

R24

MCA III SEM

END EXAMINATION QUESTION PAPERS

REGULAR

NOV./DEC. 2025

MCA III Semester Regular Examinations, November-2025

Sub Code: R24MCA301

MACHINE LEARNING USING PYTHON

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain the purpose of SciPy and how it differs from NumPy.	2	1	6M
	ii) Demonstrate the use of scikit-learn to train a simple Linear Regression model.	3	1	6M
	OR			
	b i) Implement a simple K-Nearest Neighbors (KNN) classifier using scikit-learn.	3	1	6M
2	ii) Examine how data visualization helps in identifying data patterns.	4	1	6M
	Unit-II			
	a i) Discuss the meaning of uncertainty estimates in machine learning classifiers.	2	2	6M
	ii) Demonstrate how a Naïve Bayes classifier can be used for spam detection.	3	2	6M
	OR			
3	b i) Explain the concept of overfitting in Decision Trees.	2	2	6M
	ii) Compare Decision Trees and Support Vector Machines in terms of interpretability and performance.	4	2	6M
	Unit-III			
	a i) Discuss the role of similarity measures in clustering algorithms.	2	3	6M
	ii) Demonstrate the use of data normalization and standardization before clustering with an example.	3	3	6M
4	OR			
	b i) Explain the main idea behind K-Means clustering.	2	3	6M
	ii) Compare K-Means, Agglomerative, and DBSCAN in terms of assumptions, scalability, and shape of clusters.	4	3	6M
	Unit-IV			
	a i) Discuss how preprocessing influences parameter selection.	2	4	6M
5	ii) Demonstrate how binning can be used to convert continuous values into categories.	3	4	6M
	OR			
	b i) Explain the difference between ordinal and nominal categorical variables.	2	4	6M
	ii) Compare linear models and tree-based models in terms of interpretability and feature handling.	4	4	6M
	Unit-V			
5	a i) Discuss the role of TF-IDF weighting in improving feature importance.	2	5	6M
	ii) Discuss how model coefficients can help interpret the results of a text-based classifier.	3	5	6M
	OR			
	b i) Explain why testing in production systems is crucial in machine learning.	2	5	6M
	ii) Examine the impact of feature scaling on text classification performance.	3	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA III Semester Regular Examinations, November-2025

Sub Code: R24MCA302

FULL STACK DEVELOPMENT

Time: 3 hours

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

R24

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain the structure of a JavaScript program and demonstrate how JS can be embedded within HTML.	2	1	6M
	ii) Compare different looping structures in JavaScript (for, while, do...while, for...of, for...in) and their use cases.	4	1	6M
	OR			
	b i) Illustrate various methods for manipulating strings and arrays with suitable code snippets.	2	1	6M
	ii) Describe the use of this keyword in JavaScript with examples from both functions and objects.	3	1	6M
2	Unit-II			
	a i) Design a simple HTML form with validation using event listeners to prevent submission if inputs are invalid.	3	2	6M
	ii) Discuss the difference between innerHTML and textContent with suitable examples.	2	2	6M
	OR			
	b i) Compare inline event handlers with the addEventListener() method. Which is preferable and why?	4	2	6M
	ii) Explain the concept of event handling in JavaScript. Write an example for handling mouse and keyboard events.	2	2	6M
3	Unit-III			
	a i) Interpret various input types in HTML forms and how JavaScript enhances form validation.	2	3	6M
	ii) Describe the components of the MERN stack and explain how they interact in full-stack development.	3	3	6M
	OR			
	b i) Compare MERN with traditional server-side frameworks in terms of scalability and performance.	2	3	6M
	ii) Demonstrate how to create a simple "Hello World" server using Node.js and Express.js.	3	3	6M
4	Unit-IV			
	a i) Discuss how React handles user events such as clicks or form submissions using event handlers.	2	4	6M
	ii) Illustrate the basics of Express.js and write a simple REST API that performs CRUD operations.	2	4	6M

