6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                      C: 4

THEORY COURSE FILE CONTENTS

Check list Course Outcomes Attainment

S. No.	Contents	Available (Y/N/NA)	Date of Submission	Signature of HOD
1.	Authenticated Syllabus Copy	Y	01.09.2020	
2.	Individual Time Table	Y		
3.	Students' Name List (Approved Copy)	Y		
4.	Course Plan, PO, PSO, COs, CO-PO Mapping, COA Plan, Session Plan and Periodic Monitoring	Y		
5.	Previous Year End Semester Question Papers	Y		
6.	Question Bank (All Units - Part A, Part B & C)	Y		
7.	Dissemination of Syllabus and Course Plan to Students	Y		
8.	Lecture Notes - Unit I, II	Y		
9.	**Sample Documents and Evaluation Sheet for Internal Assessment** – Tutorials / Assignments / Class Test / Open Book Test / Quiz / Project / Seminar / Role Play if any (Before Mid Term)	Y	18.01.2021	
10.	**Mid Term Examination** A. Question Paper / Any Other Assessment Tools Used B. Sample Answer Scripts (Best, Average, Poor) if required C. Evaluation Sheet D. Slow Learners List and Remedial Measures	Y		
11.	Lecture Notes – Unit III	Y	26.03.2021	
12.	**Sample Documents and Evaluation Sheet for Internal Assessment** – Tutorials / Assignments / Class Test /Open Book Test / Quiz / Project / Seminar / Role Play if any (After Mid Term)	Y		
13.	Course End Survey (Indirect Assessment) & Consolidation	Y		
14.	**End Term Examination** A. Question Paper & Answer Key B. Sample Answer Scripts (Best, Average, Poor) if required C. Evaluation Sheet	Y		

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**

7. **Course**   : **Engineering Mathematics I**   **L: 3**

8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**

9. **Target**   : **60%**   **P: 0**

        C: 4

	D. Slow Learners List and Remedial Measures.			
15.	Content Beyond the Syllabus (Proof)	Y		
16.	Innovative Teaching Tools Used for TLP	Y		
17.	Details of Visiting Faculty Session / Industry Expert / Guest Lecture / Seminar / Field Visit / Webinars / Flipped Class Room / Blended Learning / Online Resources etc.	Y		
18.	Consolidated Mark Statement	Y		
19.	CO Attainment (Mid Term + Internal Assessment + End Term)	Y	07.04.2021	
20.	Gap Analysis & Remedial Measures	Y		
21.	CO - PO Attainment	Y		
22.	Class Record (Faculty Logbook)	Y		

Signature of HOD/ Dean   **Signature of Faculty**

Date: **Date: 07.04.2021**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
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9. **Target**   **: 60%**   **P: 0**
          C: 4

MTH11501	Engineering Mathematics I	L	T	P	C
Version 1.0	Contact Hours - 60	3	1	0	4
Pre-requisites/Exposure	12th level Mathematics				
Co-requisites	--				
Academic year	2020-21				

Syllabus Copy

Course Objectives

1. To help the student to understand basic concept of abstract and vector algebra with its uses in engineering science.
2. To give emphasis about concepts of differential calculus and enable students to apply these topics in real life problems.
3. To give the students a perspective to learn integral calculus and its importance in advanced study in engineering science.
4. To enable students, acquire fundamental concept of ordinary differential equation and its applications in engineering science.

Course Content

Unit- I   **[20L]**
Group Theory: Review of concept of set theory, Binary operations, group, abelian group, subgroups, necessary and sufficient condition for a subset of group to be a subgroup, ring, field, examples.
Sequences and Series: Sequences and their limits, convergence of series, comparison test, Ratio test, Root test, Absolute and conditional convergence, alternating series, Power series.
Vector Algebra: Scalar and vector fields, Vector product, Scalar triple product and their interpretation, directional derivative, gradient, Curl, divergence.

Unit- II   **[15L]**
Differential Calculus (Functions of one Variable): Limit, continuity, differentiability of functions of single variable, successive differentiation, Leibnitz's theorem, Rolle's Theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders, indeterminate forms, concavity and convexity of a curve, points of inflexion, asymptotes and curvature.
Differential Calculus (Functions of several variables): Limit, continuity, Differentiability of functions of several variables, partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions, Euler s theorem on homogeneous functions, harmonic functions, maxima and minima of functions of several variables, Lagrange's method of multipliers.

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7. **Course** : **Engineering Mathematics I**   **L: 3**
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9. **Target** : **60%**   **P: 0**
   C: 4

Unit- III   **[15L]**
Integral Calculus: Fundamental theorem of integral calculus, mean value theorems, evaluation of definite integrals, reduction formulae. Convergence of improper integrals, tests of convergence, Beta and Gamma functions, elementary properties, Differentiation under integral sign, differentiation of integrals with variable limits, Leibnitz rule. Rectification, double and triple integrals, computations of area, surfaces and volumes, change of variables in double integrals, Jacobian's of transformations, integrals dependent on parameters, applications.

Unit-IV   **[10L]**
Ordinary Differential Equations: First order differential equations, exact, linear and Bernoulli's form, second order differential equations with constant coefficients, method of variation of parameters, general linear differential equations with constant coefficients, Euler's equations, Cauchy-Legendre's equation system of differential equations.

References:
1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons
2. B.V. Ramana, Higher Engineering Mathematics Tata McGraw-Hill.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publications
4. C. B. Gupta, S. R. Singh, Mukesh Kumar, Engineering Mathematics, McGraw Hill Publication.
5. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House, 2002

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
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8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                   C: 4

Faculty Individual Time Table

ADAMAS UNIVERSITY, KOLKATA							
SCHOOL OF ENGINEERING & TECHNOLOGY (SOET)							
ALL ENGINEERING DEPARTMENT							
PROGRAMME: B.TECH (BIOMED/CSE/EE/ECE/CE/ME)							
Course Code & Course: MTH11501 & Engineering Mathematics I Faculty Coordinator: Dr. Avik Pradhan (AP) & Dr. Sudip Jana (SJ)							
Day & Time	09.30 - 10.25	10.30 - 11.25	11.30 - 12.25	12.30 - 13.25	13.30 - 14.25	14.30 - 15.25	15.30 - 16.25	16.30 - 17.25
Monday		EM I (SJ)						
Tuesday	EM I (AP)			LUNCH				
Wednesday								
Thursday	EM I (SJ)							
Friday					EM I (AP)			

Signature of HOD   **Signature of Class Coordinator**

Date: 01.09.2020   **Date: 01.09.2020**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                              C: 4

Students Name List

Registration Number	Roll Number	Name of the Student
AU/2020/0004250	UG/02/BTCSE/2020/001	ALOK DUTTA
AU/2020/0004275	UG/02/BTCSE/2020/002	SUNANDA JANA
AU/2020/0004276	UG/02/BTCSE/2020/003	SUPRATIM TARUN NATH
AU/2020/0004451	UG/02/BTCSE/2020/004	ABHIPSIT BHATTACHARJEE
AU/2020/0004452	UG/02/BTCSE/2020/005	TIRUPATI SANYAL
AU/2020/0004462	UG/02/BTCSE/2020/007	SURAJ MAJUMDER
AU/2020/0004463	UG/02/BTCE/2020/002	ROHIT KUMAR SHIT
AU/2020/0004464	UG/02/BTCSE/2020/008	ARKADEEP CHATTERJEE
AU/2020/0004465	UG/02/BTECE/2020/001	ARYA PAUL
AU/2020/0004466	UG/02/BTCSE/2020/009	RITUSHNA ROY
AU/2020/0004467	UG/02/BTCSE/2020/010	NIRVIK SARKAR
AU/2020/0004468	UG/02/BTCSE/2020/011	PRIMA GIRI
AU/2020/0004471	UG/02/BTME/2020/001	SUMAN HAIT
AU/2020/0004472	UG/02/BTCSE/2020/012	SOUGATA DUTT
AU/2020/0004479	UG/02/BTCSE/2020/018	PROTYUSH KR CHATTERJEE
AU/2020/0004481	UG/02/BTEE/2020/001	SAPTARSHI BHATTACHARJEE
AU/2020/0004484	UG/02/BTME/2020/002	KOUSHIK GHOSH
AU/2020/0004486	UG/02/BTECE/2020/002	UTSAB BOSE
AU/2020/0004494	UG/02/BTCSE/2020/022	INDRANIL DAS
AU/2020/0004495	UG/02/BTME/2020/004	RAKESH KUMAR MOZUMDER
AU/2020/0004523	UG/02/BTCSE/2020/026	SAYAN DAS
AU/2020/0004529	UG/02/BTCSE/2020/027	ATANU PRAMANICK
AU/2020/0004530	UG/02/BTCSE/2020/028	AYAN KUMAR DAS
AU/2020/0004536	UG/02/BTCE/2020/003	ARJYA DAS
AU/2020/0004540	UG/02/BTCSE/2020/032	MD ALNAS HOSSAIN
AU/2020/0004549	UG/02/BTCSE/2020/033	VIVEK RAJ
AU/2020/0004555	UG/02/BTME/2020/005	REETAM MONDAL
AU/2020/0004557	UG/02/BTCSEAIML/2020/006	SOUMYADWIP MAITY
AU/2020/0004560	UG/02/BTEE/2020/002	ARKA JYOTI DAS
AU/2020/0004562	UG/02/BTCSE/2020/034	SOYATA SAHA
AU/2020/0004563	UG/02/BTCSEAIML/2020/009	ROHIT KUMAR ROY
AU/2020/0004565	UG/02/BTCSE/2020/035	NIKHIL KUMAR JHA
AU/2020/0004566	UG/02/BTECE/2020/004	ROHIT RAJ HALDER

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
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8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                               C: 4

AU/2020/0004569	UG/02/BTCSE/2020/036	NANDINI ROY
AU/2020/0004572	UG/02/BTCSEAIML/2020/011	SUBARNA BHOWMIK
AU/2020/0004578	UG/02/BTCSEAIML/2020/013	MD SOHAIL IRFAN
AU/2020/0004580	UG/02/BTCSE/2020/041	RAJA BANIK
AU/2020/0004583	UG/02/BTCSE/2020/042	ARSHAD RAJA
AU/2020/0004587	UG/02/BTCSECSF/2020/006	SABYASACHI PAUL
AU/2020/0004588	UG/02/BTCSEAIML/2020/015	CHANDRACHUR MAJHI
AU/2020/0004593	UG/02/BTCSE/2020/046	HRITIK KUMAR DUTTA
AU/2020/0004596	UG/02/BTCSE/2020/047	SHIULI MAHATA
AU/2020/0004600	UG/02/BTBIOME/2020/002	RAVI LAL
AU/2020/0005281	UG/02/BTBIOME/2020/008	GAURAV GAIN
AU/2020/0005498	UG/02/BTBIOME/2020/003	SOUMYADEEP SAMADDAR
AU/2020/0005499	UG/02/BTBIOME/2020/004	SPANDAN BHATTACHAARYA
AU/2020/0005541	UG/02/BTCSE/2020/051	ANANYA MONDAL
AU/2020/0005542	UG/02/BTCSE/2020/052	ANIRBAN ROY

