

**COURSE-IV**  
**CBCS/ SEMESTER SYSTEM**  
**(w.e.f. 2020-21 Admitted Batch)**  
**B.A./B.Sc. MATHEMATICS**  
**REAL ANALYSIS**  
**SYLLABUS (75 Hours)**

**Course Outcomes:**

After successful completion of this course, the student will be able to

1. get clear idea about the real numbers and real valued functions.
2. obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. test the continuity and differentiability and Riemann integration of a function.
4. know the geometrical interpretation of mean value theorems.

**Course Syllabus:**

**UNIT – I (12 Hours)**

**REAL NUMBERS :**

The algebraic and order properties of  $\mathbb{R}$ , Absolute value and Real line, Completeness property of  $\mathbb{R}$ , Applications of supremum property; intervals. (No question is to be set from this portion).

**Real Sequences:**

Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

**UNIT –II (12 Hours)**

**INFINITE SERIES :**

**Series :** Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy's  $n^{\text{th}}$  root test or Root Test.

3. D'-Alemberts' Test or Ratio Test.

4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence.

### **UNIT – III (12 Hours)**

#### **CONTINUITY :**

**Limits :** Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).

**Continuous functions :** Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

### **UNIT – IV (12 Hours)**

#### **DIFFERENTIATION AND MEAN VALUE THEORMS :**

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

### **UNIT – V (12 Hours)**

#### **RIEMANN INTEGRATION :**

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

#### **Co-Curricular Activities(15 Hours)**

Seminar/ Quiz/ Assignments/ Real Analysis and its applications / Problem Solving.

**Text Book:**

Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, published by John Wiley.

**Reference Books:**

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
2. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania, published by S. Chand & Company Pvt. Ltd., New Delhi.

**B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21**  
**Semester – IV (CBCS With Maths Combination Common to BA/BSc)**  
**Paper IV: Sampling Techniques and Designs of Experiments**

**UNIT I**

**Simple Random Sampling** (with and without replacement): Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total, mean and their variances and standard errors, determination of sample size, simple random sampling of attributes.

**UNIT II**

**Stratified random sampling:** Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

**Systematic sampling:** Systematic sampling definition when  $N = nk$  and merits and demerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

**UNIT III**

**Analysis of variance :** Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

**Design of Experiments:** Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design(C.R.D).

**UNIT IV**

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

**UNIT V**

**Factorial experiments** – Main effects and interaction effects of  $2^2$  and  $2^3$  factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

**Text Books:**

1. Telugu Academy BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by Prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC.PHI.

**Reference Books:**

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. Indian Official statistics - MR Saluja.
3. Anuvarthita Sankyaka Sastram - Telugu Academy.

**Credits: 2**

## **Practicals - Paper –IV**

### **Sampling Techniques:**

Estimation of population mean and its variance by

1. Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.
2. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.
3. Systematic sampling with  $N=nk$ . Comparison of systematic sampling with Stratified and SRSWOR.

### **Design of Experiments:**

4. ANOVA - one - way classification with equal and unequal number of observations
5. ANOVA Two-way classification with equal number of observations.
6. Analysis of CRD.
7. Analysis of RBD Comparison of relative efficiency of CRD with RBD
8. Estimation of single missing observation in RBD and its analysis
9. Analysis of LSD and efficiency of LSD over CRD and RBD
10. Estimation of single missing observation in LSD and its analysis
11. Analysis of  $2^2$  with RBD layout
12. Analysis of  $2^3$  with RBD layout

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.

### **Course Learning Outcomes**

The students shall get

- 1) Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling.
- 2) an idea of conducting the sample surveys and selecting appropriate sampling techniques,
- 3) Knowledge about comparing various sampling techniques.
- 4) carry out one way and two way Analysis of Variance,
- 5) understand the basic terms used in design of experiments,
- 6) use appropriate experimental designs to analyze the experimental data.

**Paper V: Applied Statistics**

**UNIT I**

**Time Series:** Time Series and its components with illustrations, additive, multiplicative models. Trend: Estimation of trend by free hand curve method, method of semi averages. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method.

**UNIT II**

**Seasonal Component:** Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods, Deseasonalization.

**UNIT III**

**Growth curves:** Modified exponential curve, Logistic curve and Gompertz curve, fitting of growth curves by the method of three selected points and partial sums. Detrending. Effect of elimination of trend on other components of the time series

**UNIT IV**

**Index numbers:** Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspeyres's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Cost of living index number and wholesale price index number.

