



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 1880.



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 3	Date of Submission	18/08/2021
Name of Faculty	PANKAJ KUMAR	Date of Examination	23-Aug-21
Course	B.Tech (Aeronautical Engg)	Semester	Semester 2
Batch	20, 21, AE-3 MT-06	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 :	<ol style="list-style-type: none"> To develop the use of matrix algebra techniques that is needed by engineers for practical applications. To make the students appreciate the purpose of using differential
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	<p>calculus to solve engineering problems.</p> <p>3. To familiarize the student with functions of several variables. This is needed in many branches of engineering.</p> <p>4. To make the students understand various techniques of integration.</p> <p>5. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.</p> <p>6. To gain knowledge on primary level of Engineering mathematics and its application that they would find useful in their disciplines.</p>		
Course Outcome :	<p>CO 1. Use the matrix algebra methods for solving practical problems.</p> <p>CO 2. Apply differential calculus tools in solving various application problems.</p> <p>CO 3. Obtain differential calculus ideas on several variable functions.</p> <p>CO 4. Manipulate different methods of integration in solving practical problems.</p> <p>CO 5. Appreciate multiple integral ideas in solving areas, volumes and other practical problems.</p> <p>CO 6. Utilize mathematical ideas to solve the practical problems in the society.</p>		
Email I'd	pankajkumar@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 5 from CO4), each carrying 2 marks and are compulsory to attend. There is no choice.</p> <p>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.</p>			
All the questions are compulsory to attend.			
1. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 5
Question: 1	Explain formation of partial differential Equation by elimination of arbitrary constant and arbitrary function.		

Lesson Plan No.: 29	Topic: Partial Differential equations	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 2	Define dependent and independent variable in partial differential equation.	
Lesson Plan No.: 30	Topic: Partial Differential equations	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 3	Define the grouping method and multiplicative method to solve Lagrange's Auxiliary Equation.	
Lesson Plan No.: 31	Topic: Partial Differential equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 4	Define standard form to solve a Non – linear partial differential Equation.	
Lesson Plan No.: 33	Topic: Partial Differential equation	Source: Engg Mathematics-II By Dr. Sanjay Bansal
Question: 5	Write down the Auxiliary equation of Charpit Method.	
Lesson Plan No.: 34	Topic: Partial Differential equation	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 6
Question: 6	Define the method of separation of variables.	

Lesson Plan No.: 35	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 7	Define the standard form of Laplace Equation of two dimensions.	
Lesson Plan No.: 40	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 8	How many boundary conditions are there in one dimensional wave equation?	
Lesson Plan No.: 36	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 9	Application of one dimensional wave equation.	
Lesson Plan No.: 37	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 10	Define the standard form of Laplace Equation of two dimensions.	
Lesson Plan No.: 39	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Part B		

<p>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).</p> <p>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).</p> <p>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).</p>		
<p>3. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.</p>		CO 5
<p>Question: 1</p>	<p>Form a partial differential Equation from the equation. $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$ by eliminating the constant.</p>	
<p>Lesson Plan No.: 29</p>	<p>Topic: Partial Differential equation</p>	<p>Source: Engg Mathematics-II By Dr. Manish Goyal</p>
<p>Question: 2</p>	<p>Find the complete integral of : $q = px + p^2$</p>	
<p>Lesson Plan No.: 31</p>	<p>Topic: Partial Differential equation</p>	<p>Source: Engg Mathematics-II By Dr. Manish Goyal</p>
<p>Question: 3</p>	<p>Solve the partial Differential Equation : $z = px + qy + C\sqrt{(1 + p^2 + q^2)}$</p>	
<p>Lesson Plan No.: 33</p>	<p>Topic: Partial Differential equation</p>	<p>Source: Engg Mathematics-II By Dr. Sanjay Bansal</p>
<p>4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.</p>		CO 6
<p>Question: 4</p>	<p>Use the method of separation of variables to solve the equation $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, given that $u(x, 0) = 6e^{-3x}$</p>	

Lesson Plan No.: 35	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 5	<p>A string is stretched and fastened to two points l apart. Motion is started by displacing the string in the form $y = A \sin \frac{\pi x}{l}$ from which it is released at time $t = 0$. Show that the displacement of any point at a distance x from one end at time t is given by</p> $y(x, t) = A \sin \frac{\pi x}{l} \cos \frac{\pi ct}{l}$	
Lesson Plan No.: 36	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 6	<p>Find the deflection $y(x, t)$ of the vibrating string of length π and ends fixed, corresponding to zero initial velocity and initial deflection $f(x) = k(\sin x - \sin 2x)$ given $c^2 = 1$</p>	
Lesson Plan No.: 37	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
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 5

Question: 1	Solve the partial differential equation : $z^2 (p^2 + q^2) = x^2 + y^2$	
Lesson Plan No.: 31	Topic: Partial Differential equations	Source: Engg Mathematics-II By Dr.Manish Goyal
Question: 2	Solve the partial differential equation : $(x^2 - y^2 - z^2)p + 3xyq = 2xz$	
Lesson Plan No.: 33	Topic: Partial Differential equations	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 3	Use Charpit method to solve $(x^2 - y^2)pq - xy(p^2 - q^2) = 1$	
Lesson Plan No.: 32	Topic: Partial Differential equations	Source: Engg Mathematics-II By Dr. Manish Goyal
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 6
Question: 4	Solve the partial Differential Equation by separation of variables method $u_{xx} = u_y + 2u, u(0, y) = 0$ and $\frac{\partial}{\partial x} u(0, y) = 1 + e^{-3y}$	

Lesson Plan No.: 35	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal
Question: 5	Use the method of separation of variables to solve the equation $\frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial y} + 2u$	
Lesson Plan No.: 38	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal.
Question: 6	Derive the one dimensional Heat Equation	
Lesson Plan No.: 37	Topic: Application of partial Differential Equation	Source: Engg Mathematics-II By Dr. Manish Goyal.
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>		
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.		PANKAJ KUMAR