Signature of HOD/Dean   **Signature of Class Coordinator**

Date: 01.09.2020   **Date: 01.09.2020**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
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    C: 4

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   : **Engineering Mathematics I**   **L: 3**
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   : **60%**   **P: 0**
                                                            C: 4

<u>COURSE PLAN</u>

Target   60% (marks)
Level-1   50% (population)
Level-2   60% (population)
Level-3   70% (population)

1. **Method of Evaluation**

UG
Internal Assessment (30%)
(Quizzes/Tests, Assignments & Seminars etc.)
Mid Semester Examination (20%)
End Semester Examination (50%)

2. **Passing Criteria**

Scale   **UG**

Out of 10 Point Scale   CGPA – "5.00"
                                   Min. Individual Course Grade – "C"
                                   Passing Minimum – 35

3. **Pedagogy**
    - **<u>Direct Instruction</u>**   - Expeditionary Learning
    - Kinesthetic Learning   - Inquiry Based Learning
    - **<u>Flipped Classroom</u>**   - Game Based Learning
    - Differentiated Instruction   - Personalized Learning
4. **Topics introduced for the first time in the program through this course**

5. **References:**

Text Books	Web Resources	Journals	Reference Books
-	-	-	5

Signature of HOD/Dean   **Signature of Faculty**

Date: 01.09.2020   **Date: 01.09.2020**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                             C: 4

GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the LMS in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at <u>Lecture Notes</u> section. These are our lecture notes. Make sure you use them during this course.
4. check your LMS regularly
5. go through study material
6. check mails and announcements on blackboard
7. keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. C**ell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail <u>avik.pradhan@adamasuniversity.ac.in</u> and <u>sudip.jana@adamasuniversity.ac.in</u>. Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
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9. **Target**   **: 60%**   **P: 0**
   C: 4

RELATED OUTCOMES

1. **The expected outcomes of the Program are:**

PO1	Engineering Knowledge
PO2	Problem analysis
PO3	Design/development of solutions
PO4	Conduct investigations of complex problems
PO5	Modern tool usage
PO6	The engineer and society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

2. **The expected outcomes of the Course are: (minimum 4 and maximum 6)**

CO1	**Relate** the idea of basic concepts of abstract algebra and geometrical idea of vector analysis with real world applications.
CO2	**Extend** the fundamental concepts of differential calculus to apply in real life problems.
CO3	**Make use of** the fundamental concepts of Integral Calculus and apply these topics in real life problems.
CO4	**Apply** various solution procedures of Ordinary Differential equations in engineering problems.

3. **Co-Relationship Matrix**
   Indicate the relationships by 1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	3	-	-	-	-	-	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	-
CO3	3	3	-	-	3	-	-	-	-	-	-	-

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9. **Target   : 60%**   **P: 0**
                                                                                    C: 4

CO4	3	3	-	-	3	-	-	-	-	-	-	-
Average	3	3	-	-	3	-	-	-	-	-	-	-

4. **Course Outcomes Assessment Plan (COA):**

Course Outcomes	Internal Assessment* (30 Marks)		Mid Term Exam (20 Marks)	End Term Exam (50 Marks)	Total (100 Marks)
	Before Mid Term	**After Mid Term**			
CO1	5	NA	11	8	24
CO2	5	NA	9	15	29
CO3	NA	10	NA	13	23
CO4	NA	10	NA	14	24
Total	10	20	20	50	100

* Internal Assessment – Tools Used: Assignment & Class Test

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
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9. **Target   : 60%**   **P: 0**
                                                                 C: 4

OVERVIEW OF COURSE PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Actual			Remarks
		From	**To**	**No. of Session**	**From**	**TO**	**No. of Session**	
1.	**Basic algebra & Vector Calculus**	03.09.2020	14.12.2020	20	03.09.2020	14.12.2020	20	Completed As per Plan
2.	**Differential Calculus**	01.09.2020	24.11.2020	15	01.09.2020	24.11.2020	15	Completed As per Plan
3.	**Integral Calculus**	01.12.2020	26.02.2021	15	01.12.2020	26.02.2021	15	Completed As per Plan
4.	**Ordinary differential equations**	21.12.2020	26.02.2021	10	21.12.2020	26.02.2021	10	Completed As per Plan

Total No. of Instructional periods available for the course: 60 Sessions (including tutorials)

Signature of HOD/Dean   **Signature of Faculty**

Date: 01.09.2020   **Date: 01.09.2020**

Year: I

Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                     C: 4

SESSION PLAN
UNIT-I

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1	3.9.2020	Review of concept of set theory.	CO1	1	3.9.2020	Review of concept of set theory.	CO1
2	7/9/2020	Idea of relations and functions.	CO1	2	7/9/2020	Idea of relations and functions.	CO1
3	10/9/2020	Idea of binary operations and examples.	CO1	3	10/9/2020	Idea of binary operations and examples.	CO1
4	14/9/2020	Definition of group, examples, abelian group.	CO1	4	14/9/2020	Definition of group, examples, abelian group.	CO1
5	17/9/2020	Definition of subgroup, Examples,	CO1	5	17/9/2020	Definition of subgroup, Examples,	CO1
6	24/9/2020	Condition of a subset for a group to be a subgroup	CO1	6	24/9/2020	Condition of a subset for a group to be a subgroup	CO1
7	28/9/2020	Introduction to ring theory.	CO1	7	28/9/2020	Introduction to ring theory.	CO1
8	1/10/2020	Preliminary properties of Ring Theory.	CO1	8	1/10/2020	Preliminary properties of Ring Theory.	CO1
9	5/10/2020	Idea of Integral Domain and examples.	CO1	9	5/10/2020	Idea of Integral Domain and examples.	CO1

Year: I

Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
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                                                                   C: 4

10	8/10/2020	Idea of Skew field along with examples.	CO1	10	8/10/2020	Idea of Skew field along with examples.	CO1
11	15/10/2020	Introduction to field theory and its properties.	CO1	11	15/10/2020	Introduction to field theory and its properties.	CO1
12	19/10/2020	Different aspects of Rings and Fields	CO1	12	19/10/2020	Different aspects of Rings and Fields	CO1
13	2/11/2020	Problem session on ring and field.	CO1	13	2/11/2020	Problem session on ring and field.	CO1
14	9/11/2020	Scalar field, definitions	CO1	14	9/11/2020	Scalar field, definitions	CO1
15	12/11/2020	Vector field, definitions	CO1	15	12/11/2020	Vector field, definitions	CO1
16	19/11/2020	Vector product and their properties	CO1	16	19/11/2020	Vector product and their properties	CO1
17	26/11/2020	Definition and properties of Scalar triple product.	CO1	17	26/11/2020	Definition and properties of Scalar triple product.	CO1
18	3/12/2020	Directional derivative and related problems.	CO1	18	3/12/2020	Directional derivative and related problems.	CO1
19	7/12/2020	Definition of gradient, Curl, divergence and its geometric interpretation	CO1	19	7/12/2020	Definition of gradient, Curl, divergence and its geometric interpretation	CO1
20	14/12/2020	Problems on gradient, Curl, divergence.	CO1	20	14/12/2020	Problems on gradient, Curl, divergence.	CO1

Remarks: NA

Signature of Faculty

Date: 30.09.2020

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                       C: 4

SESSION PLAN
UNIT-II

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1	01.09.2020	Idea of Limit and continuity	CO2	1	01.09.2020	Idea of Limit and continuity	CO2
2	04.09.2020	Idea of Derivative of a function and Successive derivative	CO2	2	04.09.2020	Idea of Derivative of a function and Successive derivative	CO2
3	11.09.2020	Problems on Successive Derivatives.	CO2	3	11.09.2020	Problems on Successive Derivatives.	CO2
4	15.09.2020	Leibnitz theorem with applications	CO2	4	15.09.2020	Leibnitz theorem with applications	CO2
5	22.09.2020	Problems on Leibnitz theorem.	CO2	5	22.09.2020	Problems on Leibnitz theorem.	CO2
6	25.09.2020	Rolle's theorem and Cauchy's Mean value theorem	CO2	6	25.09.2020	Rolle's theorem and Cauchy's Mean value theorem	CO2
7	29.09.2020	Taylor and Maclaurin's theorems with remainders	CO2	7	29.09.2020	Taylor and Maclaurin's theorems with remainders	CO2
8	06.10.2020	Idea of sequences and series along with convergence tests	CO2	8	06.10.2020	Idea of sequences and series along with convergence tests	CO2
9	13.10.2020	Idea of indeterminate forms, concavity and convexity of a curve, points of inflexion	CO2	9	13.10.2020	Idea of indeterminate forms, concavity and convexity of a curve, points of inflexion	CO2

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                        C: 4

10	20.10.2020	Preliminary idea of Asymptotes.	CO2	10	20.10.2020	Preliminary idea of Asymptotes.	CO2
11	27.10.2020	Preliminary idea of Curvature.	CO2	11	27.10.2020	Preliminary idea of Curvature.	CO2
12	03.11.2020	Limit, continuity, Differentiability of functions of several variables,	CO2	12	03.11.2020	Limit, continuity, Differentiability of functions of several variables,	CO2
13	10.11.2020	Partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions,	CO2	13	10.11.2020	Partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions,	CO2
14	17.11.2020	Euler s theorem on homogeneous functions, harmonic functions,	CO2	14	17.11.2020	Euler s theorem on homogeneous functions, harmonic functions,	CO2
15	24.11.2020	maxima and minima of functions of several variables, Lagrange's method of multipliers	CO2	15	24.11.2020	maxima and minima of functions of several variables, Lagrange's method of multipliers	CO2

Remarks: NA   **Signature of Faculty**

                                                                              Date: 27.11.2021

Year: I

Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                               C: 4

SESSION PLAN
UNIT-III

		Session Plan				Actual Delivery	
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1	01/12/2020	Fundamental theorem of integral calculus, mean value theorems	CO3	1	01/12/2020	Fundamental theorem of integral calculus, mean value theorems	CO3
2	04/12/2020	Evaluation of definite integrals, reduction formulae	CO3	2	04/12/2020	Evaluation of definite integrals, reduction formulae	CO3
3	08/12/2020	Different kind of reduction formulas.	CO3	3	08/12/2020	Different kind of reduction formulas.	CO3
4	11/12/2020	Convergence of improper integrals, tests of convergence	CO3	4	11/12/2020	Convergence of improper integrals, tests of convergence	CO3
5	15/12/2020	Beta and Gamma functions, elementary properties	CO3	5	15/12/2020	Beta and Gamma functions, elementary properties	CO3
6	22/12/2020	Problems on Beta Gamma functions.	CO3	6	22/12/2020	Problems on Beta Gamma functions.	CO3
7	05/01/2021	Differentiation under integral sign.	CO3	7	05/01/2021	Differentiation under integral sign.	CO3
8	08/01/2021	Differentiation of integrals with variable limits.	CO3	8	08/01/2021	Differentiation of integrals with variable limits.	CO3

