



School of Aeronautics (Neemrana)

APPROVED BY DIRECTOR GENERAL OF CIVIL AVIATION, MINISTRY OF CIVIL AVIATION, GOVT. OF INDIA
APPROVED BY ALL INDIA COUNCIL FOR TECHNICAL EDUCATION & AFFILIATED TO RAJASTHAN TECHNICAL UNIVERSITY, KOTA
& BIKANER TECHNICAL UNIVERSITY, BIKANER, RUN & MANAGED BY L. N. VERMA MEMORIAL SOCIETY

School of Aeronautics

APPROVED BY DIRECTOR GENERAL OF CIVIL AVIATION, MINISTRY OF CIVIL AVIATION, GOVT. OF INDIA
RUN AND MANAGED BY LAXMI NARAIN VERMA MEMORIAL SOCIETY, REGISTERED,
DELHI ADMINISTRATION, UNDER SOCIETIES REGISTRATION ACT XXI OF 1860.



Question Paper for Internal Assessment Examination (Theory) - Credit 4

Instructions for Students/Faculty: Mid Term I (Total 80 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are ten (5 from CO1 and 5 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words for both Question & Answer**), no objective type or fill in the blanks. Total 20 marks.
- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question**), each carrying 5 marks. Total 20 marks.
- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question**) *, each carrying 10 marks. Total 40 marks.

Mid Term II (Total 120 Marks, 2.5 HRS., Syllabus from Unit-2)

- Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 4 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words for both Question & Answer**), no objective type or fill in the blanks. Total 40 marks.
- Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are long answer type (**Not More Than 50 Words for Question**), each carrying 7 marks. Total 28 marks.
- Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question**) *, each carrying 13 marks. Total 52 marks.

Mid Term III (Total 120 Marks, 2.5 HRS., Syllabus from Unit-3)

- Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 4 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words for both Question & Answer**), no objective type or fill in the blanks. Total 40 marks.
- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question**), each carrying 7 marks. Total 28 marks.

- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question**) *, each carrying 13 marks. Total 52 marks.

*** LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** NO SUBJECT UNDER CREDIT FOUR

Instructions for Faculties:

There should be total 6 Course Outcomes (COs) for each subject.

- Mid Term Question Papers are to be submitted as per Course Outcomes (COs) which should be divided equally in Part A, Part B and Part C according to Mid Term Examination and Credit Point.
- In Mid Term-1, the questions are to be given from CO1 and CO2. In Mid Term-2, the questions are to be given from CO3 and CO4. Similarly, in Mid Term-3, the questions are to be given from CO5 and CO6.
- FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER**

INSTRUCTION FOR STUDENTS

- STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.**

QUESTION PAPER AND STUDENTS DETAILS

Type of Exam	Mid Term 1	Date of Submission	22/06/2021
Name of Faculty		Date of Examination	28-Jun-21
Course		Semester	Semester 2
Batch	20, 21, AE-3, MT-6	Subject	2FY2-01 Engineering Mathematics II (Cr 4)

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER

(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Objective :	1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
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	<p>2. To make the students appreciate the purpose of using differential equations of first order to solve engineering problems.</p> <p>3. To familiarize the student with functions of ordinary differential equations of higher orders. This is needed in many branches of engineering.</p> <p>4. To gain knowledge on primary level of Engineering mathematics and its application that they would find useful in their disciplines.</p> <p>5. To make the students understand various techniques of First order-Partial Differential Equations.</p> <p>6. To acquaint the student with mathematical tools needed in evaluating Partial Differential Equations– Higher order and their applications</p>		
Course Outcome:	<p>CO 1. Recall the matrix algebra methods for solving practical problems.</p> <p>CO 2. Select differential equations of first order to solve engineering problems.</p> <p>CO 3. Demonstrate higher order ordinary differential equation ideas on several functions.</p> <p>CO 4. Utilize mathematical ideas to solve the practical problems in the society.</p> <p>CO 5. Summarize the Partial Differential Equations– Higher order ideas in solving heat and wave equations and other practical problems.</p> <p>CO 6. Illustrate the different methods of First order-Partial Differential Equations in solving practical problems.</p>		
Email I'd	pankjkumar@soaneemrana.org	Phone No.	8769828628
Student Name		Student Reg No.	
Part A			
<p>FOR MIDTERM 1 - Part A: Total number of questions to be given are ten (5 from CO1 and 5 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice.</p> <p>FOR MIDTERM 2 - Part A: Total number of questions to be given are ten (5 from CO3 and</p>			

5 from CO4), each carrying 2 marks and are compulsory to attend. There is no choice.
FOR MIDTERM 3 - Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 2 marks and are compulsory to attend. There is no choice.

