.

Or

(b) What is inheritance in Java? Explain different types of inheritance with examples.

12. (a) Explain string handling functions in Java.

Or

(b) How does multiple inheritance work using interfaces?

13. (a) What are thread priorities? How are they set in Java?

Or

(b) Describe the JDBC architecture in Java.

14. (a) Discuss different types of event handling mechanisms in Java.

Or

(b) Describe how to create and use layout managers in Java. Explain any two types of layouts in java.

15. (a) What is the Model-View-Controller (MVC) pattern? Explain its implementation in Java web applications.

Or

(b) Describe different types of JSP tags used in Java web development.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. How does Java implement control statements? Explain with examples.

17. Explain how packages help in organizing Java programs. Demonstrate package creation with an example.

18. Discuss the life cycle of a thread in Java with an example.

19. Discuss various AWT controls and their functionalities with examples.

20. Discuss the role of cookies in Java web applications. How are they implemented?

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Information Technology**

**R PROGRAMMING**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. How do you assign a value to a variable in R?

2. Difference between = and < in R.

3. What does the break statement do in a loop in R?

4. Write the syntax for defining a function in R?

5. Define vector in R.

6. What is the purpose of the merge function for lists in R?

7. Define matrix in R.

8. How do you create a data frame in R?

9. Which function is used to read a CSV file in R?

10. Write the purpose of the readxl package in R.

## Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) What are the essential features of the R programming language?

Or

(b) How are variables created, found, and deleted in R? Give examples.

12. (a) Explain the use of decision-making statements (if, if-else, and nested if) in R.

Or

(b) Explain how recursion works in R, and provide an example of a recursive function.

13. (a) How do you create a list in R? Explain how to name and access list elements.

Or

(b) Discuss the operations that can be performed on array elements in R.

14. (a) What are factors in R? How do factors differ from vectors? Explain with an example.

Or

(b) How do you join columns and rows in a data frame?

15. (a) How R can be connected with MYSQL. Write the steps to query a table from R.

Or

(b) Write short note on 3D pie charts in R.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the different types of operators in R, including arithmetic, logical, relational, and assignment operators, with examples.

17. Describe how functions are defined and used in R. Explain the components of a function. how to call a function, and the difference between built-in and user-defined functions.

18. Explain how to merge two lists with an example in R.

19. Explain the process of creating data frames and how to extract data from specific columns or rows in R.

20. Discuss the different file-handling techniques in R. Write code snippets to read and write CSV files.

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Information Technology**

**Elective — INTERNET OF THINGS**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Define Internet of Things (IOT).

2. What is IOT Levels?

3. What is M2M?

4. What is mean by SDN?

5. Define Gateways.

6. What is Local Area Networking?

7. Define Reference Model.

8. What is functional model?

9. Write any two implementation examples of IOT.

10. What is Smart metering?

## Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write a short note on physical design of IOT.

Or

(b) Write about Introduction of IOT.

12. (a) Describe Domain specific IOT.

Or

(b) Write the difference between IOT and M2M.

13. (a) Describe an IOT Architecture out line.

Or

(b) Write a note on Wide area Networking.

14. (a) Discuss about IOT Reference Model.

Or

(b) Write down the IOT Domain Model.

15. (a) Discuss about Smart Grid.

Or

(b) Write a short note on Smart energy City.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain IOT Enabling Technologies.

17. Discuss about IOT and M2M.

18. Write a note on Devices and Gateways.

19. Explain about functional model for IOT Architecture.

20. Explain commercial building Automation today.

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**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Information Technology**

**PROFESSIONAL COMMUNICATION SKILL**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. What is Verbal Communication? Give examples.

2. State two disadvantages of Written Communication.

3. What are the seven types of body language?

4. Define Body Posture.

5. What is IPA?

6. What are the different branches of phonetics?

7. What is oral presentation?

8. What is meant by active presentation?

9. How to you introduce yourself, during an interview?

10. What is soft skills in interview questions?

## Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Draw a Communication Cycle and state the important elements.

Or

(b) Write a paragraph on 'Mechanical barriers of Communication'.

12. (a) Write a short note on 'eye contact'.

Or

(b) How to improve your body posture?

13. (a) Write a note on Methodologies of reading skills.

Or

(b) Write a paragraph on voice modulation.

14. (a) How do you prepare before presentation?

Or

(b) How do you prepare to speak before a large audience

15. (a) Write a note on 'before interview'.

Or

(b) Write a paragraph on Dress code on interview.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the different barriers to effective listening.

17. Write an essay on 'Listening and Self awareness'.

18. Write an essay on structure of a presentation.

19. What is reading skills and explain purpose and process of reading skill.

20. Prepare a mock interview for choosing an employee for your firm.

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