



SASURIE COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi. Affiliated to Anna University, Chennai

Near NH544, Coimbatore Bypass, Near Vijayamangalam Tollgate, Tirupur 638056

NAAC DOCUMENTS

QUALITY INDICATOR FRAME WORK

CRITERION - 1

CURRICULAR ASPECTS

SUBMITTED BY

IQAC

INTERNAL QUALITY ASSURANCE CELL

SASURIE COLLEGE OF ENGINEERING



Criterion 1	Curricular Aspects	100
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1.1 Curricular Planning and Implementation (20)

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

Table of Contents

S.No	Description
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Department : *N. Kavithamani*
Subject Code & Name : *MA3151*
Class & Batch : *B.E CSE*
Semester : *I*

CONTENTS - COURSE FILE
PARTICULARS

S.NO	PARTICULARS	REMARKS
1	Time Table	✓
2	Student name list	✓
3	Subject Information Record	✓
4	Syllabus	✓
5	Lesson Plan	✓
6	Test Plan for the Subject	✓
7	Result Analysis	✓
8	Corrective Action Report	✓
9	Quality objective monitoring record	✓
10	Internal test mark sheet(Consolidated)	✓
11	Internal test question paper	✓
12	Model question paper	✓
13	Sample Answer paper for all test(Min-3)	✓
14	Content beyond the syllabus	
15	Tutorial Class - schedule and content	Soft copy
16	Assignment - schedule and paper	✓
17	PPT - handout	Soft copy
18	Video - Animation - Soft copy	Soft copy
19	Question bank	Soft copy
20	Sample university question papers(min 5 QP-recent exam)	Soft copy
21	Personal Log book - Updated	
22	Lecture Note	Soft copy
23	Special Class if any, Approval letter, Schedule, content covered.	Soft copy

	Prepared By	Approved By
Sign:	<i>N. Kavithamani</i>	<i>M. Jayakumar</i>
Name:	<i>N. Kavithamani</i>	
	Faculty	HOD



CLASS TIME TABLE

Department : Science and Humanities

Semester : I

ACADEMIC YEAR : 2022-2023 (ODD)

CLASS : CSE

HOUR		I	II		III	IV		V	VI		VII	VIII		
DAY/ TIME		9.30 TO 10.15	10.15 TO 11.00	11.00 TO 11.10	11.10 TO 11.55	11.55 TO 12.40 p.m.	12.40 p.m. TO 1.20 p.m.	1.20 TO 2.05	2.05 TO 2.50	2.50 TO 3.00	3.00 TO 3.45	3.45 TO 4.30 PM		
MONDAY				BREAK	MAT	MAT	LUNCH			BREAK				
TUESDAY					MAT				MAT					
WEDNESDAY		MAT (T)	MAT (T)											
THURSDAY								MAT						
FRIDAY												MAT		
SATURDAY								MAT						

S.No	Subject Code	Name of the Subject	Abbreviation	Name of the Staff & Dept.	No of hours
1	MA3151	Matrices and Calculus	MAT		9
				Total	9

	Prepared by	Verified by	Authorized by
Sig...	<i>N. Kavithamani</i>	<i>M. B. R.</i>	<i>M. V.</i>
	TIME TABLE I/C	HOD	PRINCIPAL

M. V.
 DR. M. VIJAYAWANJAR ME., Ph.D.,
 PRINCIPAL
 SASURIE COLLEGE OF ENGINEERING,
 Vijayamangalam - 635 056, Tirupur (Dt).