**UNIT V**

**Vital Statistics:** Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of life tables.

**Text Books:**

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

**Reference Books:**

3. Anuvarthita Sankhyaka Sastram - Telugu Academy.
4. Mukopadhyay, P (2011). Applied Statistics, 2<sup>nd</sup> ed. Revised reprint, Books and Allied Pvt. Ltd.
5. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.
6. Chatfield, C. (2001). Time Series Forecasting., Chapman & Hall.
7. Srinivasan, K. (1998). Demographic Techniques and Applications. Sage Publications
8. Srivastava O.S. (1983). A Text Book of Demography. Vikas Publishing House

Credits: 2

## Practical Paper –V

### **Time Series:**

1. Measurement of trend by method of moving averages(odd and evenperiod)
2. Measurement of trend by method of Least squares(linear andparabola)
3. Determination of seasonal indices by method simpleaverages
4. Determination of seasonal indices by method of Ratio to movingaverages
5. Determination of seasonal indices by method of Ratio totrend
6. Determination of seasonal indices by method of Linkrelatives

### **Index Numbers:**

7. Computation of simple indexnumbers.
8. Computation of all weighted index numbers.
9. Computation of reversaltests.

### **Vital Statistics:**

10. Computation of various Mortalityrates
11. Computation of various Fertilityrates
12. Computation of various Reproductionrates.
13. Construction of LifeTables

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writinginferences.

### **Course Learning Outcomes**

After completion of this course, the students will know about

- 1) time series data, its applications to various fields and components of time series,
- 2) fitting and plotting of various growth curves such as modified exponential, Gompertz and logistic curve,
- 3) fitting of trend by Moving Average method,
- 4) measurement of Seasonal Indices by Ratio-to-Trend , Ratio-to-Moving Average and Link Relative methods,
- 5) Applications to real data by means of laboratory assignments.
- 6) Interpret and use a range of index numbers commonly used in the business sector
- 7) Perform calculations involving simple and weighted index numbers
- 8) Understand the basic structure of the consumer price index and perform calculations involving its use
- 9) Various data collection methods enabling to have a better insight in policy making, planning and systematic implementation,
- 10) Construction and implementation of life tables,
- 11) Population growth curves, population estimates and projections,
- 12) Real data implementation of various demographic concepts as outlined above through practical assignments.

**SRI VENKATESWARA UNIVERSITY**  
**B.Sc. DEGREE COURSE IN COMPUTER SCIENCE**  
**SEMESTER SYSTEM WITH CBCS**  
**SEMESTER IV**  
**W.E.F. 2021-2022**

**C4-OBJECT ORIENTATED PROGRAMMING THROUGH JAVA**

**Objectives:**

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

**Course Learning Outcomes:** At the end of this course student will:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java

**UNIT – I**

**Introduction to Java:** Features of Java, The Java virtual Machine, Parts of Java

**Naming Conventions and Data Types:** Naming Conventions in Java, Data Types in Java, Literals

**Operators in Java:** Operators, Priority of Operators

**Control Statements in Java:** if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

**Input and Output:** Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()

**Arrays:** Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments



## **UNIT – II**

**Strings:** Creating Strings, String Class Methods, String Comparison, Immutability of Strings **Introduction to OOPs:** Problems in Procedure Oriented Approach, Features of Object- Oriented Programming System (OOPS)

**Classes and Objects:** Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

**Methods in Java:** Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

**Inheritance:** Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance

## **UNIT – III**

**Polymorphism:** Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

**Type Casting:** Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

**Abstract Classes:** Abstract Method and Abstract Class

**Interfaces:** Interface, Multiple Inheritance using Interfaces

**Packages:** Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document **Exception Handling:** Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

## **UNIT – IV**

**Streams:** Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

**Threads:** Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle.

## **UNIT – V**

**Applets:** Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters.

**Java Database Connectivity:** Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc-odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Stored Procedures and Callable Statements, Types of Result Sets

## **BOOKS:**

1. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.
2. E. Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw- Hill Company.
3. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TMH.
4. Deitel & Deitel. Java TM: How to Program, PHI (2007)

## **RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

### **RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

# **SRI VENKATESWARA UNIVERSITY**

## **B.Sc. DEGREE COURSE IN COMPUTER SCIENCE**

### **IV SEMESTER - W.E.F. 2021-22**

#### **PAPER-C4 OBJECT ORIENTATED PROGRAMMING THROUGH JAVA** **MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.

Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

#### **PART – A**

**Answer any *Five* of the following question.**

**(5X5=25M)**

<b>1.</b>	
<b>2.</b>	
<b>3.</b>	
<b>4.</b>	
<b>5.</b>	
<b>6.</b>	
<b>7.</b>	
<b>8.</b>	

**(P.T.O)**

**PART - B**

**Answer All The Questions. Each question carries 10 marks (5X10= 50M)**

9.	(A)  OR  (B)
10.	(A)  OR  (B)
11.	(A)  OR  (B)
12.	(A)  OR  (B)
13.	(A)  OR  (B)