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**

   C: 4

9	19/01/2021	Leibnitz rule.	CO3	9	19/01/2021	Leibnitz rule.	CO3
10	22/01/2021	Rectification, double and triple integrals	CO3	10	22/01/2021	Rectification, double and triple integrals	CO3
11	02/02/2021	Change of variables in double integrals.	CO3	11	02/02/2021	Change of variables in double integrals.	CO3
12	05/02/2021	Computations of area.	CO3	12	05/02/2021	Computations of area.	CO3
13	09/02/2021	Computations of surface and volume.	CO3	13	09/02/2021	Computations of surface and volume.	CO3
14	23/02/2021	Jacobian's of transformations.	CO3	14	23/02/2021	Jacobian's of transformations.	CO3
15	26/02/2021	Integrals dependent on parameters, applications.	CO3	15	26/02/2021	Integrals dependent on parameters, applications.	CO3

Remarks: NA   **Signature of Faculty**

Date: 26.02.2021

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
          C: 4

SESSION PLAN
UNIT-IV

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1	21/12/2020	Differential Equations: Basic definitions, Formation, Type of Solutions of a differential equation, Illustrative examples	CO4	1	21/12/2020	Differential Equations: Basic definitions, Formation, Type of Solutions of a differential equation, Illustrative examples	CO4
2	4/1/2021	Differential equation of First order and first degree: Exact equations, Necessary and sufficient condition of exactness of a first order and first degree ODE (statement only), Illustrative examples	CO4	2	4/1/2021	Differential equation of First order and first degree: Exact equations, Necessary and sufficient condition of exactness of a first order and first degree ODE (statement only), Illustrative examples	CO4
3	7/1/2021	Rules for finding Integrating factors, Illustrative examples	CO4	3	7/1/2021	Rules for finding Integrating factors, Illustrative examples	CO4
4	21/1/2021	Linear equation, Bernoulli's equation, Illustrative examples	CO4	4	21/1/2021	Linear equation, Bernoulli's equation, Illustrative examples	CO4
5	25/1/2021	ODE- Higher order and first degree: General linear ODE of order two with constant coefficients, C.F. & P.I. Illustrative examples	CO4	5	25/1/2021	ODE- Higher order and first degree: General linear ODE of order two with constant coefficients, C.F. & P.I. Illustrative examples	CO4

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                           C: 4

6	1/2/2021	D-operator methods for finding P.I., Illustrative examples	CO4	6	1/2/2021	D-operator methods for finding P.I., Illustrative examples	CO4
7	4/2/2021	Method of variation of parameters, Illustrative examples	CO4	7	4/2/2021	Method of variation of parameters, Illustrative examples	CO4
8	11/2/2021	Cauchy-Euler equations, Illustrative examples	CO4	8	11/2/2021	Cauchy-Euler equations, Illustrative examples	CO4
9	15/2/2021	Solution of simultaneous linear differential equations, Illustrative examples	CO4	9	15/2/2021	Solution of simultaneous linear differential equations, Illustrative examples	CO4
10	25/02/2021	Geometrical and physical applications	CO4	10	25/02/2021	Geometrical and physical applications	CO4

Remarks: NA   **Signature of Faculty**

Date: 26.02.2021

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                              C: 4

PERIODIC MONITORING

Actual date of completion and remarks, if any

Components		From	To	From	To
Duration (Mention from and to Dates)		01.09.2020	16.01.2021	18.01.2021	24.03.2021
Percentage of Syllabus covered		50%		50%	
Lectures	Planned	1	30	31	60
	Taken	1	30	31	60
Tutorials	Planned	NA			
	Taken				
Test/Quizzes/ Mid Semester/ End Semester	Planned	1	1 (Mid)	1 (End)	
	Taken	1	1	1	
	CO's Addressed	CO1, CO2	CO1, CO2	CO1, CO2, CO3, CO4	
	CO's Achieved	CO1, CO2	CO1, CO2	CO1, CO2, CO3, CO4	
Assignments	Planned			1	
	Taken			1	
	CO's Addressed			CO3, CO4	
	CO's Achieved			CO3, CO4	
Signature of Faculty					
Head of the Department					
OBE Coordinator					

Signature of HOD/ Dean   Signature of Faculty

Date: 26.03.2021   Date: 26.03.2021

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                                   C: 4

PERIODIC MONITORING

Attainment of the Course (Learning) Outcomes:

Components	Attainment level	Action Plan	Remarks
Assignment	CO1: CO2: CO3: CO4:	Submission Target **28.02.2021**	**Covered most of the syllabus**
Quiz/Test etc.	CO1: CO2: CO3: CO4:	**Conducted on 22.12.2020**	**Covered First two units**
Mid Semester	CO1: CO2: CO3: CO4:	**Scheduled on 12.01.2021**	**Previous year questions are provided to give an idea about the examination pattern**
End Semester	CO1: CO2: CO3: CO4:	**Scheduled on 22.03.2021**	**Previous year questions are provided to give an idea about the examination pattern**
Any Other	CO1: CO2: CO3: CO4:	**NA**	

Signature of HOD/ Dean   **Signature of Faculty**

Date: 26.03.2021   **Date: 26.03.2021**

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                                       C: 4

Previous Year Question Papers – Set 1

ADAMAS UNIVERSITY
END -TERM EXAMINATIONS (January, 2018)
Name of the Program: B.Tech.   **SEMESTER-I**

PAPER NAME: Engineering Mathematics-I   **PAPER CODE: SMA41101**

Maximum Marks: 40   **Time: 3 hours**
Total No of questions: 12
Total No of Pages: 02

General Instructions to Candidates:
1. Please follow all the Instructions given on the cover page of the answer book.
2. Assumptions /abbreviation made if any should be stated clearly at the beginning of your answer.
3. Questions should be answered sequentially.
4. Start answering each section (sections A, B &C) from a new page.

Section-A (Answer ANY FIVE from the following):
[1 x 5=5]

1. The differential equation of the family of curves $y = Ae^{2x} + Be^{-2x}$ after eliminating A and B is

   (a) $y_2 = 4y$ (b) $yy'' = (y')^2$ (c) $2yy'' = y' + y$ (d) none of these.

2. An integrating factor of $\dfrac{dy}{dx} + y = \dfrac{1+y}{x}, x > 0$ is

   (a) $\dfrac{x}{e^x}$ (b) $\dfrac{e^x}{x}$ (c) xe^x (d) e^x.

3. $\beta(3,2)$ is equal to

   (a) $\dfrac{3}{2}$ (b) $\dfrac{1}{12}$ (c) $\dfrac{5}{8}$ (d) $\dfrac{3}{4}$.

4. The series $\dfrac{1}{\sqrt{1}} + \dfrac{1}{\sqrt{2}} + \dfrac{1}{\sqrt{3}} + \ldots\ldots\ldots$ is

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana** **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
      C: 4

   (a) Convergent   (b) divergent   (c) Oscillatory   (d) None.

5. The degree and order of the differential equation $\left(\dfrac{d^2 y}{dx^2} + 2\right)^{\frac{3}{2}} = x\dfrac{dy}{dx}$

   (a) $\dfrac{3}{2}, 2$ (b) 2,3   (c) 3,2   (d) 2,1.

6. Which of the following function obeys Rolle's theorem in $[0, \pi]$

   (a) x (b) $\sin x$ (c) $\cos x$ (d)
   None

Section-B (Answer ANY THREE Questions):   [5 x 3=15]

7. Discuss the convergence of the following series:

   a) $\displaystyle\sum_{n=1}^{\infty} \dfrac{\cos\cos (nx)}{n^2}$

   b) $\displaystyle\sum_{n=1}^{\infty} \dfrac{u_n}{u_{n+1}}$, if $\displaystyle\sum_{n=1}^{\infty} u_n$ is divergent.

   c) $1 - \dfrac{1}{2} + \dfrac{1}{3} - \dfrac{1}{4} + \ldots$

8. Find $f_{xx}(0,0),\ f_{xy}(0,0),\ f_{yx}(0,0),\ f_{yy}(0,0)$ if

   $f(x,y) = \{\dfrac{xy}{(x^2+y^2)}$, $for\ (x,y) \neq (0,0)$ $\qquad 0 \qquad , for\ (x,y) = (0,0)$

9. Define "Bernoulli's equation". Hence solve: $2x^2 \dfrac{dy}{dx} = xy + y^2$

10. Solve by the method of variation of parameters:
   $$\dfrac{d^2 y}{dx^2} + 9y = \sec\sec 3x$$

Section-C (Answer ALL Questions):   [2x10=20]

11. (a) If the perimeter of a triangle is constant, prove that the area of the triangle is maximum if the triangle is equilateral.

   (a) If $f\left(v^2 - x^2,\ v^2 - y^2,\ v^2 - z^2\right) = 0$ prove that $\dfrac{1}{x}\dfrac{\partial V}{\partial x} + \dfrac{1}{y}\dfrac{\partial V}{\partial y} + \dfrac{1}{z}\dfrac{\partial V}{\partial z} = \dfrac{1}{v}$.

   (b) Find $\displaystyle\int_0^{\frac{\pi}{2}} (\tan x)^p\, dx$.

   (c) Prove that the sequence u_n defined by $u_1 = \sqrt{7}$ and $u_{n+1} = \sqrt{7u_n}$ for all $n \geq 1$ is convergent.

12. (a) Solve the following ODE $x^2 \dfrac{d^2 y}{dx^2} - x\dfrac{dy}{dx} + 4y = 10(x + \dfrac{1}{x})$

   (b) Solve the following system of simultaneous linear differential equations:
   $$\dfrac{dx}{dt} + 5x + y = e^t,\ \dfrac{dy}{dt} + 3y - x = e^{2t}.$$

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**　　　**Course Code: MTH11501**
7. **Course**　　　　　**: Engineering Mathematics I**　　　　　**L: 3**
8. **Program**　　　　**: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**　　**T: 1**
9. **Target**　　　　　**: 60%**　　　　　　　　　　　　　　　**P: 0**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　C: 4

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                                    C: 4

Previous Year Question Papers – Set 2

ADAMAS UNIVERSITY
END -TERM EXAMINATIONS (January, 2018)
Name of the Program: B.Tech.   SEMESTER-I

PAPER NAME: Engineering Mathematics-I   PAPER CODE: SMA41101

Maximum Marks: 40   Time: 3 hours

Total No of questions: 12

Total No of Pages: 02

General Instructions to Candidates:

5. Please follow all the Instructions given on the cover page of the answer book.
6. Assumptions /abbreviation made if any should be stated clearly at the beginning of your answer.
7. Questions should be answered sequentially.
8. Start answering each section (sections A, B &C) from a new page.

Section-A (Answer ANY FIVE from the following)   [1 x 5=5]

1. The differential equation of the family of curves $y = x(A+B)^2$ after eliminating A and B is

   (b) $2yy'' = (y')^2$ (b) $yy'' = (y')^2$ (c) $2yy'' = y' + y$ (d) $2yy'' = y' - y$

2. The Wronskian of the independent solutions of $(D^2 - 2D)y = 0$ is

   (a) e^{2x} (b) $2e^{2x}$ (c) $2e^x$ (d) None of these.

3. $\beta(3,2)$ is equal to

   (b) $\dfrac{3}{2}$ (b) $\dfrac{1}{12}$ (c) $\dfrac{5}{8}$ (d) $\dfrac{3}{4}$.

