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 3

Instructions for Students / Faculty
Mid Term I (Total 60 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are six (3 from CO1 and 3 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 12 marks.

- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 4 marks. Total 16 marks.

- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to 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 8 marks. Total 32 marks.

Mid Term II (Total 90 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 3 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 30 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 6 marks. Total 24 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 any 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 9 marks. Total 36 marks.

Mid Term III (Total 90 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 3 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 30 marks

- 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). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 6 marks.

Total 24 marks.

- 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). They are numerical answer type / fully elaborative type (**Not More Than 70 Words forQuestion)** *, each carrying 9 marks. Total 36 marks.

* LIST OF ELABORATIVE THEORY QUESTION SUBJECTS: *This question format is only for Mathematics Subject.

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	25-12-2020 10:47
Name of Faculty	Sapana Thakur	**Date of Examination**	11-Jan-21
Course	B.Tech	**Semester**	Semester 3
Batch	Lateral entry AE-20	**Subject**	3AN2-01 Advance Engineering Mathematics (Cr 3)

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 introduce the basic concepts of solving algebraic, transcendental equations and numerical techniques of interpolation in various intervals in real life.

	2. To acquaint the student with understanding of numerical techniques of differentiation and integration this plays an important role in engineering and technology disciplines. 3. To get exposure on Advance level of Engineering mathematics and its application that they would find useful in their disciplines 4. To make the students appreciate the purpose of using Laplace transforms to create a new domain in which it is easier to handle the problem that is being investigated. 5. To acquire knowledge on Fourier transform techniques used in wide variety of situations in which the functions used are not periodic; 6. To develop Z- transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems.
Course Outcome :	. **CO 1.** Apply the numerical techniques of differentiation and integration for engineering problems. **CO 2.** Apply mathematical ideas to solve the practical problems in the society **CO 3.** Understand the basic concepts and techniques of solving algebraic and transcendental equations **CO 4.** Appreciate Laplace transform methods for solving linear and differential equations. **CO 5.** Obtain Fourier transforms for the functions which are needed for solving application problems. **CO 6.** Manipulate discrete data sequences using Z transform techniques.
Email I'd	sapnathakur@soaneemrana.org

Email I'd	sapnathakur@soaneemrana.org	**Phone No.**	8823094838
Student Name		**Student Reg No.**	

Part A

Part A

FOR MIDTERM 1 - Part A: Total number of questions to be given are ten (3 from CO1 and 3 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice.
FOR MIDTERM 2 - Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 3 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 3 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 2

Question: 1	What is the difference between Newton forward and Newton backward method	
Lesson Plan No.: LP 4	**Topic: Interpolation**	**Source: By B.S. Grewal**
Question: 2	What is the difference between Gauss forward and Gauss backward method	
Lesson Plan No.: 5	**Topic: Interpolation**	**Source: By B.S. Grewal**
Question: 3	Construct the forward difference table for this data	

x	0	10	20	30	40
y	0	6	18	65	80

Lesson Plan No.: 2	**Topic: Interpolation**	**Source: By B.S. Grewal**
2. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 1
Question: 4	What is Trapezoidal rule	
Lesson Plan No.: 10	**Topic: Numerical integration**	**Source: By B.S. Grewal**
Question: 5	What is the difference between Simpson rule 1/3 and Simpson 3/8 rule	
Lesson Plan No.:10	**Topic: Numerical integration**	**Source: By B.S. Grewal**
Question: 6	What is the relation between Δ, ∇, E and $\Delta, D \; and \; E$	
Lesson Plan No.:2	**Topic: Finite diff. Operator**	**Source: By B.S. Grewal**

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 2

Question: 1

Find $\frac{dy}{dx}$ at $x = 0.4$

(x)	0.1	0.2	0.3	0.4
(y)	1.105	1.221	1.349	1.491

Lesson Plan No.: 9	**Topic: Numerical differentiation**	**Source: By B.S. Grewal**

Question: 2

A curve is drawn to pass through the points given by following table

X	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bounded by the curve , x- axis and the lines x= 1 and x= 4

Lesson Plan No.: 10	**Topic: Numerical integration**	**Source: By B.S. Grewal**

Question: 3

Prove that $\Delta = 1 - e^{-hD}$

Lesson Plan No.: 2	**Topic: Finite diff. operator**	**Source: By B.S. Grewal**

4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	CO 1

Question: 4

From the following data and estimate the increasing population during the year 1976 to 1978

Year (x)	1941	1951	1961	1971	1981	1991
Population in Lakh (y)	12	15	20	27	39	52

Lesson Plan No.: 4	**Topic: Interpolation**	**Source: By B.S. Grewal**

Question: 5

By using Gauss forward formula find the polynomial from the given data

(x)	1	2	3	4	5
(y)	1	-1	1	-1	1

Lesson Plan No.: 5	Topic: Interpolation	Source: By B.S. Grewal

Question: 6	Prove that $\mu = \sqrt{\left(1 + \frac{\delta^2}{4}\right)}$

Lesson Plan No.: 3	Topic: Finite diff. Operator	Source: By B.S. Grewal

Part C

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).

5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	CO 1

Question: 1	Using the Lagrange's method , find the f(I) at T = 1.6 | T	1.2	2	2.5	3
I	1.36	0.58	0.34	0.20 | Where I is a electric current with respect to T
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Lesson Plan No.: 7	Topic: Interpolation	Source: By B.S. Grewal

Question: 2	Find the distance moved by a particle and its acceleration at the end of 4 second , if the time verses velocity data as follows by Lagrange's method | t	0	1	3	4
v	21	15	12	10	
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Lesson Plan No.: 8	Topic: Interpolation	Source: By B.S. Grewal

Question: 3	A thermocouple gives the following output for rise in temperature

Temp °C	0	10	20	30	40	60
Output	0	0.4	0.8	1.2	1.6	2

Find the output of thermocouple for 37°C $temp$ using by Newton divided difference formula.

Lesson Plan No.: 8	**Topic: Interpolation**	**Source: By B.S. Grewal**
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 4	Evaluate the $\int_{0.2}^{1.4} (sinx - logx + e^x)dx$ by Simpson 3/8 rule	
Lesson Plan No.: 10	**Topic: Numerical integration**	**Source: By B.S. Grewal**
Question: 5	Find $\frac{dy}{dx}$ $and \frac{d^2y}{dx^2}$ $at \ x = \ 2$ <table><tr><td>(x)</td><td>2</td><td>4</td><td>6</td><td>8</td></tr><tr><td>(y)</td><td>10</td><td>12</td><td>15</td><td>18</td></tr></table>	
Lesson Plan No.: 9	**Topic: Numerical differentiation**	**Source: By B.S. Grewal**
Question: 6	Evaluate the $\int_0^1 \frac{1}{1+x} dx$ by trapezoidal rule, Simpson 1/3 rule and Simpson 3/8 rule and compare the error with exact value	
Lesson Plan No.: 10	**Topic: Numerical integration**	**Source: By B.S. Grewal**
Upload Scanned Document in Case of Numerical or Diagram for Any of the Above Questions. *(Mention question number with relevant fig / numerical / equations. Max 150 KB)*		

I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.	