**SEMESTER SYSTEM WITH CBCS**  
**SEMESTER IV**  
**W.E.F. 2021-2022**

**C4-P - OBJECT ORIENTATED PROGRAMMING THROUGH JAVA LAB**

1. Write a program to read ***Student Name, Reg.No, Marks[5]*** and calculate ***Total, Percentage, Result***. Display all the details of students
2. Write a program to perform the following String Operations
  - a. Read a string
  - b. Find out whether there is a given substring or not
  - c. Compare existing string by another string and display status
  - d. Replace existing string character with another character
  - e. Count number of works in a string
3. Java program to implements Addition and Multiplication of two N X N matrices.
4. Java program to demonstrate the use of Constructor.
5. Calculate area of the following shapes using method overloading.
  - a. Triangle
  - b. Rectangle
  - c. Circle
  - d. Square
6. Implement inheritance between ***Person (Aadhar, Surname, Name, DOB, and Age)*** and ***Student (Admission Number, College, Course, Year)*** classes where ReadData(), DisplayData() are overriding methods.
7. Java program for implementing Interfaces
8. Java program on Multiple Inheritance.
9. Java program for to display ***Serial Number from 1 to N*** by creating two Threads
10. Java program to demonstrate the following exception handlings
  - a. Divided by Zero
  - b. Array Index Out of Bound
  - c. File Not Found
  - d. Arithmetic Exception
  - e. User Defined Exception

11. Create an Applet to display different shapes such as Circle, Oval, Rectangle, Square and Triangle.
12. Write a program to create **Book (ISBN, Title, Author, Price, Pages, Publisher)** structure and store book details in a file and perform the following operations
  - a. Add book details
  - b. Search a book details for a given ISBN and display book details, if available
  - c. Update a book details using ISBN
  - d. Delete book details for a given ISBN and display list of remaining Books

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**B.Sc. DEGREE COURSE IN COMPUTER SCIENCE**  
**SEMESTER SYSTEM WITH CBCS**  
**SEMESTER IV**  
**W.E.F. 2021-2022**  
**C5-OPERATING SYSTEMS**

**Objectives:**

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Know Computer system resources and the role of operating system in resource management with algorithms
2. Understand Operating System Architectural design and its services.
3. Gain knowledge of various types of operating systems including Unix and Android.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. Have a basic knowledge about multithreading.
6. Comprehend different approaches for memory management.
7. Understand and identify potential threats to operating systems and the security features design to guard against them.
8. Specify objectives of modern operating systems and describe how operating systems have evolved over time.
9. Describe the functions of a contemporary operating system

**UNIT- I**

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.



## **UNIT- II**

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

## **UNIT III**

**Process Management:** Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter- process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

## **UNIT IV**

**Memory Management:** Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

## **UNIT V**

**File and I/O Management, OS security:** Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization

Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System, Small Application Development using Android Development Framework.

**REFERENCE BOOKS:**

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7<sup>th</sup>Edition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
4. Online Resources for UNIT V

**RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.

7. Efficient delivery using seminar presentations,
8. Viva-Voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

# **SRI VENKATESWARA UNIVERSITY**

## **B.Sc. DEGREE COURSE IN COMPUTER SCIENCE**

### **IV SEMESTER - W.E.F. 2021-22**

### **PAPER-C5 OPERATING SYSTEMS**

### **MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.

Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

### **PART – A**

**Answer any *Five* of the following question.**

**(5X5=25M)**

<b>1.</b>	
<b>2.</b>	
<b>3.</b>	
<b>4.</b>	
<b>5.</b>	
<b>6.</b>	
<b>7.</b>	
<b>8.</b>	

**(P.T.O)**

**PART - B**

**Answer All The Questions. Each question carries 10 marks (5X10= 50M)**

9.	(A)  OR  (B)
10.	(A)  OR  (B)
11.	(A)  OR  (B)
12.	(A)  OR  (B)
13.	(A)  OR  (B)

**SEMESTER SYSTEM WITH CBCS**  
**SEMESTER IV**  
**W.E.F. 2021-2022**  
**C5-P - OPERATING SYSTEMS LAB USING C/JAVA**

1. Write a program to implement Round Robin CPU Scheduling algorithm
2. Simulate SJF CPU Scheduling algorithm
3. Write a program the FCFS CPU Scheduling algorithm
4. Write a program to Priority CPU Scheduling algorithm
5. Simulate Sequential file allocation strategies
6. Simulate Indexed file allocation strategies
7. Simulate Linked file allocation strategies
8. Simulate MVT and MFT memory management techniques
9. Simulate Single level directory File organization techniques
10. Simulate Two level File organization techniques
11. Simulate Hierarchical File organization techniques
12. Write a program for Bankers Algorithm for Dead Lock Avoidance
13. Implement Bankers Algorithm Dead Lock Prevention.
14. Simulate all Page replacement algorithms.
  - a) FIFO
  - b) LRU
  - c) LFU
15. Simulate Paging Techniques of memory management