	OR				
b	i) Compare REST APIs with GraphQL. How does GraphQL improve efficiency?	2	4	6M	
	ii) Write an example to demonstrate lifting state up in React and explain its significance.	2	4	6M	
5	Unit-V				
	a	i) Summarize the architecture of MongoDB and differentiate between documents, collections, and databases.	2	5	6M
		ii) Write MongoDB commands to perform CRUD operations using insertOne, find, updateOne, and deleteOne.	2	5	6M
	OR				
	b	i) Discuss Hot Module Replacement (HMR) in Webpack and its benefits during development.	2	5	6M
		ii) Outline how DefinePlugin and other optimization techniques improve production builds.	2	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA III Semester Regular Examinations, November-2025

R24

Sub Code: R24MCA303

BIG DATA TECHNOLOGIES

Time: 3 hours

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain the difference between structured, unstructured, and semi-structured data using practical examples	2	1	9M
	ii) List any three challenges in handling unstructured data for analysis	1	1	3M
	OR			
	b Design a healthcare analytics use case that uses Big Data to predict patient readmission rates using EHR and sensor data and explain the required pipeline technologies.	3	1	12M
2	Unit-II			
	a A hospital wants to archive high-resolution medical images. Design an HDFS-based solution that maximizes cost efficiency, fault tolerance, and accessibility for remote clinics.	3	2	12M
	OR			
3	b i) A streaming service wants to identify its top 100 most-watched shows per week. Detail how the Combiner and Partitioner components in MapReduce can be used to speed up this calculation.	3	2	12M
	Unit-III			
	a i) Explain how MongoDB handles schema flexibility compared to relational databases?	2	3	6M
	ii) List and explain scaling mechanisms that MongoDB uses to handle large volumes of data?	1	3	6M
	OR			
4	b i) A fast-growing e-commerce company uses MongoDB to manage its product catalog. Each product document contains details such as name, price, categories, inventory, ratings (array of numbers), dateAdded, and optional fields like discount or tags. Products can belong to multiple categories, and users can search, filter, and update inventory in real-time. ▪ Write a query to find all products in the "Electronics" category with a price between ₹2,000 and ₹10,000, sorted by dateAdded in descending order. ▪ Write an aggregation pipeline to compute the average rating for each product (using the ratings array), and return only those products whose average rating is greater than 4.0 ▪ Suppose there's a 10% off sale on all "Clothing" category products added before July 1, 2025. Write an update query to set a discount field to 0.1 (10%) for these products. ▪ Find all products that currently have a discount field, and display only their name, price, and discount values. ▪ Write an aggregation query to count the number of products in each category.	4	3	12M
	Unit-IV			
a	i) Describe the main components of Hive architecture and their roles in processing large datasets	2	4	12M

	OR				
	b	i) Compare two types of complex data types that allow storage of nested or ordered collections within big data processing scripts, explaining use cases for each	2	4	7M
		ii) When querying semi-structured data stored as files in a large-scale distributed filesystem, what factors affect the choice of file format, and how do they impact query efficiency?	3	4	5M
5	Unit-V				
	a	i) Develop a Spark pipeline to classify news articles into categories such as "sports," "finance," and "health." Explain how you would evaluate the accuracy of the classifier.	3	5	12M
	OR				
	b	i) Create a hypothetical scenario involving fake links or spam pages. Propose how you could adapt the PageRank algorithm or use graph normalization to mitigate manipulation.	4	5	12M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA III Semester Regular Examinations, November-2025