4. The series $\sum \dfrac{1}{n^p}$ is convergent if

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   Course Code: MTH11501
7. **Course**   : **Engineering Mathematics I**   **L: 3**
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   : **60%**   **P: 0**
      C: 4

(a) $p \geq 1$ (b) $p > 1$ (c) $p < 1$ (d)

$p \leq 1$.

5. The order and degree of the differential equation $\left(\dfrac{d^3 y}{dx^3}\right)^2 = x^2 \left(\dfrac{dy}{dx}\right)^3$ are

(b) 3,2   (b) 2,3   (c) 3,1   (d) 3,3.

6. If $y = e^{-x}$, then y_n is

(d) e^x (b) $(-1)^n$ (c) $(-1)^n e^{-x}$ (d)   none of
these.

Section-B (Answer ANY THREE Questions):   [5 x 3=15]

7. Discuss the convergence of the following series:

d) $\displaystyle\sum_{n=1}^{\infty} \dfrac{\sin \sin (nx)}{n^2}$

e) $\displaystyle\sum_{n=1}^{\infty} \dfrac{u_n}{u_{n+1}}$, if $\displaystyle\sum_{n=1}^{\infty} u_n$ is convergent.

f) $1 - \dfrac{1}{2} + \dfrac{1}{3} - \dfrac{1}{4} + \dots$

8. Find $f_{xx}(0,0),\ f_{xy}(0,0),\ f_{yx}(0,0),\ f_{yy}(0,0)$ if

$f(x,y) = \{\dfrac{xy(x^2-y^2)}{(x^2+y^2)}$, $for\ (x,y) \neq (0,0)$ 0 $, for\ (x,y) = (0,0)$

9. Define "Linear differential equation". Hence solve: $(x^2 y^3 + 2xy)dy = dx$

10. Solve by the method of variation of parameters:

$$\dfrac{d^2 y}{dx^2} + 2\dfrac{dy}{dx} + y = \dfrac{e^{-x}}{x^2}$$

Section-C (Answer ALL Questions):   [2x10=20]

11. (a) Find the dimension of a rectangular box of maximum capacity whose surface area is given when the box is open at the top.

(e) If $V = f(\dfrac{x}{z},\ \dfrac{y}{z})$, prove that $x\dfrac{\partial V}{\partial x} + y\dfrac{\partial V}{\partial y} + z\dfrac{\partial V}{\partial z} = 0$.

(f) Find $\displaystyle\int_0^{\frac{\pi}{2}} (Cot\ x)^p\ dx$.

(g) Prove that the sequence u_n defined by $u_1 = \sqrt{2}$ and $u_{n+1} = \sqrt{2u_n}$ for all $n \geq 1$ is convergent.

12. (a) Reduce the following differential equation to a homogeneous differential equation and hence solve it. $(x+2)^2 \dfrac{d^2 y}{dx^2} - 4(x+2)\dfrac{dy}{dx} + 4y = 2\sin \sin \{2 \log \log (2+x)\}$

(b) Solve the following system of simultaneous linear differential equations:

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                   C: 4

$$\frac{dx}{dt} - 7x + y = 0, \quad \frac{dy}{dt} - 2x - 5y = 0.$$

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
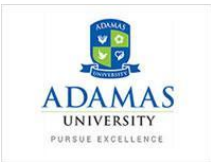9. Target   : 60%   P: 0

                                                              C: 4

Question Bank Sample

School: School of Engineering and Technology   **Department:Computer Science and Engineering**
Course Code: MTH11501   **Course Name: Engineering Mathematics-I**
Program: B.Tech   **Semester: I**

Sl. No.	Question	Level of Difficulty (Easy/ Medium/ Difficult)	Knowledge Level (Bloom's Taxonomy)	Course Outcome (CO)
	UNIT-I			
	Part A (Multiple Choice Questions) (1 mark each)			
1.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then $div \vec{r}$ is i)0 ii)3 iii)-3 iv) 1	Easy	Remembering	CO1
2.	If $\vec{c}$ is a constant vector and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then $grad\,(\vec{c}.\,\vec{r})$ is i) $\vec{c}$ ii) $2\vec{c}$ iii) $\vec{r}$ iv) $2\vec{r}$	Medium	Remembering	CO1
3.	The series $\sum \dfrac{1}{n^p}$ is convergent if i) $p \geq 1$ (ii) $p > 1$ (iii) $p < 1$ (iv) $p \leq 1$.	Difficult	Remembering	CO1
	Part B (Definition/Naming Questions) (2 marks each)			
1.	**Show** that intersection of two subgroup of a group is also a subgroup of that group.	Easy	Remembering	CO1
2.	Let G be a commutative group. Show that the subset S= $\{p \in G: p = p^{-1}\}$ forms a subgroup of G.	Medium	Remembering	CO1
3.	Show that in a group a left identity is also a right identity.	Difficult	Understanding	CO1
	Part C (Short Questions) (3-4 marks each)			

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course** : Engineering Mathematics I   **L: 3**
8. **Program** : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   **T: 1**
9. **Target** : 60%   **P: 0**
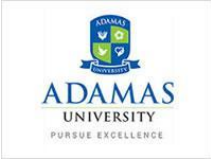   **C: 4**

1.	A relation ρ is defined on the set Z by "$a\,\rho\,b$ if and only if $a - b$ is divisible by 5". Then check whether ρ is an equivalence relation.	**Easy**	Understanding	CO1
2.	**Test** the convergence of the following series: $$\sum_{n=1}^{\infty} \frac{n!2^n}{n^n}$$	**Medium**	Understanding	CO1
3.	Show that $div\left(\vec{A} + \vec{B}\right) = div\vec{A} + div\vec{B}.$	**Difficult**	Remembering	CO1
Part D (Explanation Based Questions) (5 marks each)				
1.	If $\vec{r} = (acost)\hat{i} + (asint)\hat{j} + (at\,tan\alpha)\,\hat{k},$ then show that $\left[\frac{d\vec{r}}{dt}\,\frac{d^2\vec{r}}{dt^2}\,\frac{d^3\vec{r}}{dt^3}\right] = a^3 \tan tan\,\alpha\,.$	**Easy**	Remembering	CO1
2.	Show that a proper vector $\vec{r}$ has constant length if $\vec{r}.\frac{d\vec{r}}{dt} = 0.$	**Medium**	Remembering	CO1
3.	Examine the convergence of the following series, $$\sum_{n=1}^{\propto} \frac{n+2}{2(n+1)^2}$$	**Difficult**	Understanding	CO1
Part E (Questions Based on Reasoning) (5 marks each)				
1.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ and $r = |\vec{r}|$, show that $gradf(r) \times \vec{r} = \vec{0}\,.$	**Easy**	Remembering	CO1
2.	Find $div\vec{F}$ and $curl\vec{F}$, where $\vec{F} = grad\,(x^3 + y^3 + z^3 - 3xyz)$	**Medium**	Understanding	CO1
3.	Consider two sets A and B, with $\eta(A) = 20,\ \eta(B) = 30$ and $\eta(A\cap B) = 10$, where η (A) represents number of elements of a set A. Then find $\eta(A\cup B)$.	**Difficult**	Remembering	CO1
Part F (Application Based Questions) (5-10 marks each)				
1.	Examine the convergence of the following series,	**Easy**	Applying	CO1

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course** : **Engineering Mathematics I**   **L: 3**
8. **Program** : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target** : **60%**   **P: 0**
   C: 4

	(ii) $\frac{1.2}{3} + \frac{2.3}{5} + \frac{3.4}{7} + \dots$				
2.	Show that $\left[\vec{a} + \vec{b}\ \vec{b} + \vec{c}\ \vec{c} + \vec{a}\right] = 2[\vec{a}\vec{b}\vec{c}]$, where $\vec{a},\ \vec{b},\ \vec{c}$ are any three vectors.	**Medium**	Understanding	CO1	
3.	Consider the mapping $f:Z{\rightarrow}Z$ defined by $f(x) = x + 1,\ x{\in}Z$. Then check whether f is a bijective mapping.	**Difficult**	Remembering	CO1	
Part G (Short Notes) (5 marks each)					
1.	If $\vec{r} = \left(x\hat{i} + y\hat{j} + z\hat{k}\right)$ then find $div\ \vec{r}$ and $l\ \vec{r}$.	**Easy**	Understanding	CO1	
2.	Show that a proper vector $\vec{r}$ has constant magnitude if $\vec{r} \times \frac{d\vec{r}}{dt} = \vec{0}.$	**Medium**	Understanding	CO1	
3.	Check that the following is a group or not: Consider the structure $(Q',{*})$ where $Q' = Q - \{0\}$ and $* b = \frac{ab}{2}$, where $*$ is the binary operation defined on Q'.	**Difficult**	Applying	CO1	

School: **School of Engineering and Technology**   Department:**Computer Science and Engineering**
Course Code: **MTH11501**   Course Name: **Engineering Mathematics-I**
Program: **B.Tech**   Semester: **I**

Sl. No.	Question	Level of Difficulty (Easy/ Medium/ Difficult)	Knowledge Level (Bloom's Taxonomy)	Course Outcome (CO)
	UNIT-II			
Part A (Multiple Choice Questions) (1 mark each)				

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
          C: 4

1.	The extreme value of xy when $x^2 + xy + y^2 = 1$ is: i)-1 ii) 1 iii) -2 iv) 0	**Easy**	**Understanding**	**CO2**
2.	The function $f(x, y) = 4x^2y - y^2 - 8x^4$ has maximum at: i)(1,1) ii) (1,-1) iii) (0,0) iv) (-1,1)	**Medium**	**Understanding**	**CO2**
3.	The function $f(x, y) = 3x^3 + 4x^2y - 3xy^2 - 4y$ is neither maximum nor minimum at i)(1,1) ii) (0,0) iii) (1,-1) iv) (0,1).	**Difficult**	**Understanding**	**CO2**
	Part B (Definition/Naming Questions) (2 marks each)			
1.	What is the value of y_n if $y = e^{ax}$?	**Easy**	**Understanding**	**CO2**
2.	Define homogeneous function.	**Medium**	**Understanding**	**CO2**
3.	Demonstrate Lagrange's Mean Value theorem.	**Difficult**	**Understanding**	**CO2**
	Part C (Short Questions) (3-4 marks each)			
1.	Find the value of $\frac{Sin\,x}{x}$ using L'Hospital rule.	**Easy**	**Understanding**	**CO2**
2.	Find the value of $\frac{log\,x}{x}$.	**Medium**	**Understanding**	**CO2**
3.	Find the Jacobian $J\left(\frac{u,v}{x,y}\right)$ if $u = x - y$, $v = x^2 - y^2$.	**Difficult**	**Understanding**	**CO2**
	Part D (Explanation Based Questions) (5 marks each)			
1.	Find the value of y_n, if $y = Sinx\,Sin2x$.	**Easy**	**Understanding**	**CO2**
2.	If $z = e^{xy}$, $x = \sin\sin t$, $y = \cos\cos t$, calculate $\frac{dz}{dt}$ at $t = \frac{\pi}{2}$.	**Medium**	**Understanding**	**CO2**
3.	Recall whether the function $f(x, y) = \frac{x^3+y^3}{xy}$ is a homogeneous function or not.	**Difficult**	**Understanding**	**CO2**
	Part E (Questions Based on Reasoning) (5 marks each)			
1.	If $f(x, y) = x\,Cos\,y + y\,Sin\,x$, find $\frac{\partial^2 f}{\partial x \partial y}$.	**Easy**	**Understanding**	**CO2**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                                                        C: 4