Academic Year – 2021 -2022 ODD SEMESTER

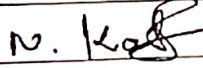
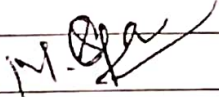

STUDENTS NAME LIST


Department : CSE

Year : I

S.NO	Register Number	Name of the Student	H/D
1	22CS001	Abishek J	
2	22CS002	Akileshkumar S	
3	22CS003	Arun V	
4	22CS004	Arunkumar A	
5	22CS005	Aswin S	
6	22CS006	Basharath mahamood S	
7	22CS007	Baskar S	
8	22CS008	Deepak v	
9	22CS009	Deepakraj R	
10	22CS010	Dharshini R	
11	22CS011	Dharun T	
12	22CS012	Eswarprabhu S	
13	22CS013	Farhath A	
14	22CS014	Guhan K R	
15	22CS015	Guruprasad R	
16	22CS016	Harijeeva M	
17	22CS017	Harikrishnan B	
18	22CS018	Haripriya V	
19	22CS019	Irudhaya vishva A	
20	22CS020	Jeena D	
21	22CS021	Jeeva S	
22	22CS022	Jeeva S	
23	22CS023	Kalaiselvan R	
24	22CS024	Karthika K	
25	22CS025	Keerthika S	
26	22CS026	Logeswaran K	
27	22CS027	Maheswari T	
28	22CS028	Mathavan C	
29	22CS029	Mohammed thamimul ansari C J	
30	22CS030	Nandhini M R	
31	22CS031	Navaneethakrishnan M	
32	22CS032	Naveena M	
33	22CS033	Naveenkumar V	

34	22CS034	Pandi E	
35	22CS035	Revathi.P	
36	22CS036	Sabariyanandhan T	
37	22CS037	Saran B	
38	22CS038	Saravanan R	
39	22CS039	Selvapriya C	
40	22CS040	Shanmathi C T	
41	22CS041	Sikkanthar bathusha R	
42	22CS042	Sriraj S	
43	22CS043	Subash M	
44	22CS044	Swathi R	
45	22CS045	Thirupathi P	
46	22CS046	Vasanth A	
47	22CS047	Vasanthakumar P	

	Prepared By	Verified By	Approved By
Sign:			
Name:	N. Kavithamani.	M. G. A.	M. V.
	Faculty	HoD	Principal


Dr. M. VIJAYAKUMAR M.E., Ph.D.
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 Vijayamangalam - 638 656, Tirupur (Dt)

MA3151

MATRICES AND CALCULUS

L T P C
3 1 0 4

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT - I

MATRICES

9 + 3

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation. – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT - II

DIFFERENTIAL CALCULUS

9 + 3

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications : Maxima and Minima of functions of one variable.

UNIT - III

FUNCTIONS OF SEVERAL VARIABLES

9 + 3

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications : Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT - IV

INTEGRAL CALCULUS

9 + 3

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.

UNIT - V

MULTIPLE INTEGRALS

9 + 3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals – Applications: Moments and centres of mass, moment of inertia.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- Use the matrix algebra methods for solving practical problems.
- Apply differential calculus tools in solving various application problems.
- Able to use differential calculus ideas on several variable functions.
- Apply different methods of integration in solving practical problems.
- Apply multiple integral ideas in solving areas, volumes and other practical problems.

TEXT BOOKS:

1. Kreyszig, E. "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2013.
3. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.3].

M. V. J.

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Vijayawada - 520017, Andhra Pradesh

SUBJECT INFORMATION RECORD

Department : Computer Science And Engineering

Subject : Matrices And Calculus.

Year : I

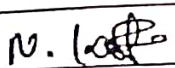
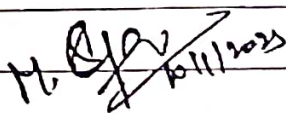
Semester : I

Last year handled by : M. Sathya

Percentage of Result (last year) : 50 % .

Quality Objectives : To produce result more than 80% in university Exam.

Reference Book : 1. Dr. G. Balaji, " Matrices And Calculus".
2. Dr. M. Chandrasekar, " Matrices And Calculus".