Sub Code: R24MCA304

CLOUD COMPUTING

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain scalable computing over the Internet.	2	1	6M
	ii) Discuss system models for distributed and cloud computing including software environments.	2	1	6M
	OR			
	b i) Explain performance, security, and energy efficiency considerations in cloud systems.	2	1	6M
	ii) Analyze the role of clustering and virtualization in distributed and cloud systems.	4	1	6M
2	Unit-II			
	a i) Explain implementation levels of virtualization and virtualization structures.	2	2	6M
	ii) Explain about virtualization of CPU, memory, and I/O devices.	2	2	6M
	OR			
	b i) Apply the technology of virtual clusters and resource management in cloud data centers.	3	2	6M
	ii) Explain about virtualization for data center automation and its benefits.	2	2	6M
3	Unit-III			
	a i) Explain about cloud computing service models and architectural design of compute and storage clouds.	3	3	6M
	ii) Illustrate about public cloud platforms	2	3	6M
	OR			
	b i) Explain service-oriented architecture and message-oriented middleware in cloud platforms.	3	3	6M
	ii) Explain about cloud security and strategies for trust management in cloud computing.	2	3	6M
4	Unit-IV			
	a i) Explain about the features of cloud and grid platforms	2	4	6M
	ii) Explain about the programming support on Google App Engine and Microsoft Azure.	3	4	6M
	OR			
	b i) Explain evolution of storage technology and distributed file systems.	2	4	6M
	ii) Illustrate about Google File System and Apache Hadoop.	3	4	6M
5	Unit-V			
	a i) Explain policies and mechanisms for resource management and applications of control theory to task scheduling.	2	5	6M
	ii) Illustrate about stability of two-level resource allocation architecture and feedback control based on dynamic thresholds.	2	5	6M
	OR			
	b i) Explain scheduling algorithms for computing clouds including fair queuing and borrowed virtual time.	2	5	6M
	ii) Analyze the cloud scheduling subject to deadlines and scheduling MapReduce applications.	4	5	6M

MCA III Semester Regular Examinations, November-2025

Sub Code: R24MCA308

HUMAN RESOURCE MANAGEMENT

Time: 3 hours

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Analyze the ethical aspects of HRM in organizations.	4	1	6M
	ii) Define scope and strategies of HRM.	3	1	6M
	OR			
	b i) Evaluate the importance of Strategic HRM in a changing environment.	5	1	6M
	ii) Discuss the functions of HRM.	3	1	6M
2	Unit-II			
	a i) Outline the steps in the selection procedure.	3	2	6M
	ii) Explain important of recruitment and Methods/sources	3	2	6M
	OR			
	b i) Discuss the importance of training and development in enhancing employee performance.	4	2	6M
	ii) Enumerate various steps in selection process and write a brief note on types of interviews.	3	2	6M
3	Unit-III			
	a i) Analyze factors influencing wage and salary structures.	4	3	6M
	ii) Define performance management & modern methods of performance appraisal.	3	3	6M
	OR			
	b i) Explain various incentive payment systems.	3	3	6M
	ii) Illustrate components of compensation and performance based pay in banking industry.	3	3	6M
4	Unit-IV			
	a i) Compare effectiveness of modern vs traditional appraisal systems.	4	4	6M
	ii) What is welfare measures & discuss statutory and non-statutory welfare	4	4	6M
	OR			
	b i) List and describe various methods of payment.	3	4	6M
	ii) Discuss importance of payment of wages act.	3	4	6M
5	Unit-V			
	a i) Analyze the role of trade unions in maintaining industrial peace.	4	5	6M
	ii) Write a note on various strikes and trade unions objectives & functions.	4	5	6M
	OR			
	b i) Outline various dispute resolution mechanisms.	3	5	6M
	ii) Enumerate grievance handling procedures and stages.	3	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