2.	Find the value of $\frac{\partial f}{\partial x}$ at (1, 1) from definition for the function $f(x, y) = \frac{x+y}{x+y+1}$.	**Medium**	Understanding	CO2
3.	If $u = \left(\frac{x+y}{\sqrt{x}-\sqrt{y}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + \frac{1}{2}\cot\cot u = 0$.	**Difficult**	Understanding	CO2

Part F (Application Based Questions) (5-10 marks each)

1.	Find the maximum value of $f(x) = \left(\frac{1}{x}\right)^x$.	**Easy**	Understanding	CO2
2.	If $y = e^{mx}$, show that $\left(1 - x^2\right)y_{n+2} - (2n + 1)xy_{n+1} - \left(n^2 + m^2\right)y_n = 0$.	**Medium**	Understanding	CO2
3.	Find maxima or minima of $f(x, y) = x^3 + y^3 - 3x - 12y + 20$.	**Difficult**	Understanding	CO2

Part G (Short Notes) (5 marks each)

1.	If $u = f(x, y)$, $x = r\cos\cos\theta$, $y = r\sin\sin\theta$, show that $u_x^2 + u_y^2 = u_r^2 + \frac{1}{r^2}u_\theta^2$.	**Easy**	Understanding	CO2
2.	Show that the function defined by $f(x) = x^p(1 - x)^q$, $p, q \in N$ has a maximum value at $x = \frac{p}{p+q}$.	**Medium**	Understanding	CO2
3.	Find the value of a for which the following limit is finite: $\frac{(\sin\sin 2x + a\sin\sin x)}{x^3}$.	**Difficult**	Understanding	CO2

School: School of Engineering and Technology   **Department:Computer Science and Engineering**
Course Code: MTH11501   **Course Name: Engineering Mathematics-I**
Program: B.Tech   **Semester: I**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                    C: 4

Sl. No.	Question	Level of Difficulty (Easy/ Medium/ Difficult)	Knowledge Level (Bloom's Taxonomy)	Course Outcome (CO)
	UNIT-III			
	Part A (Multiple Choice Questions) (1 mark each)			
1.	The value of $\int\limits_{0}^{\frac{\pi}{2}} x\,dx$ is i) $\frac{128}{195}$ ii) $\frac{128}{315}$ iii) $\frac{128\pi}{315}$ iv) none	**Easy**	Understanding	CO3
2.	The value of $\int\limits_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x\,dx$ is i) $\frac{5}{32}$ ii) $\frac{7\pi}{16}$ iii) $\frac{5\pi}{16}$ iv) none	**Medium**	Remembering	CO3
3.	The value of $\int\limits_{0}^{2\pi} x\,dx$ is i) $\frac{32}{15}$ ii) $\frac{8}{3}$ iii) $\frac{32\pi}{15}$ iv) $\frac{8\pi}{3}$	**Difficult**	Applying	CO3
	Part B (Definition/Naming Questions) (2 marks each)			
1.	Define Type I improper integral? Mention the various cases of it and ways to solve them.	**Easy**	Applying	CO3
2.	Find: $\int \dfrac{x\,dx}{(x-a)^2(x-b)}$.	**Medium**	Understanding	CO3
3.	Find $\int\limits_{0}^{1} x^3(1-x^2)^{\frac{5}{2}}\,dx$.	**Difficult**	Applying	CO3
	Part C (Short Questions) (3-4 marks each)			
1.	Find the relation between Beta and Gamma function.	**Easy**	Understanding	CO3
2.	Find the volume generated by revolving the circle $x^2 + y^2 = a^2$ about X-axis .	**Medium**	Understanding	CO3

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7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**

          C: 4

3.	Show that $B(m,n) = B(n,m)$.	**Difficult**	Applying	CO3
	Part D (Explanation Based Questions) (5 marks each)			
1.	Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.	**Easy**	Applying	CO3
2.	Evaluate $\int\limits_0^\infty \frac{dx}{1+x^4}$.	**Medium**	Remembering	CO3
3.	Find the dimension of a rectangular box of maximum capacity whose surface area is given when the box is open at the top.	**Difficult**	Understanding	CO3
	Part E (Questions Based on Reasoning) (5 marks each)			
1.	Evaluate: $\int\limits_{-\infty}^{\infty} e^{-x^2}\, dx$	**Easy**	Applying	CO3
2.	Using reduction formula prove that $$\int\limits_0^{\pi/2} \sin^n x\, dx = \begin{cases} \dfrac{n-1}{n}\dfrac{n-3}{n-2}\ldots\dfrac{4}{5}\dfrac{2}{3} & \text{where } n \text{ is odd pos} \\ \dfrac{n-1}{n}\dfrac{n-3}{n-2}\ldots\dfrac{3}{4}\dfrac{1}{2}\dfrac{\pi}{2} & \text{where } n \text{ is even po} \end{cases}$$	**Medium**	Understanding	CO3
3.	Evaluate $\int\limits_0^1\int\limits_0^1 \dfrac{x-y}{(x+y)^3}\, dy\, dx$	**Difficult**	Applying	CO3
	Part F (Application Based Questions) (5-10 marks each)			
1.	Evaluate $\int\limits_0^a \int\limits_0^{\sqrt{a^2-y^2}} (x^2+y^2)\, dx\, dy$ by changing to polar coordinates.	**Easy**	Applying	CO3
2.	Evaluate $\int\limits_0^a\int\limits_0^x\int\limits_0^y x^3 y^2 z\, dx\, dy\, dz$.	**Medium**	Understanding	CO3

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course** : **Engineering Mathematics I**   **L: 3**
8. **Program** : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target** : **60%**   **P: 0**
     C: 4

3.	Find the constants p, q so that the surface $px^2 - qyz = (p+2)x$ is orthogonal to the surface $4x^2 y + z^3$ at the point $(1,2,-1)$.	**Difficult** **Remembering**		CO3
Part G (Short Notes) (5 marks each)				
1.	Show that $$\int_a^b (x-a)^m (b-x)^n \, dx = (b-a)^{m+n+1} \mathrm{B}(m+1, n+1),$$ $m, n > 0$.	**Easy** **Understanding**		CO3
2.	Prove that $\Gamma(n+1) = n\Gamma(n)$ where $$\Gamma(n) = \int_0^\infty e^{-x} x^{n-1} dx, \quad n > 0.$$ Hence evaluate $$\int_0^\infty e^{-3x} x^4 dx.$$	**Medium** **Understanding**		CO3
3.	Obtain a reduction formula for $$\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x \, dx$$ where $m, n > 1$ are positive integers.	**Difficult** **Applying**		CO3

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                          C: 4

School: School of Engineering and Technology Course Code: MTH11501 Program: B.Tech		Department:Computer Science and Engineering Course Name: Engineering Mathematics-I Semester: I		
Sl. No.	**Question**	**Level of Difficulty (Easy/ Medium/ Difficult)**	**Knowledge Level (Bloom's Taxonomy)**	**Course Outcome (CO)**
	UNIT-IV			
	Part A (Multiple Choice Questions) (1 mark each)			
1.	The order of the equation $\frac{dy}{dx} + 5y = 0$ is: i)0 ii)2 iii)1 iv)5.	**Easy**	Applying	CO4
2.	An equation is said to be exact if i)$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$ ii) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ iii) $\frac{\partial M}{\partial x} \neq \frac{\partial N}{\partial y}$ iv) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$	**Medium**	Applying	CO4
3.	The degree of the equation $\frac{dy}{dx} + 5y = 0$ is: i)0 ii)2 iii)1 iv)5.	**Difficult**	Applying	CO4
	Part B (Definition/Naming Questions) (2 marks each)			
1.	Define order of an ordinary differential equation.	**Easy**	Applying	CO4
2.	What is the degree of the differential equation $\left(\frac{d^2y}{d^2x}\right)^2 + y = \frac{dy}{dx}$.	**Medium**	Applying	CO4
3.	Solve $(D^2 + 4)y = 0$.	**Difficult**	Applying	CO4
	Part C (Short Questions) (3-4 marks each)			
1.	Solve $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^x$.	**Easy**	Applying	CO4
2.	Solve by method of variation of parameters: $\frac{d^2y}{dx^2} + a^2y = secax$.	**Medium**	Applying	CO4
3.	Solve $x\frac{dy}{dx} - 4y = x^6 e^x$	**Difficult**	Applying	CO4

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
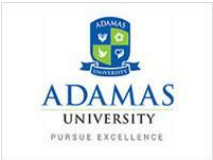9. **Target   : 60%**   **P: 0**
                                                                                             C: 4

Part D (Explanation Based Questions) (5 marks each)				
1.	What is the order of the differential equation $\left(\frac{d^2y}{d^2x}\right)^2 + y = \frac{dy}{dx}$	**Easy**	**Applying**	CO4
2.	Eliminate A and B to find the differential equation from the equation $y = Ae^{2x} + Be^{-2x}$.	**Medium**	**Applying**	CO4
3.	Find the integrating factor of $(x + 2y^3)\frac{dx}{dx} = y$.	**Difficult**	**Applying**	CO4
Part E (Questions Based on Reasoning) (5 marks each)				
1.	Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = e^{3x}$.	**Easy**	**Applying**	CO4
2.	Solve $x\frac{dy}{dx} + y = y^2 logx$.	**Medium**	**Applying**	CO4
3.	Solve by method of variation of parameters: $\frac{d^2y}{dx^2} + 9y = sec3x$.	**Difficult**	**Applying**	CO4
Part F (Application Based Questions) (5-10 marks each)				
1.	Solve the differential equation $\frac{dy}{dx} + \frac{1}{x}y = x^2$.	**Easy**	**Applying**	CO4
2.	Describe the general form of the Bernoulli's equation.	**Medium**	**Applying**	CO4
3.	Solve $x\frac{dy}{dx} + y = x^2y^2$.	**Difficult**	**Applying**	CO4
Part G (Short Notes) (5 marks each)				
1.	Check whether the following differential equation is exact: $$2y^2x \, dx + 2x^2y \, dy = 0$$	**Easy**	**Applying**	CO4
2.	Solve $\frac{dy}{dx} - \frac{tan \, tan \, y}{1+x} = (1 + x) \sec \, sec \, y \, e^x$.	**Medium**	**Applying**	CO4
3.	Check whether the following differential equation is exact and then solve it.	**Difficult**	**Applying**	CO4

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                       C: 4

	$\left(x^3 + xy^4\right)dx + 2y^3 dy = 0$			

Lecture Notes – Sample

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   Course Code: MTH11501
7. **Course**   : **Engineering Mathematics I**   L: 3
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   T: 1
9. **Target**   : **60%**   P: 0
                                                                   C: 4

Internal Assessment – Assignment I

Assignment Sample

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**

                                                                  C: 4

Class Test I

1. Show that $f_{xy}(0,0) \neq f_{yx}(0,0)$ for the following function:

   $$f(x,y) = \{\frac{xy^3}{x+y^2}, \quad (x,y) \neq (0,0) \; 0, \qquad (x,y) = (0,0) \,. \qquad\qquad 5$$

2. Check the continuity of the function

   $$f(x,y) = \{\frac{(x+2y)}{(2x+4y)}, \quad (x,y) \neq (0,0) \; \frac{1}{2} \,, \qquad\qquad (x,y) = (0,0) \quad \text{at } (0,0) \text{ point.} \qquad 2$$

3. If $z = f(x,y)$, $x = e^{2r} + e^{-2s}$, $y = e^{-2r} + e^{2s}$, then show that $\frac{\partial z}{\partial r} - \frac{\partial z}{\partial s} = 2\left(x\frac{\partial f}{\partial x} - y\frac{\partial f}{\partial y}\right)$.

