School of Aeronautics (Neemrana)

Paper For Internal Assessment Examination (Theory) - Credit 4

Instructions For Students / Faculty
Mid Term I (Total 80 Marks, 2 hrs.)

- Part A: Total number of questions to be given are ten, 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, out of which student has to answer any four. 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 four, out of which student has to answer any three. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 12 marks. Total 36 marks.

Mid Term II & III (Total 120 Marks, 2.5 hrs.)

- Part A: Total number of questions to be given are ten, 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 seven, out of which student has to answer any five. They are long answer type (**Not More Than 50 Words For Question)**, each carrying 8 marks. Total 40 marks.
- Part C: Total number of questions to be given are five, out of which student has to answer any four. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 15 marks. Total 60 marks.

*** LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: Communication Skills, Human Values, Technical Communication, Managerial Economics and Financial, Aircraft Materials and Processes, Aircraft Systems, Aircraft Maintenance Practices, Avionics-I, Aircraft Rules and Regulation, Wind Tunnel Techniques, Maintenance of Airframe and System, Helicopter Theory, Avionics-II, Maintenance of Power Plant and System, Unmanned Aerial Vehicles & Systems (UAV), Space Mission Design & Optimization, CAD, Airlines and Airport Management.

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER

Question Paper & Student Details

Mid Term *	Back internal exam	Date of Submission of QP	11/28/2020	!!!
Name of Faculty *	Sapana Thakur	Date of Examination *	12/01/2020	!
Subject *	1FY2-01 Engineering mathematics – I	Course*	B.Tech	
Batch	AE & MT	Semester *	1	
Email Id of Faculty:*	sapanathakur1990@gmail.com	Phone Number of Faculty*	8823094838	

Student Name | **Student Reg No.**

1FY2-01: Engineering Mathematics I (Credit-4)

COURSE OBJECTIVE

1. The objective of this course is to familiarize the prospective engineers with techniques in calculus, sequences and series Fourier series, its tools to use the advance mathematics.
2. Multivariable analysis to differentiation and its tools to various segments in engineering mathematics and its application
3. Multivariable analysis to vector calculus and its tools to various segments in engineering mathematics and its application
4. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more
5. Advanced level of mathematics and applications that they would find useful in in their disciplines.

1FY2-01: Engineering Mathematics I (Credit-4)

COURSE OUTCOME

Upon completion of the course, Students will be able to

CO1: To be able to apply the fundamental application in finding out the solution of maxima and minima of engineering problems and the fallouts of Lagrange multipliers.

CO2: To be able deal with functions of several variables essential required in almost all branches of engineering.

CO3: Capable to apply the use of essential tools of multiple integrals and vector calculus in Engineering fields.

CO4: To be able to apply differential and integral calculus to notation of a definite integrals and to improper integrals.

CO5: Understand the applications of Beta and Gamma functions.

CO6: Able to understand the tool of power series and Fourier series for learning advanced Engineering mathematics

PART : A

Question: 1	Define P- test for convergence						
Lesson Plan *	LP38	Topic*	Seq. and series	Source*	By H.K.Das	CO*	Co6
Question: 2*	What is the difference between stationary and saddle points						
Lesson Plan *	LP5	Topic*	Max and min	Source*	By H.K.Das	CO*	Co1
Question: 3*	What is the difference between grad and divergence?						
Lesson Plan *	LP 7	Topic*	Vector	Source*	By H.K.Das	CO*	Co3
Question: 4*	Write the Euler's formula of Fourier series						
Lesson Plan *	LP 29	Topic*	Fourier series	Source*	By H.K.Das	CO*	Co6
Question: 5*	Define periodic function with example						
Lesson Plan *	LP28	Topic*	Fourier series	Source*	By H.K.Das	CO*	Co6
Question: 6*	What is the difference between Green's and stokes theorem ?						
Lesson Plan *	LP 18	Topic*	Integral calculus	Source*	By H.K.Das	CO*	Co4

Question: 7*

Define Cauchy root test for convergence

Lesson Plan * LP38 Topic* Seq. and series Source* By H.K.Das CO* Co6

Question: 8*

Define half range sine and cosine Fourier series

Lesson Plan * LP32 Topic* Fourier series Source* By H.K.Das CO* Co6

Question: 9*

State the Gauss div theorem

Lesson Plan * LP20 Topic* Integral calculus Source* By H.K.Das CO* Co4

Question: 10*

Write the necessary condition for Euler's theorem

Lesson Plan * LP4 Topic* Partial derivative Source* By H.K.Das CO* Co2

PART : B

Question: 1*

State and prove duplication formula

Lesson Plan * LP25 Topic* Beta and gamma Source* By H.K.Das CO* Co5

Question: 2*

If u = $\cos^{-1}\left(\frac{x^4+y^4}{x+y}\right)$ $then\ show\ that\ x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=-3\ cotu$

Lesson Plan *	Topic*	Source*	CO*
LP3	Partial derivative	By H.K.Das	Co2

Question: 3*

If $Z=\sin x+siny+sin(x+y)\ then\ find\ \max or \min of\ function\ Z$

Lesson Plan *	Topic*	Source*	CO*
LP 4	Max or min	By H.K.Das	Co1

Question: 4*

Using by change of order solve $\int_0^1\int_0^{2-x}\frac{x}{y}\,dx\,dy$

Lesson Plan *	Topic*	Source*	CO*
LP20	Integral calculus	By H.K.Das	Co4

Question: 5*

Write the relation between beta and gamma function and prove that

Lesson Plan *	Topic*	Source*	CO*
LP 23	Beta and gamma	By H.K.Das	Co5

Question: 6*

Evaluate $\int_0^1\int_0^x\int_0^{1-x-y}(x+y+z)\,dxdydz$

Lesson Plan *	Topic*	Source*	CO*
LP14	Integral calculus	By H.K.Das	Co4

Question: 7*

Prove that $\Gamma(n+1) = n\Gamma n$

Lesson Plan *	LP21	Topic*	Beta and gamma	Source*	By H.K.Das	CO*	Co5

PART : C

Question: 1*

Evaluate $\int_0^1 \int_0^x (x^2 + yx + y^2)\, dx\, dy$

Lesson Plan *	LP12	Topic*	Integral calculus	Source*	By H.K.Das	CO*	Co4

Question: 2*

Verify the Stokes's theorem and Evaluate $\oint F.dr$ $where$ $\overrightarrow{F}$ = $2x^2$ $\hat{i}$ + 3xy $\hat{j}$ which is bounded by square in plane z=0 and bounded by line x=0 ,y= 0 ,x=2 and y=2

Lesson Plan *	LP18	Topic*	Integral calculus	Source*	By H.K.Das	CO*	Co4

Question: 3*

Find Half range Fourier sine series for f(x) = $x \cos x$

Lesson Plan *	LP 34	Topic*	Fourier series	Source*	By H.K.Das	CO *	Co6

Question: 4*

Using by Green's theorem Evaluate $\oint F.dr \ \ if \ \ \overrightarrow{F} = xy\,\hat{i} - 2x^2y\,\hat{j}$ which is bounded by $y = x \ and \ y = x^2$

Lesson Plan *	Topic *	Source *	CO *
LP17	Integral calculus	By H.K.Das	Co4

Question: 5*

Find Fourier series for f(x) = $x^2 \ in \ (-\pi, \pi)$

Lesson Plan *	Topic *	Source *	CO *
LP 29	Fourier series	By H.K.Das	Co6

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

Faculty's Sign SAPANA THAKUR