II MCA III Semester Regular Examinations, December/2025

Sub Code: R24MCA3MNC

EMPLOYABILITY SKILLS-2

Time: 3 hours

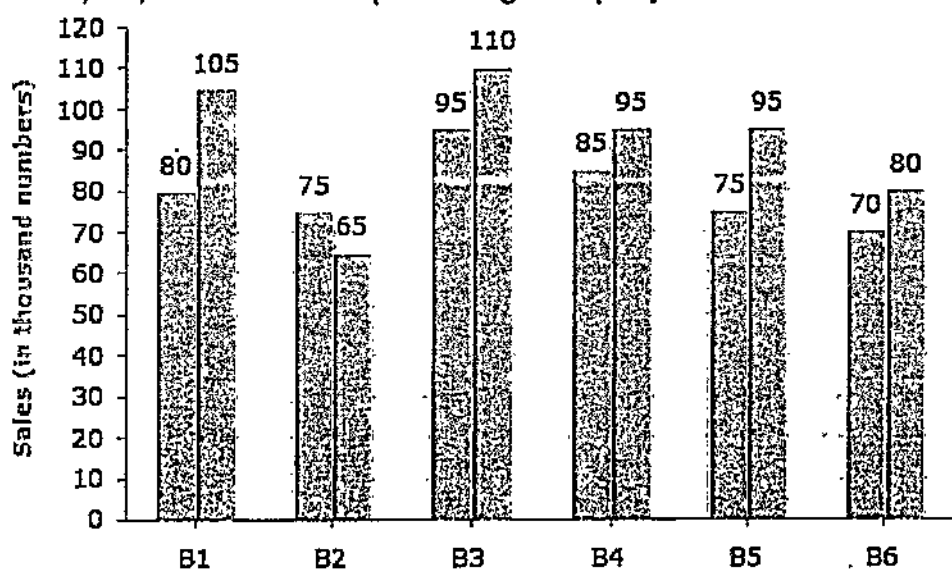
Max. Marks: 60

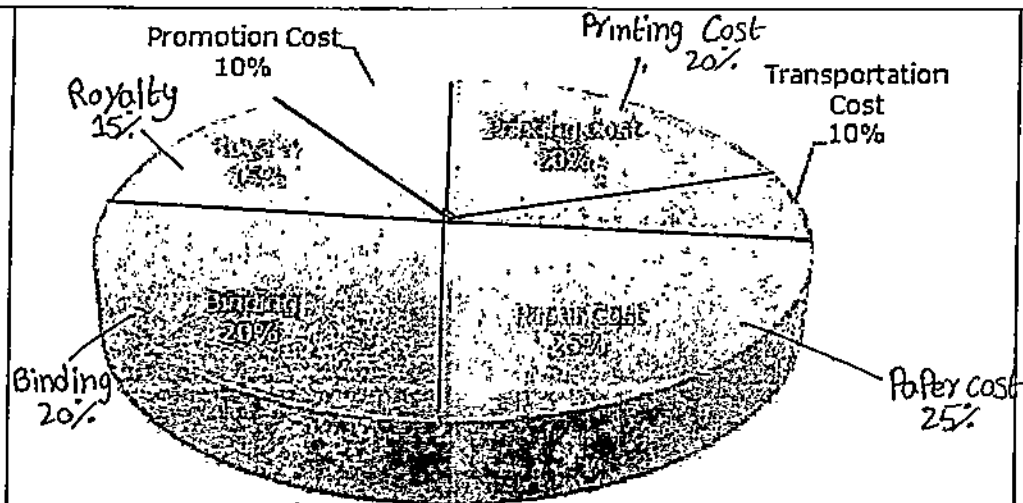
Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

R24

Q.No	Questions	KL	CO	M
1	Unit-I			
	a) I) Write the Divisibility rules 2,3,4,5,6. II) Find the L.C.M of $(2^2 \times 3^2 \times 5 \times 7)$, $(2^3 \times 3 \times 5^2 \times 7^2)$ and $(2 \times 3 \times 7 \times 11)$. III) Find the average of First five multiples of 3. IV) A TV and a VCR together cost Rs.35000. If TV is $1\frac{1}{2}$ times costlier than VCR, find the cost of VCR?	3	CO1	12M
	(OR)			
	b) I) A bag contains one-rupee, 50-p and 25-p coins in the ratio 8:9:11. If the total money in the bag is Rs.122, find the number of coins of each type. II) A and B start a business by investing Rs.100000 and Rs.15000 respectively. Find the share of each out of a total profit of Rs.24000. III) If A's Salary is 25% less than that of B, then how many percent is B's salary more than that of A? IV) A chair is bought for Rs.750 and sold at a loss of 6% Find the selling price.	3	CO1	12M
2	Unit-II			
	a) I) The present ages of A,B,C are in the proportion 4:7:9. Eight years ago the sum of their ages was 56. Find their present ages. II) A can do a piece of work in 8 days, which B can do in 10 days. In how many days both working together can do it? III) If 15 dolls cost Rs.35, what do 39 dolls cost? IV) I walk a certain distance and ride back taking a total time of 37 min. I could walk both ways in 55 min. how long would it take me to ride both ways?	3	CO2	12M
	(OR)			
	b) I) A man is 30 times older than his son. 1 years later he will be only thrice as old as his son. What is man's present age? II) A can build a wall in 30 days, while B alone can build it in 40 days. If they build it together and get a payment of Rs.7000, what is B's share? III) If 36 men can do a piece of work in 25 days, in how many days will 15 men do it? IV) Convert 54 Km/hr into meter/sec.	3	CO2	12M
3	Unit-III			
	a) I) In what ratio must water be mixed with milk to gain 10% by selling the mixture at cost price? II) A sum when reckoned at 12% S.I. amounts to Rs.2405 in 4 years. Find sum. III) At A game of billiards, A can give B 10 points in 60 and he can give C 15 in 60. How many can B give C in a game of 90? IV) What was the day of the week on 4 th June, 2002?	3	CO3	12M
	(OR)			
	b) I) Find compound interest on rs.6250 at % p.a for 2 years. II) In a Km race, A beats B by 40m or seconds. Find A's time over the course. III) At what time between 3 and 4 o'clock will the hands of a clock be together? IV) Find S.I on Rs.16250 at 8% p.a for 73 days.	3	CO3	12M
4	Unit-IV			
	a) I) One side of a rectangular field is 8m and one of its diagonals is 17m. Find the area of the field.	3	CO4	12M