	Prepared By	Approved By
Sign:		
Name:	N. Kavithamani.	
	Faculty	HD

TEST PLAN FOR SUBJECT

Subject : MATHS I & Faculty : N. Kavithamani.
Matrices & Calculus

Semester : I Year: 2022 - 23

Department : CSE

S. No.	Description	Planned Date/Month	Actual Conducted Date / Month	Remarks
1.	unit test - I	19.12.22	19.12.22	-
2.	unit test - II	2.1.23	2.1.23	-
3.	unit test - III	23.1.23	23.1.23	-
4.	unit test - IV	6.3.23	6.3.23	-

	Prepared By	Approved By
Sign:	N. Kallu	M. B. [Signature] 6/3/2023
Name:	N. Kavithamani.	
	Faculty	HD

RESULT ANALYSIS OF TEST

Subject : MATHS & Matrices And Calculus Date : 19-12-22
 Class : I Department : AE & DS
 Semester : I
 Exam details & date : Unit test - I [19-12-22]
 Faculty : N. Kavithamani.
 Number of students : 47
 No. of students attended : 44
 No. of students absent : 3
 No. of students passed : 12
 No. of students failed : 26
 Percentage of failures : 66%.

RESULT DATA:

Marks	0-25	26-50	51-75	76-90	91-100
No. of Students	10	24	11	1	0

	Prepared By	Approved By
Sign:	N. Kavithamani	M. B. [Signature]
Name:	N. Kavithamani.	
	Faculty	HD

RESULT ANALYSIS OF TEST

Subject : MA3151 & Matrices And Calculus Date : 21/1/23
 Class : I Department : AI & DS
 Semester : I
 Exam details & date : unit test - II [21.1.23]
 Faculty : N. Kowithamani.
 Number of students : 47
 No. of students attended : 43
 No. of students absent : 4
 No. of students passed : 17
 No. of students failed : 20
 Percentage of failures : 47.

RESULT DATA:

Marks	0-25	26-50	51-75	76-90	91-100
No. of Students	8	14	15	3	1

	Prepared By	Approved By
Sign:	N. Kowithamani	H. [Signature] / 21/1/2023
Name:	N. Kowithamani.	
	Faculty	HD [Signature]



RESULT ANALYSIS OF TEST

Subject : MA3151 & Matrices And Calculus. Date : 23/1/23
 Class : I Department : AE & DS
 Semester : I
 Exam details & date : unit test - III [23 / 1 / 23]
 Faculty : N. Kowithamani.
 Number of students : 47
 No. of students attended : 40
 No. of students absent : 7
 No. of students passed : 14
 No. of students failed : 22
 Percentage of failures : 59.

RESULT DATA:

Marks	0-25	26-50	51-75	76-90	91-100
No. of Students	6	16	13	3	2

	Prepared By	Approved By
Sign:	<u>N. Kowithamani</u>	<u>M. Vijayakumar</u>
Name:	<u>N. Kowithamani.</u>	<u>23/1/2023</u>
	Faculty	HD
		<u>Dr. M. VIJAYAKUMAR ME., Ph.D.</u>



QUALITY OBJECTIVE MONITORING RECORD

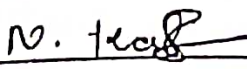
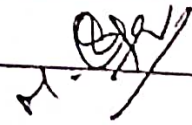
Department : CSE

Year : I

Semester : I

Subject : MA3151 & Matrices And Calculus

S.No	Quality Objective	Internal Test-I		Internal Test-II		Model exam	
		Expecting result	Obtained result	Expecting result	Obtained result	Expecting Result	Obtained result
1	To develop the use of Matrices algebra + techniques that is needed by engineer for practical application.	75%	28%	80%	43%	85%	57%

	Prepared By	Approved By
Sign:		
Name:	<u>N. Kavithamani</u>	
	Faculty	HOD



SASURIE

College of Engineering

Vijayamangalam, Tiruppur.

Internal Assessment Exam - I			Date/Session	19.12.2022/FN	Marks	50
Course code	MA3151	Course Title	MATRICES AND CALCULUS			
Regulation	2021	Duration	1.30 Hours	Academic Year	2022-2023	
Year	I	Semester	I	Department	COMMON TO ALL BRANCH	

COURSE OUTCOMES

CO1:	Use the matrix algebra methods for solving practical problems.
CO2:	Apply differential calculus tools in solving various application problems.
CO3:	Able to use differential calculus ideas on several variable functions.
CO4:	Apply different methods of integration in solving practical problems.
CO5:	Apply multiple integral ideas in solving areas, volumes and other practical problems.