All the questions are compulsory to attend.

1. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 1
Question: 1	Define the Diagonal matrix.	
Lesson Plan No: 01	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 2	Define the Hermitian matrix and skew-Hermitian matrix	
Lesson Plan No.:01	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 3	How do you prove a matrix is symmetric?	
Lesson Plan No.:6	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 4	Application of Cayley – Hamilton theorem.	
Lesson Plan No.:8	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 5	Define the orthogonal matrix	
Lesson Plan No.:10	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal

2. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 6	Write the standard form of linear equation.	
Lesson Plan No.:11	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 7	Define various types of Bernoulli's form of linear differential equation.	
Lesson Plan No.: 12	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 8	How do you solve higher degree differential equations?	
Lesson Plan No.:14	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 9	How do you solve first order high degree differential equations?	
Lesson Plan No.:15	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 10	Define the Clairaut's form of differential equation	
Lesson Plan No.:16	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Part B		
FOR MIDTERM 1 - Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). FOR MIDTERM 2 - Part B: Total number of questions to be given are six (3 from CO3 and		

3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).
FOR MIDTERM 3 - Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

3. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 1
Question: 1	If $A = \begin{bmatrix} 2 & 2 & 1 \\ -2 & 1 & 2 \\ 1 & -2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 & 2 \\ 1 & 2 & 1 \\ 2 & -3 & -1 \end{bmatrix}$ be two matrices of the order three, Verify that $(AB)^{-1} = A^{-1} B^{-1}$	
Lesson Plan No.:02	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 2	Find the Rank of the matrix A where $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 0 & 2 & 2 \end{bmatrix}$	
Lesson Plan No.:3	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 3	Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$	
Lesson Plan No.:07	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 4	Solve the following differential equation : $\frac{dy}{dx} + \frac{3x^2}{1+x^3} y = \frac{\sin^2 x}{1+x^2}$	
Lesson Plan No.:11	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay

		Bansal
Question: 5	Solve the differential equation: $(e^y + 1)\cos x dx + e^y \sin x dy = 0$	
Lesson Plan No.:13	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 6	Solve the differential equation : $y^2 + x^2p^2 - 2xyp = 4p^2$	
Lesson Plan No.:16	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Part C		
<p>FOR MIDTERM 1 - Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). FOR MIDTERM 2 - Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4). FOR MIDTERM 3 - Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).</p>		
5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 1
Question: 1	Reduce the matrix $A = \begin{bmatrix} 1 & -1 & 2 & 0 \\ 2 & -2 & -1 & 2 \\ 1 & -1 & 2 & -3 \end{bmatrix}$ to Echelon form and find the rank of matrix.	
Lesson Plan No.:4	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 2	Find the characteristic equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence compute A^{-1} . Also find the matrix represented by $A^8 - 5A^7 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$	

Lesson Plan No.:8	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 3	Prove that the full matrix is orthogonal $\frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$	
Lesson Plan No.:10	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 4	Solve the differential equation: $(2ax + by)ydx + (ax + 2by)xdy = 0$	
Lesson Plan No.:13	Topic: Matrix	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 5	Solve the following differential equation: $2 \sin x \frac{dy}{dx} - y \cos x = xy^3 e^x$	
Lesson Plan No.:12	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 6	Solve the differential equation : $xy^2 + (p^2 + 2) = 2py^3 + x^3$	
Lesson Plan No.:14	Topic: Linear Differential Equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal

Upload Scanned Document in Case of Numerical or Diagram for Any of the Above Questions. (<i>Mention question number with relevant fig / numerical / equations. Max 150 KB</i>)	Not required yet.
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.	PANKAJ TOMAR