   3

Class Test Answer Script

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   Course Code: MTH11501
7. **Course**   : **Engineering Mathematics I**   L: 3
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   T: 1
9. **Target**   : **60%**   P: 0
                                                              C: 4

SCHOOL OF ENGINEERING AND TECHNOLOGY
MID-SEMESTER EXAMINATION (THEORY)
(Academic Session: 2020 – 21, Semester Term: Sep 2020 – Mar 2021)

Name of the Program: B.Tech.   Semester: I
Stream: CSE/ME/CE/EE/ECE/Biotech
PAPER TITLE: Engineering Mathematics- I   PAPER CODE: MTH11501
Maximum Marks: 20   Time duration: 2
hours
Total No of questions: 6   Total No of Pages:

Instructions:
1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.
3. All parts of a Question should be answered consecutively.

Answer all the Groups
Group A
*(Answer **ALL** the questions)* $5 \times 1 = 5$

1. **a)** Verify whether the function $f(x) = x^2$ satisfies Rolle's Theorem on the interval [-1, 1].
   b) A relation ρ is defined on the set Z by "$a\rho b$ if and only if $a - b$ is divisible by 5"
   for $, b \in Z$. Examine whether ρ is reflexive and transitive relation on Z or not.
   c) Find y_n, when $y = log(x + a)$

   d) Prove that $curl(grad(f)) = \vec{0}$.
   e) Find the value of a for which the following limit is finite: $\frac{(sinsin\, 2x + asinsin\, x\,)}{x^3}$

Group B
*(Answer **ANY 3** questions)*
$3 \times 5 = 15$

3. If $y = Cos(logx)$, prove that $x^2 y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - 1)y_n = 0$.

4. Test the convergence of the following series:

Year: I

Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   : **Engineering Mathematics I**   **L: 3**
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   : **60%**   **P: 0**

                                                                   C: 4

(i) $\displaystyle\sum_{n=1}^{\infty} \frac{n!\,2^n}{n^n}$.

(ii) $\displaystyle\sum_{n=1}^{\infty} \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^{\frac{3}{2}}}$.   (

      $2.5 + 2.5)$

5. If $u = \left(\frac{x^3 + y^3}{x - y}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin\sin 2u$.

6. Show that $div\left(r^n \vec{r}\right) = (n + 3)r^n$, where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$. Hence show that
   $\nabla^2\left(r^n \vec{r}\right) = n(n + 3)r^{n-2}\vec{r}$.

***********END**********

Answer Script Sample

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course** : **Engineering Mathematics I**   **L: 3**
8. **Program** : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target** : **60%**   **P: 0**
   C: 4

Evaluation Sheet – Mid Semester

Registration Number	Roll Number	Name of the Student	Marks (20)
AU/2020/0004250	UG/02/BTCSE/2020/001	ALOK DUTTA	14.00
AU/2020/0004275	UG/02/BTCSE/2020/002	SUNANDA JANA	18.00
AU/2020/0004276	UG/02/BTCSE/2020/003	SUPRATIM TARUN NATH	18.00
AU/2020/0004451	UG/02/BTCSE/2020/004	ABHIPSIT BHATTACHARJEE	0.00
AU/2020/0004452	UG/02/BTCSE/2020/005	TIRUPATI SANYAL	0.00
AU/2020/0004462	UG/02/BTCSE/2020/007	SURAJ MAJUMDER	18.00
AU/2020/0004463	UG/02/BTCE/2020/002	ROHIT KUMAR SHIT	18.50
AU/2020/0004464	UG/02/BTCSE/2020/008	ARKADEEP CHATTERJEE	18.00
AU/2020/0004465	UG/02/BTECE/2020/001	ARYA PAUL	16.00
AU/2020/0004466	UG/02/BTCSE/2020/009	RITUSHNA ROY	16.50
AU/2020/0004467	UG/02/BTCSE/2020/010	NIRVIK SARKAR	0.00
AU/2020/0004468	UG/02/BTCSE/2020/011	PRIMA GIRI	19.00
AU/2020/0004471	UG/02/BTME/2020/001	SUMAN HAIT	17.00
AU/2020/0004472	UG/02/BTCSE/2020/012	SOUGATA DUTT	20.00
AU/2020/0004479	UG/02/BTCSE/2020/018	PROTYUSH KR CHATTERJEE	18.00
AU/2020/0004481	UG/02/BTEE/2020/001	SAPTARSHI BHATTACHARJEE	18.00
AU/2020/0004484	UG/02/BTME/2020/002	KOUSHIK GHOSH	18.00
AU/2020/0004486	UG/02/BTECE/2020/002	UTSAB BOSE	18.00
AU/2020/0004494	UG/02/BTCSE/2020/022	INDRANIL DAS	12.00
AU/2020/0004495	UG/02/BTME/2020/004	RAKESH KUMAR MOZUMDER	0.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course** : Engineering Mathematics I   **L: 3**
8. **Program** : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   **T: 1**
9. **Target** : 60%   **P: 0**
        C: 4

AU/2020/0004523	UG/02/BTCSE/2020/026	SAYAN DAS	0.00
AU/2020/0004529	UG/02/BTCSE/2020/027	ATANU PRAMANICK	7.00
AU/2020/0004530	UG/02/BTCSE/2020/028	AYAN KUMAR DAS	12.00
AU/2020/0004536	UG/02/BTCE/2020/003	ARJYA DAS	8.50
AU/2020/0004540	UG/02/BTCSE/2020/032	MD ALNAS HOSSAIN	15.50
AU/2020/0004549	UG/02/BTCSE/2020/033	VIVEK RAJ	16.00
AU/2020/0004555	UG/02/BTME/2020/005	REETAM MONDAL	17.50
AU/2020/0004557	UG/02/BTCSEAIML/2020/006	SOUMYADWIP MAITY	15.50
AU/2020/0004560	UG/02/BTEE/2020/002	ARKA JYOTI DAS	17.50
AU/2020/0004562	UG/02/BTCSE/2020/034	SOYATA SAHA	8.00
AU/2020/0004563	UG/02/BTCSEAIML/2020/009	ROHIT KUMAR ROY	9.00
AU/2020/0004565	UG/02/BTCSE/2020/035	NIKHIL KUMAR JHA	15.00
AU/2020/0004566	UG/02/BTECE/2020/004	ROHIT RAJ HALDER	0.00
AU/2020/0004569	UG/02/BTCSE/2020/036	NANDINI ROY	18.00
AU/2020/0004572	UG/02/BTCSEAIML/2020/011	SUBARNA BHOWMIK	17.50
AU/2020/0004578	UG/02/BTCSEAIML/2020/013	MD SOHAIL IRFAN	19.50
AU/2020/0004580	UG/02/BTCSE/2020/041	RAJA BANIK	18.50
AU/2020/0004583	UG/02/BTCSE/2020/042	ARSHAD RAJA	19.00
AU/2020/0004587	UG/02/BTCSECSF/2020/006	SABYASACHI PAUL	20.00
AU/2020/0004588	UG/02/BTCSEAIML/2020/015	CHANDRACHUR MAJHI	17.00
AU/2020/0004593	UG/02/BTCSE/2020/046	HRITIK KUMAR DUTTA	16.50
AU/2020/0004596	UG/02/BTCSE/2020/047	SHIULI MAHATA	17.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                                   C: 4

AU/2020/0004600	UG/02/BTBIOME/2020/002	RAVI LAL	15.50
AU/2020/0005281	UG/02/BTBIOME/2020/008	GAURAV GAIN	17.00
AU/2020/0005498	UG/02/BTBIOME/2020/003	SOUMYADEEP SAMADDAR	14.00
AU/2020/0005499	UG/02/BTBIOME/2020/004	SPANDAN BHATTACHAARYA	15.00
AU/2020/0005541	UG/02/BTCSE/2020/051	ANANYA MONDAL	0.00
AU/2020/0005542	UG/02/BTCSE/2020/052	ANIRBAN ROY	19.00

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 18.01.2021**

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                              C: 4

Planning for Remedial Classes – Mid Semester

Sl. No.	Name of Student	Roll No.	Reg. No.	Mid Sem Marks	Remedial Classes Held			Class test on the basis of Remedial Classes	End Sem Marks	Improvement (Y/N)
					Date	18.01.21	19.01.21			
					Venue	3103				
					Time	5:30-6:30	5:30-6:30			
1.	ATANU PRAMANICK			7		P	P		48.5	Y
2.	ARJYA DAS			8.5		P	P		45.5	Y
3.	SOYATA SAHA			8		P	P		23	N
4.	ROHIT KUMAR ROY			9		P	P		45	Y

Signature of HOD/ Dean   **Signature of Faculty**

Date: **Date: 20.01.2021**

6. **Name of the Faculty:** Dr. Avik Pradhan & Dr. Sudip Jana   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
          C: 4

Evaluation Sheet – Internal Assessment

Registration Number	Roll Number	Name of the Student	Internal Assessment (30)		
			Assignment	Class Test	Total
AU/2020/0004250	UG/02/BTCSE/2020/001	ALOK DUTTA			28.00
AU/2020/0004275	UG/02/BTCSE/2020/002	SUNANDA JANA			29.00
AU/2020/0004276	UG/02/BTCSE/2020/003	SUPRATIM TARUN NATH			27.00
AU/2020/0004451	UG/02/BTCSE/2020/004	ABHIPSIT BHATTACHARJEE			0.00
AU/2020/0004452	UG/02/BTCSE/2020/005	TIRUPATI SANYAL			0.00
AU/2020/0004462	UG/02/BTCSE/2020/007	SURAJ MAJUMDER			26.00
AU/2020/0004463	UG/02/BTCE/2020/002	ROHIT KUMAR SHIT			27.00
AU/2020/0004464	UG/02/BTCSE/2020/008	ARKADEEP CHATTERJEE			26.00
AU/2020/0004465	UG/02/BTECE/2020/001	ARYA PAUL			29.00
AU/2020/0004466	UG/02/BTCSE/2020/009	RITUSHNA ROY			26.00
AU/2020/0004467	UG/02/BTCSE/2020/010	NIRVIK SARKAR			0.00
AU/2020/0004468	UG/02/BTCSE/2020/011	PRIMA GIRI			26.00
AU/2020/0004471	UG/02/BTME/2020/001	SUMAN HAIT			26.00
AU/2020/0004472	UG/02/BTCSE/2020/012	SOUGATA DUTT			27.00
AU/2020/0004479	UG/02/BTCSE/2020/018	PROTYUSH KR CHATTERJEE			27.00
AU/2020/0004481	UG/02/BTEE/2020/001	SAPTARSHI BHATTACHARJEE			29.00
AU/2020/0004484	UG/02/BTME/2020/002	KOUSHIK GHOSH			29.00
AU/2020/0004486	UG/02/BTECE/2020/002	UTSAB BOSE			28.00
AU/2020/0004494	UG/02/BTCSE/2020/022	INDRANIL DAS			29.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                 C: 4