5		II) Find the area of a right triangle whose base is 12cm and hypotenuse 13cm. III) The surface area of a cube is 384cm^2 . Find its volume. IV) How many iron rods, each of length 7m and diameter 2cm can be made out of 0.8m^3 of iron?																							
	OR																								
	b)	I) Find the area of a square one of whose diagonals is 2.4 long. II) Find the ratio of the areas of the incircle and circumcircle of a square. III) A copper sphere of diameter 18cm is drawn into a wire of diameter 4mm. Find length of the wire. IV) A cone is 8.4cm high and the radius of its base is 2.1cm. It is melted and recast into a sphere. Find the surface area of the sphere.	4	CO4	12M																				
	Unit-V																								
a)	The bar graph given below shows the sales of books (in thousand number) from six branches of a publishing company during two consecutive years 2000 and 2001. Sales of Books (in thousand numbers) from Six Branches - B1, B2, B3, B4, B5 and B6 of a publishing Company in 2000 and 2001.  <table border="1"> <caption>Sales of Books (in thousand numbers)</caption> <thead> <tr> <th>Branches</th> <th>2000</th> <th>2001</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>80</td> <td>105</td> </tr> <tr> <td>B2</td> <td>75</td> <td>65</td> </tr> <tr> <td>B3</td> <td>95</td> <td>110</td> </tr> <tr> <td>B4</td> <td>85</td> <td>95</td> </tr> <tr> <td>B5</td> <td>75</td> <td>95</td> </tr> <tr> <td>B6</td> <td>70</td> <td>80</td> </tr> </tbody> </table> I) What is the ratio of the total sales of branch B2 for both years to the total sales of branch B4 for both years? II) Total sales of branch B6 for both the years is what percent of the total sales of branches B3 for both the years? III) What percent of the average sales of branches B1, B2 and B3 in 2001 is the average sales of branches B1, B3 and B6 in 2000? IV) What is the average sales of all the branches (in thousand numbers) for the year 2000?	Branches	2000	2001	B1	80	105	B2	75	65	B3	95	110	B4	85	95	B5	75	95	B6	70	80	3	CO5	12M
Branches	2000	2001																							
B1	80	105																							
B2	75	65																							
B3	95	110																							
B4	85	95																							
B5	75	95																							
B6	70	80																							
OR																									
b)	The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. Study the pie-chart and the answer the questions based on it. Various Expenditures (in percentage) Incurred in Publishing a Book	4	CO5	12M																					



- I) What is the central angle of the sector corresponding to the expenditure incurred on Royalty?
- II) Royalty on the book is less than the printing cost by:
- III) If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, then what will be amount of royalty to be paid for these books?
- IV) The price of the book is marked 20% above the C.P. If the marked price of the book is Rs. 180, then what is the cost of the paper used in a single copy of the book?

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome M: Marks