Q.No.	Question	CO	BTS
PART A (Answer all the Questions 10 x 2 = 20 Marks)			
1	Define Cayley Hamilton theorem	CO1	R
2	Find the characteristic equation of the matrix $\begin{bmatrix} 12 & \\ & 02 \end{bmatrix}$	CO1	R
3	Find the sum and product of eigen values of the matrix $\begin{pmatrix} -1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1 \end{pmatrix}$	CO1	R
4	Find the eigen values of $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$	CO1	R
5	If 3 & 15 are the eigenvalues of $A = \begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$, find det A using eigen values.	CO1	A
6	If 2, -1, -3 are the eigenvalues of the matrix A, then find the eigenvalues of the matrix $A^2 - 2I$.	CO1	A
7	Two eigenvalues of the $A = \begin{pmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{pmatrix}$ are 3 & 6. Find the eigen values of A^{-1} .	CO1	U
8	Write the matrix of the quadratic form $2x_1^2 - 2x_2^2 + 4x_3^2 + 2x_1x_2 - 6x_1x_3 + 6x_2x_3$.	CO1	A
9	Determine the nature of the following quadratic form $f(x,y,z) = x^2 + 2y^2$	CO1	E
10	Find the rank, index & signature of the quadratic form $x_1^2 - 2x_2^2 + x_3^2$	CO1	R

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PART B
(Answer all the Questions 2 x 15 = 30 Marks)

11a	i) Find the eigenvalues and eigenvectors of the matrix $\begin{pmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{pmatrix}$ (7)	COI	R
	(ii) Verify Cayley-Hamilton theorem of a matrix $\begin{pmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ (8)	COI	A
OR			
11b	Verify Cayley-Hamilton theorem of a matrix $A = \begin{pmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix}$ and find the values of the matrices given by $f(A) = A^8 - 5A^7 + 7A^6 - 3A^5 + 8A^2 - 2A + I$.	COI	A
12a	Reduce the quadratic form $Q = 6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4zx$ into canonical form through orthogonal transformation	COI	U
OR			
12b	Reduce the quadratic form $Q = x^2 + y^2 + z^2 - 2xy - 2yz - 2zx$ into canonical form through orthogonal transformation.	COI	U

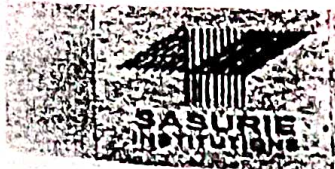
D. Kavitha
18/12/22
Course Faculty
(Name / Sign / Date)
(N. CA VATHAMANI)

M. Sathya
18/12/2022
HoD
(Name / Sign / Date)
[M. Sathya]

M. Sathya
18-12-22
Principal
(Name / Sign / Date)

M. Sathya
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Internal Assessment Test Answer Book

Name	A. Irudhaya Vishwa		Year/ Semester/Section	I / 2 / A				
Register Number	782422104019	Date/Session	19.12.22/FN	Department	CSE			
Course code	MA3151	Course Title	Matrix and Calculus					
Internal Assessment Test	IAT 1	<input checked="" type="checkbox"/>	IAT 2	<input type="checkbox"/>	IAT 3	<input type="checkbox"/>	Model	<input type="checkbox"/>
Name and Signature of the Invigilator with date			P. Jimy (Sivaranjani.P)					

Instruction to the Student: Put tick mark to the question attended in the column against question.

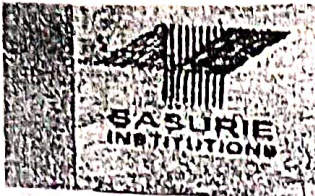
Part A			Part B/ Part C				Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a	b	
					Marks	Marks	
1	✓	2	11	✓	7, 7		14
2	✓	2	12	✓	10		10
3	✓	2	13		—		—
4	✓	2	14		—		—
5	✓	2	15		—		—
6	✓	2	16		—		—
7	✓	2	Grand Total				24
8	✓	2	44 Grand Total				N. Kavin (N. Kavithamani) Name and Signature of the Examiner with date
9	✓	2					
10	✓	2					
Total		20					

To be filled by the examiner

Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	20	30	-	-	-	-	
Marks Obtained	20	24	-	-	-	-	50
IQAC Audit - Remarks							44
Marks Verified							M. Sathya Name and Signature of the IQAC member

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SASURIE
College of Engineering
Vijayamangalam, Tiruppur.