AU/2020/0004495	UG/02/BTME/2020/004	RAKESH KUMAR MOZUMDER			22.00
AU/2020/0004523	UG/02/BTCSE/2020/026	SAYAN DAS			0.00
AU/2020/0004529	UG/02/BTCSE/2020/027	ATANU PRAMANICK			26.00
AU/2020/0004530	UG/02/BTCSE/2020/028	AYAN KUMAR DAS			27.00
AU/2020/0004536	UG/02/BTCE/2020/003	ARJYA DAS			27.00
AU/2020/0004540	UG/02/BTCSE/2020/032	MD ALNAS HOSSAIN			27.00
AU/2020/0004549	UG/02/BTCSE/2020/033	VIVEK RAJ			26.00
AU/2020/0004555	UG/02/BTME/2020/005	REETAM MONDAL			27.00
AU/2020/0004557	UG/02/BTCSEAIML/2020/006	SOUMYADWIP MAITY			26.00
AU/2020/0004560	UG/02/BTEE/2020/002	ARKA JYOTI DAS			28.00
AU/2020/0004562	UG/02/BTCSE/2020/034	SOYATA SAHA			26.00
AU/2020/0004563	UG/02/BTCSEAIML/2020/009	ROHIT KUMAR ROY			24.00
AU/2020/0004565	UG/02/BTCSE/2020/035	NIKHIL KUMAR JHA			26.00
AU/2020/0004566	UG/02/BTECE/2020/004	ROHIT RAJ HALDER			24.00
AU/2020/0004569	UG/02/BTCSE/2020/036	NANDINI ROY			28.00
AU/2020/0004572	UG/02/BTCSEAIML/2020/011	SUBARNA BHOWMIK			27.00
AU/2020/0004578	UG/02/BTCSEAIML/2020/013	MD SOHAIL IRFAN			27.00
AU/2020/0004580	UG/02/BTCSE/2020/041	RAJA BANIK			26.00
AU/2020/0004583	UG/02/BTCSE/2020/042	ARSHAD RAJA			26.00
AU/2020/0004587	UG/02/BTCSECSF/2020/006	SABYASACHI PAUL			27.00
AU/2020/0004588	UG/02/BTCSEAIML/2020/015	CHANDRACHUR MAJHI			26.00
AU/2020/0004593	UG/02/BTCSE/2020/046	HRITIK KUMAR DUTTA			27.00

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                              C: 4

AU/2020/0004596	UG/02/BTCSE/2020/047	SHIULI MAHATA			26.00
AU/2020/0004600	UG/02/BTBIOME/2020/002	RAVI LAL			26.00
AU/2020/0005281	UG/02/BTBIOME/2020/008	GAURAV GAIN			27.00
AU/2020/0005498	UG/02/BTBIOME/2020/003	SOUMYADEEP SAMADDAR			28.00
AU/2020/0005499	UG/02/BTBIOME/2020/004	SPANDAN BHATTACHAARYA			27.00
AU/2020/0005541	UG/02/BTCSE/2020/051	ANANYA MONDAL			0.00
AU/2020/0005542	UG/02/BTCSE/2020/052	ANIRBAN ROY			27.00

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 01.03.2021**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**

                                                              C: 4

COURSE END SURVEY

INDIRECT ASSESSMENT

Sample format for Indirect Assessment of Course outcomes:

NAME: ARYA PAUL
ROLL NO.: UG/02/BTECE/2020/001
REG. NO.: AU/2020/0004465
COURSE: Engineering Mathematics I
PROGRAM: B.Tech CSE

Please rate the following aspects of course outcomes of **Engineering Mathematics I**

Use the scale 1-5 (Poor – Excellent)

Course Outcomes	Statement	1	2	3	4	5
CO1	Can you relate the concept of basic algebra and vector calculus in engineering science?					5
CO2	What is the basic concept of successive and partial derivative?					5
CO3	Can you apply fundamental concept of integral calculus in real life?					5
CO4	How you can apply the concept of ordinary differential equation in solving engineering problems?					5

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                        C: 4

INDIRECT ASSESSMENT CONSOLIDATION

<table>
<tr><td colspan="3" align="center">ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
ALL ENGINEERING DEPARTMENT
CO Indirect Assessment</td></tr>
<tr><td colspan="2">Programme: B.Tech
Batch: 2020-22</td><td>Academic Year:2020-21</td></tr>
<tr><td>Course Code & Name:</td><td>MTH11501</td><td>Engineering Mathematics I</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Course Outcome</td><td>Students Feed Back (5)</td><td>Attainment (100)</td></tr>
<tr><td align="center">CO1</td><td align="right">5</td><td align="right">100</td></tr>
<tr><td align="center">CO2</td><td align="right">5</td><td align="right">100</td></tr>
<tr><td align="center">CO3</td><td align="right">5</td><td align="right">100</td></tr>
<tr><td align="center">CO4</td><td align="right">5</td><td align="right">100</td></tr>
<tr><td colspan="2">Signature of HOD/Dean
Date:</td><td>Signature of Faculty
Date: 01.03.2021</td></tr>
</table>

6. **Name of the Faculty:** Dr. Avik Pradhan & Dr. Sudip Jana   **Course Code: MTH11501**
7. **Course**   : **Engineering Mathematics I**   **L: 3**
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   : **60%**   **P: 0**
                                                                           C: 4

End Semester Question Papers – Set 1

	ADAMAS UNIVERSITY
	END SEMESTER EXAMINATION (Academic Session: 2020 – 21)

Name of the Program:	B.Tech. (BME/CSE/ ECE/EE/ME/CE/Biotech)	**Semester:**	I
Paper Title:	Engineering Mathematics-I	**Paper Code:**	SMA41101
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	02
(Any other information for the student may be mentioned here)	1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Define monotonic increasing sequence.	R	CO1
2	What is the order of homogeneity for $f(x,y) = \frac{xy}{x+y}$	U	CO2
3	Find the value of $\int_0^{\frac{\pi}{4}} x \sin \sin x \, dx$.	AP	CO3
4	Define order of an ordinary differential equation.	AP	CO4
5	What is the degree of the differential equation $\left(\frac{d^2 y}{d^2 x}\right)^2 + y = \frac{dy}{dx}$.	AP	CO4
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Show that $grad(\varphi_1 + \varphi_2) = grad\varphi_1 + grad\varphi_2$.	R	CO1
(OR)			
6 b)	Show that $div(\vec{A} + \vec{B}) = div\vec{A} + div\vec{B}$.	R	CO1
7 a)	Find whether the following limit exist or not: $\frac{xy}{x^2+y^2}$	U	CO2
(OR)			
7 b)	Determine $\frac{\partial^2 z}{\partial x \partial y}$ for the function $z = xy^2 - x^2 y$.	U	CO2

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   : **Engineering Mathematics I**   **L: 3**
8. **Program**   : **B.Tech (BioMed/CSE/EE/ECE/CE/ME)** **T: 1**
9. **Target**   : **60%**   **P: 0**
                                                               C: 4

8 a)	Define the reduction formula of $\int Sin^n x\, dx$	AP	CO3
	(OR)		
8 b)	Find the value of $\int_0^{\frac{\pi}{4}} tan^n x\, dx$	AP	CO3
9 a)	Solve $\left(e^x siny + e^{-y}\right)dx + \left(e^x cosy - xe^{-y}\right)dy = 0$	AP	CO4
	(OR)		
9 b)	Solve $\left(D^2 + 4\right)y = 0$.	AP	CO4
10 a)	Demonstrate Rolle's theorem.	U	CO2
	(OR)		
10 b)	Find the Jacobian $J\left(\frac{u,v}{x,y}\right)$ if $u = x - y,\ v = x^2 - y^2$.	U	CO2

Group C
Answer All the Questions (7 x 5 = 35)

11 a)	If $\vec{r} = (acost)\hat{i} + (asint)\hat{j} + (at\,tan\alpha)\,\hat{k}$, then show that $\left[\frac{d\vec{r}}{dt}\ \frac{d^2\vec{r}}{dt^2}\ \frac{d^3\vec{r}}{dt^3}\right] = a^3 \tan tan\,\alpha$.	R	CO1
	(OR)		
11 b)	Show that a proper vector $\vec{r}$ has constant length if $\vec{r}.\frac{d\vec{r}}{dt} = 0$.	R	CO1
12 a)	Find the value of y_n, if $y = Sinx\, Sin2x$	U	CO2
	(OR)		
12 b)	Find the value of $\frac{e^{x-2}-1}{x-2}$ using L'Hospital rule.	U	CO2
13 a)	Evaluate $\int_0^{\frac{\pi}{2}} x\, dx$	AP	CO3
	(OR)		
13 b)	Evaluate $\int_0^1 \frac{x^7}{\sqrt{1-x^4}}dx$	AP	CO3
14 a)	Solve $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^x$.	AP	CO4
	(OR)		
14 b)	Solve by method of variation of parameters: $\frac{d^2y}{dx^2} + a^2 y = secax$.	AP	CO4
15 a)	If $u = \left(\frac{x+y}{\sqrt{x}-\sqrt{y}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + \frac{1}{2}cot\,cot\,u = 0$	U	CO2
	(OR)		
15 b)	Find the extreme values of $f(x,y) = x^3 + y^3 - 6xy$.	U	CO2
16 a)	Find the area of the surface generated by revolving the parabola $y^2 = 4ax$ about X-axis bounded by $x = a$.	AP	CO3
	(OR)		

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                              C: 4

16 b)	Find the volume generated by revolving the parabola $y^2 = 4ax$ about X-axis bounded by $x = a$.	AP	CO3
17 a)	Solve $x\frac{dy}{dx} - 4y = x^6 e^x$	AP	CO4
(OR)			
17 b)	Solve $x\frac{dy}{dx} + y = y^2 logx$.	AP	CO4

End Semester Question Papers - Set 2

<table>
<tr><td rowspan="2"></td><td colspan="4">ADAMAS UNIVERSITY
END SEMESTER EXAMINATION
(Academic Session: 2020 – 21)</td></tr>
<tr></tr>
<tr><td>Name of the Program:</td><td colspan="2">B.Tech. (BME/CSE/
ECE/EE/ME/CE/Biotech)</td><td>Semester:</td><td>I</td></tr>
<tr><td>Paper Title:</td><td colspan="2">Engineering Mathematics-I</td><td>Paper Code:</td><td>SMA41101</td></tr>
<tr><td>Maximum Marks:</td><td colspan="2">50</td><td>Time Duration:</td><td>3 Hrs</td></tr>
<tr><td>Total No. of Questions:</td><td colspan="2">17</td><td>Total No of Pages:</td><td>02</td></tr>
<tr><td>(Any other information for the student may be mentioned here)</td><td colspan="4">4. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
5. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
6. Assumptions made if any, should be stated clearly at the beginning of your answer.</td></tr>
</table>

