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	25-12-2020 11:52
Name of Faculty	Sapana Thakur	**Date of Examination**	28-Dec-20
Course	B.Tech	**Semester**	Semester 1
Batch	AE -20 and MT-6	**Subject**	1FY-01 Engineering Mathematics I (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 Integral Calculus techniques that is needed by engineers for practical applications. 2. To make the students appreciate the purpose of using Sequences

	and Series to solve engineering problems.
	3. To familiarize the student with functions of Fourier Series. This is needed in many branches of engineering. 4. To make the students understand various techniques of Multivariable Calculus differentiation. 5. To acquaint the student with mathematical tools needed in evaluating Multivariable Calculus integration and their applications. 6. To gain knowledge on primary level of Engineering mathematics and its application that they would find useful in their disciplines.
Course Outcome :	**CO 1.** Manipulate different methods of Multivariable Calculus differentiation in solving practical problems **CO 2.** Make use of mathematical ideas to solve the practical problems in the society **CO 3.** Use the Integral Calculus techniques methods for solving practical problems. **CO 4.** Appreciate Multivariable Calculus integration ideas in solving practical problems **CO 5.** Apply Sequences and Series tools in solving various application problems. **CO 6.** Obtain Fourier series ideas on several variable functions.

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

All the questions are compulsory to attend.

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 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.

1. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	CO 1
Question: 1	Write the definition of Homogenous function

Lesson Plan No.:4	**Topic: Partial differentiation**	**Source: By H.K.Das**
Question: 2	Define unit normal vector	
Lesson Plan No.:9	**Topic: Vector**	**Source: By H.K.Das**
Question: 3	Can we apply Euler's theorem for non-homogenous function	
Lesson Plan No.:4	**Topic: Partial differentiation**	**Source: By H.K.Das**
Question: 4	If $z = x + y$ where $x = a\cos\theta$, $y = b\sin\theta$ then find $\frac{dz}{d\theta}$	
Lesson Plan No.:8	**Topic: Total differentiation**	**Source: By H.K.Das**
Question: 5	If $z = x^2 y \sin\theta + \cos\theta$ then find $\frac{\partial^2 z}{\partial x^2}$	
Lesson Plan No.:3	**Topic: Partial differentiation**	**Source: By H.K.Das**
2. WRITE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 6	Write the equation of Lagrange's multiplier's method	
Lesson Plan No.:6	**Topic: Maxima and minima**	**Source: By H.K.Das**
Question: 7	Test the continuity for f(x,y) = $\begin{cases} \frac{x+2y}{x-3y} & when\ x \neq 0\ and\ y \neq 0 \\ 0 & when\ x = 0\ and\ y = 0 \end{cases}$	
Lesson Plan No.:2	**Topic: Continuity**	**Source: By H.K.Das**
Question: 8	Find $\lim_{\substack{x \to 4 \\ y \to 1}} \left\{ \frac{y^3 x + y}{x^3 y} \right\}$	

Lesson Plan No.:1	Topic: Limit	Source: By H.K.Das
Question: 9	Find $\lim_{\substack{x\to1\\y\to1}}\{\frac{10xy}{2x^3+3y^3}\}$	
Lesson Plan No.:1	Topic: Limit	Source: By H.K.Das
Question: 10	Define saddle point	
Lesson Plan No.:4	Topic: Maxima and minima	Source: By H.K.Das

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	Using by Euler's theorem If $z = \sin^{-1}\{\frac{(x^3-y^3)}{x^2 y}\}$ *then prove that* $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = tanz$

Lesson Plan No.:4	Topic: Partial differentiation	Source: By H.K.Das
Question: 2	If $y = sint (x^3) + 2 t\, cosx$ then find $\frac{\partial^2 y}{\partial t^2}$ and $\frac{\partial^2 y}{\partial x^2}$	
Lesson Plan No.:3	Topic: Partial differentiation	Source: By H.K.Das
Question: 3	Find the equation of tangent and normal line to the surface 2xy-y+z= 1 at (1 , 0 ,2)	

Lesson Plan No.:8	Topic: Tangent and normal	Source: By H.K.Das
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 4	Find the minimum value of u $=x^p y^q z^r$ $and\ subject\ to\ the\ condition\ is\ ax + by + cz = p + q + r$	
Lesson Plan No.:7	**Topic: Maxima and minima**	Source: By H.K.Das
Question: 5	If u $= x^3 + y^3 - 2xy\ then\ find\ \max imum\ or\ minimum\ value\ of\ u$	
Lesson Plan No.:6	**Topic: Maxima and minima**	Source: By H.K.Das
Question: 6	Prove that vector F = (x-y^2) i+(y^2 -z)j+(z-2)k is solenoidal or not	
Lesson Plan No.:9	**Topic: Vector**	Source: By H.K.Das

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 by Euler's theorem If $t = \sec^1\{\frac{x^{\frac{1}{10}}+y^{\frac{1}{10}}}{x^2+y^2}\}\ then\ prove\ that$ $x\ \frac{\partial t}{\partial x} + y\ \frac{\partial t}{\partial y} = -\frac{19}{10}\cot t$	
Lesson Plan No.:4	**Topic: Partial differentiation**	Source: By H.K.Das
Question: 2	$If\ u = 2xy\,e^{x+y}\ where\ yx^2 + xy^2 + 3xy = 2\ then\ find\ \frac{du}{dx}$	

Lesson Plan No.:8	Topic: Total differentiation	Source: By H.K.Das
Question: 3	If u =2 $xy\ where\ x = e^t + t\ , y = e^t - e^{2t}\ then\ find \frac{du}{dt}$	
Lesson Plan No.:8	Topic: Total differentiation	Source: By H.K.Das
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		CO 2
Question: 4	Find the directional derivative of $f(x,y,z)$=$xy + z^2\ at\ (1,2,3\ )\ in\ the\ direction\ of$ $\hat{\imath} + 5\hat{\jmath} + \hat{k}$	
Lesson Plan No.:10	Topic: Vector	Source: By H.K.Das
Question: 5	Show that Rectangular solid of maximum value that can be inscribed in a sphere is a cube	
Lesson Plan No.:7	Topic: Maxima and minima	Source: By H.K.Das
Question: 6	If $\vec{F}$= $r^2\vec{r}\ is\ conservative\ then\ find\ scalar\ potential$	
Lesson Plan No.:10	Topic: Vector	Source: By H.K.Das
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.		