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 forQuestion)** *, 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 for Question)** *, 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 3	**Date of Submission**	23-Mar-21
Name of Faculty	PANKAJ KUMAR	**Date of Examination**	25-Mar-21
Course	B.Tech (Aeronautical Egg)	**Semester**	Semester 3
Batch	B-18, B-19, AE-2 MT-5	**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 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. 4. To acquire knowledge on Fourier transform techniques used in wide variety of situations in which the functions used are not periodic; 5. 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. 6. To get exposure on Advance level of Engineering mathematics and its application that they would find useful in their disciplines.
Course Outcome :	**CO 1.** Understand the basic concepts and techniques of solving algebraic and transcendental equations. **CO 2.** Apply the numerical techniques of differentiation and integration for engineering problems. **CO 3.** Appreciate Laplace transform methods for solving linear and differential equations. **CO 4.** Obtain Fourier transforms for the functions which are needed for solving application problems. **CO 5.** Manipulate discrete data sequences using Z transform techniques. **CO 6.** Apply mathematical ideas to solve the practical problems in the society.

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Student Name		**Student Reg No.**	

Part A

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.
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 5

Question: 1	Write the formula for Fourier transform.	
Lesson Plan No.: 29	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 2	Find the Fourier Cosine transform of e^{-x^2}	
Lesson Plan No.: 30	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 3	Define the application Fourier transforms.	
Lesson Plan No.: 30	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 4	Define the Convolution theorem for Fourier transform.	
Lesson Plan No.: 31	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 5	If the Fourier sine transform of $f(x) = \frac{1-\cos nx}{n^2\pi^2}$ $(0 \leq x \leq \pi)$	
Lesson Plan No.:32	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
2. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 6
Question: 6	Define the linearity property of Z- transform	
Lesson Plan No.:35	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 7	Find the Z- transform of the sin (3n+5)	
Lesson Plan No.:36	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 8	Define the Damping rule for Z- transform	

Lesson Plan No.:36	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 9	Find the Z- transform of 2t e^t sin	
Lesson Plan No.:37	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 10	Find the Z- transform of the n^2e^{an}	
Lesson Plan No.:38	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr 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 5
Question: 1	Find the Fourier sine and cosine transform of x^{n-1} , n > 0.	
Lesson Plan No.: 29	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 2	Using Parseval's identities, Prove that $\int_0^\infty \frac{t^2}{(t^2+1)^2} dt = \frac{\pi}{4}$	
Lesson Plan No.: 32	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 3	Find the Fourier sine transform of $e^{\frac{-ax}{x}}$	
Lesson Plan No.: 30	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 6

Question: 4	Find the Z-transform of $cos\left\langle\frac{n\pi}{2}+\frac{\pi}{4}\right\rangle$	
Lesson Plan No.: 36	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 5	If U(x) = $\frac{2x^2+3x+14}{(z-1)^4}$, Evaluate u_2 and u_3	
Lesson Plan No.: 37	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 6	Using Z-transform , Solve the following u_{n+2} $+4u_{n+1}+3u_n=3^n$ with $u0=0, u_1=1$	
Lesson Plan No.: 40	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr 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 5
Question: 1	Determine the distribution of temperature in the semi- infinite medium x ≥ 0. When the end x = 0 is maintained at zero temperature and the initial distribution of temperature is f (x)	
Lesson Plan No.: 33	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 2	Using finite Fourier Transform, solve $\frac{\partial u}{\partial t}=\frac{\partial^2 u}{\partial x^2}$, given u (0, t) = 0, u (4. t) =0 and u (x, 0) = 2x where 0 < x< 4, t> 0	
Lesson Plan No.: 34	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 3	Solve $\frac{\partial u}{\partial t}=\frac{2\partial^2 u}{\partial x^2}$, if u (0, t) =0, u(x, 0) =e^{-x} (x >0), u (x, t) is bounded.	

Lesson Plan No.: 34	**Topic: Fourier Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 6
Question: 4	Using the inversion integral method, Find the inverse Z-transform of $\frac{10z}{(z-1)(z-2)}$	
Lesson Plan No.: 38	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 5	Find the inverse Z-transform of $\frac{2z^2+3z}{(z+2)(z-4)}$	
Lesson Plan No.: 38	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr B.S. Grewal**
Question: 6	Use Convolution theorem to evaluate $Z^{-1}\left\{\frac{z^2}{(z-a)(z-b)}\right\}$	
Lesson Plan No.: 39	**Topic: Z- Transform**	**Source: Engg Mathematics By Dr 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.		