DEPARTMENT OF SCIENCE AND HUMANITIES

Assignment Question Paper

Assignment -1		Date of Issue:	25.01.2023	Marks	10
Course code	MA3151	Course Title	MATRICES AND CALCULUS		
Year	I	Semester	I	Date of Submission:	04.02.2023

Q.No	Questions	CO
1.	Show that the matrix $\begin{pmatrix} 1 & -2 \\ 2 & 1 \end{pmatrix}$ satisfies its characteristic equation.	CO1
2.	Use cauley-Hamilton to find the value of the matrix is given by $f(A) = A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$	CO1
3.	To find the eigen value and eigen vectors of the matrix $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$.	CO1
4	Reduce the quadratic form $q = 6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4zx$ into canonical form by an orthogonal transformation.	CO1

N. Kaif

Name and Signature of the Faculty Incharge

(N. KA VET H/H-MA-W.F)

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M. Sathya
HoD/S&H

[M. Sathya]

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DEPARTMENT OF SCIENCE AND HUMANITIES

Assignment Answer Sheet

Name of the Student : S. Bashrath Mahmood

AU Register Number: 732422104006

Assignment -1			Date of Issue:	25.01.2023	Marks	10
Course code.	MA3151	Course	MATRICES AND CALCULUS			
Year	I	Semester	I	Date of Submission:	04.02.2023	

Q.No	Questions	CO
1.	Show that the matrix $\begin{pmatrix} 1 & -2 \\ 2 & 1 \end{pmatrix}$ satisfies its characteristic equation.	CO1
2.	Use cauley-Hamilton to find the value of the matrix is given by $f(A) = A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + 1$	CO1
3.	To find the eigen value and eigen vectors of the matrix $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$.	CO1
4	Reduce the quadratic form $q = 6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4zx$ into canonical form by an orthogonal transformation.	CO1

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	4
Presentation Quality	2	2
Timely submission	2	2
Total marks	10	08

D. Karf (N. KAVITHAMINI)
Name and Signature of the Faculty Incharge

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Sathya



SASURIE
College of Engineering
Vijayamangalam, Tiruppur.

DEPARTMENT OF SCIENCE AND HUMANITIES

Tutorial Question Paper

Tutorial - 01		Date of Issue:	08.12.2022	Marks	10
Course code	MA3151	Course Title	MATRICES AND CALCULUS		
Year	I	Semester	I	Date of Submission:	17.12.2022

Q. No	Questions	CO
1	Find the eigen values of $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$	C01
2	Two eigenvalues of the $A = \begin{pmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{pmatrix}$ are 3 & 6. Find the eigen values of A^{-1} .	C01
3	Find the eigenvalues and eigenvectors of the matrix $A = \begin{pmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{pmatrix}$	C01

N. Kavi
Name and Signature of the Faculty Incharge
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DEPARTMENT OF SCIENCE AND HUMANITIES

Tutorial Answer Sheet

Name of the Student : M. R. Nandhini

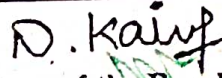
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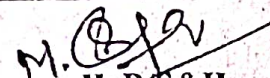
Tutorial - 01			Date of Issue:	08.12.2022	Marks	10
Course code	MA3151	Course Title	MATRICES AND CALCULUS			
Year	I	Semester	I	Date of Submission:	17.12.2022	

Q.No	Questions	CO
1	Find the eigen values of $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$	CO1
2	Two eigenvalues of the $A = \begin{pmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{pmatrix}$ are 3 & 6. Find the eigen values of A^{-1} .	CO1
3	Find the eigenvalues and eigenvectors of the matrix $A = \begin{pmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{pmatrix}$	CO1

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Problem solving approach	6	6
Correctness of Answer	2	2
Timely submission	2	2
Total marks	10	10


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