Group A			
Answer All the Questions (5 x 1 = 5)			
1	What is the value of y_n if $y = e^{ax}$	U	CO2
2	What is the value of $lim (x, y) \to (2, 3) (x^2 + 2y)$	U	CO2
3	Find the value of $\int_0^5 xe^x dx$	AP	CO3

Year: I

Semester: I

6. **Name of the Faculty:** Dr. Avik Pradhan & Dr. Sudip Jana   **Course Code: MTH11501**

7. **Course** : Engineering Mathematics I   **L: 3**

8. **Program** : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   **T: 1**

9. **Target** : 60%   **P: 0**

    C: 4

4	What is the order of the differential equation $\left(\frac{d^2y}{d^2x}\right)^2 + y = \frac{dy}{dx}$	AP	CO4
5	Define monotonic decreasing sequence.	R	CO1
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Show that $curl\left(\vec{A} + \vec{B}\right) = curl\vec{A} + curl\vec{B}$.	R	CO1
(OR)			
6 b)	Show that $div\left(\varphi\vec{A}\right) = (grad\ \varphi).\vec{A} + \varphi div\vec{A}$.	R	CO1
7 a)	Find whether the following limit exist or not:$\frac{y}{x+y}$	U	CO2
(OR)			
7 b)	Determine $\frac{\partial^2 z}{\partial x \partial y}$ for the function $z = x^2 y - 2xy$.	U	CO2
8 a)	Define the reduction formula of $\int cos^n x dx$	AP	CO3
(OR)			
8 b)	Find the value of $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} cot^7 x\ dx$	AP	CO3
9 a)	Eliminate A and B to find the differential equation from the equation $y = Ae^{2x} + Be^{-2x}$.	AP	CO4
(OR)			
9 b)	Find the integrating factor of $\left(x + 2y^3\right)\frac{dx}{dx} = y$.	AP	CO4
10 a)	Demonstrate Lagrange's mean value theorem.	U	CO2
(OR)			
10 b)	Find the Jacobian $J\left(\frac{u,v}{x,y}\right)$ if $u = 2x - y,\ v = x^2 - xy$.	U	CO2
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ and $r = \|\vec{r}\|$, show that $gradf(r) \times \vec{r} = \vec{0}$.	R	CO1
(OR)			
11 b)	Show that a proper vector $\vec{r}$ has constant magnitude if $\vec{r} \times \frac{d\vec{r}}{dt} = \vec{0}$.	R	CO1
12 a)	If $y = e^{m\ sin^{-1}x}$, show that $\left(1 - x^2\right)y_{n+2} - (2n + 1)xy_{n+1} - \left(n^2 + m^2\right)y_n = 0$	U	CO2
(OR)			
12 b)	Find the value of $\frac{\partial f}{\partial x}$ at (1,1) from definition for the function $f(x, y) = x + yx + y + 1$	U	CO2
13 a)	Evaluate $\int_0^1 \frac{x^7}{\sqrt{1-x^4}}dx$	AP	CO3
(OR)			

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**

                                                                 C: 4

13 b)	Find the volume generated by revolving the parabola $y^2 = 4ax$ about X-axis bounded by $x = a$.	AP	CO3
14 a)	Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = e^{3x}$.	AP	CO4
(OR)			
14 b)	Solve by method of variation of parameters: $\frac{d^2y}{dx^2} + 9y = sec3x$.	AP	CO4
15 a)	If $u = \left(\frac{x+y}{\sqrt{x}-\sqrt{y}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + \frac{1}{2}\cot \cot u = 0$	U	CO2
(OR)			
15 b)	Find maxima or minima of $f(x, y) = x^3 + y^3 - 3x - 12y + 20$	U	CO2
16 a)	Evaluate $\int_0^{\frac{\pi}{2}} x\, dx$	AP	CO3
(OR)			
16 b)	Find the surface area generated by revolving the parabola $y^2 = 4ax$ about X-axis bounded by $x = a$.	AP	CO3
17 a)	Solve $x\frac{dy}{dx} + y = x^2y^2$.	AP	CO4
(OR)			
17 b)	Solve $\frac{dy}{dx} - \frac{\tan\tan y}{1+x} = (1 + x) \sec \sec y\ e^x$.	AP	CO4

Answer Script (Sample)

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                      C: 4

Evaluation Sheet (End Semester)

Registration Number	Roll Number	Name of the Student	Marks (50)
AU/2020/0004250	UG/02/BTCSE/2020/001	ALOK DUTTA	48.00
AU/2020/0004275	UG/02/BTCSE/2020/002	SUNANDA JANA	46.00
AU/2020/0004276	UG/02/BTCSE/2020/003	SUPRATIM TARUN NATH	45.50
AU/2020/0004451	UG/02/BTCSE/2020/004	ABHIPSIT BHATTACHARJEE	0.00
AU/2020/0004452	UG/02/BTCSE/2020/005	TIRUPATI SANYAL	0.00
AU/2020/0004462	UG/02/BTCSE/2020/007	SURAJ MAJUMDER	44.00
AU/2020/0004463	UG/02/BTCE/2020/002	ROHIT KUMAR SHIT	48.50
AU/2020/0004464	UG/02/BTCSE/2020/008	ARKADEEP CHATTERJEE	38.50
AU/2020/0004465	UG/02/BTECE/2020/001	ARYA PAUL	49.50
AU/2020/0004466	UG/02/BTCSE/2020/009	RITUSHNA ROY	43.00
AU/2020/0004467	UG/02/BTCSE/2020/010	NIRVIK SARKAR	0.00
AU/2020/0004468	UG/02/BTCSE/2020/011	PRIMA GIRI	44.50
AU/2020/0004471	UG/02/BTME/2020/001	SUMAN HAIT	40.00
AU/2020/0004472	UG/02/BTCSE/2020/012	SOUGATA DUTT	45.50
AU/2020/0004479	UG/02/BTCSE/2020/018	PROTYUSH KR CHATTERJEE	46.00
AU/2020/0004481	UG/02/BTEE/2020/001	SAPTARSHI BHATTACHARJEE	47.00
AU/2020/0004484	UG/02/BTME/2020/002	KOUSHIK GHOSH	49.00
AU/2020/0004486	UG/02/BTECE/2020/002	UTSAB BOSE	44.00
AU/2020/0004494	UG/02/BTCSE/2020/022	INDRANIL DAS	35.50
AU/2020/0004495	UG/02/BTME/2020/004	RAKESH KUMAR MOZUMDER	2.00

Year: I

Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                              C: 4

AU/2020/0004523	UG/02/BTCSE/2020/026	SAYAN DAS	0.00
AU/2020/0004529	UG/02/BTCSE/2020/027	ATANU PRAMANICK	48.50
AU/2020/0004530	UG/02/BTCSE/2020/028	AYAN KUMAR DAS	45.00
AU/2020/0004536	UG/02/BTCE/2020/003	ARJYA DAS	45.50
AU/2020/0004540	UG/02/BTCSE/2020/032	MD ALNAS HOSSAIN	47.00
AU/2020/0004549	UG/02/BTCSE/2020/033	VIVEK RAJ	42.00
AU/2020/0004555	UG/02/BTME/2020/005	REETAM MONDAL	46.50
AU/2020/0004557	UG/02/BTCSEAIML/2020/006	SOUMYADWIP MAITY	33.00
AU/2020/0004560	UG/02/BTEE/2020/002	ARKA JYOTI DAS	45.50
AU/2020/0004562	UG/02/BTCSE/2020/034	SOYATA SAHA	23.00
AU/2020/0004563	UG/02/BTCSEAIML/2020/009	ROHIT KUMAR ROY	45.00
AU/2020/0004565	UG/02/BTCSE/2020/035	NIKHIL KUMAR JHA	47.00
AU/2020/0004566	UG/02/BTECE/2020/004	ROHIT RAJ HALDER	33.50
AU/2020/0004569	UG/02/BTCSE/2020/036	NANDINI ROY	48.00
AU/2020/0004572	UG/02/BTCSEAIML/2020/011	SUBARNA BHOWMIK	47.00
AU/2020/0004578	UG/02/BTCSEAIML/2020/013	MD SOHAIL IRFAN	46.00
AU/2020/0004580	UG/02/BTCSE/2020/041	RAJA BANIK	46.00
AU/2020/0004583	UG/02/BTCSE/2020/042	ARSHAD RAJA	44.50
AU/2020/0004587	UG/02/BTCSECSF/2020/006	SABYASACHI PAUL	47.00
AU/2020/0004588	UG/02/BTCSEAIML/2020/015	CHANDRACHUR MAJHI	46.00
AU/2020/0004593	UG/02/BTCSE/2020/046	HRITIK KUMAR DUTTA	41.50
AU/2020/0004596	UG/02/BTCSE/2020/047	SHIULI MAHATA	35.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                                                                      C: 4

AU/2020/0004600	UG/02/BTBIOME/2020/002	RAVI LAL	47.00
AU/2020/0005281	UG/02/BTBIOME/2020/008	GAURAV GAIN	36.00
AU/2020/0005498	UG/02/BTBIOME/2020/003	SOUMYADEEP SAMADDAR	44.00
AU/2020/0005499	UG/02/BTBIOME/2020/004	SPANDAN BHATTACHAARYA	46.50
AU/2020/0005541	UG/02/BTCSE/2020/051	ANANYA MONDAL	0.00
AU/2020/0005542	UG/02/BTCSE/2020/052	ANIRBAN ROY	44.00

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 26.03.2021**

Planning for Remedial Classes – End Semester

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                                                             C: 4

Sl. No.	Name of Student	Roll No.	Reg. No.	End Sem Marks	Remedial Classes Held									Class test on the basis of Remedial Classes	SuppleExam Marks	Improvement (Y/N)
					Date											
					Venue											
					Time											
1.																
2.																

Signature of HOD/ Dean   **Signature of Faculty**

Date   **Date**

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0
                                                              C: 4

Consolidated Mark Statement

Registration Number	Roll Number	Name of the Student	Total Marks			
			Mid Semester (20)	Internal Assessment (30)	End Semester (50)	Total (100)
AU/2020/0004250	UG/02/BTCSE/2020/001	ALOK DUTTA	14.00	28.00	48.00	90.00
AU/2020/0004275	UG/02/BTCSE/2020/002	SUNANDA JANA	18.00	29.00	46.00	93.00
AU/2020/0004276	UG/02/BTCSE/2020/003	SUPRATIM TARUN NATH	18.00	27.00	45.50	90.50
AU/2020/0004451	UG/02/BTCSE/2020/004	ABHIPSIT BHATTACHARJEE	0.00	0.00	0.00	0.00
AU/2020/0004452	UG/02/BTCSE/2020/005	TIRUPATI SANYAL	0.00	0.00	0.00	0.00
AU/2020/0004462	UG/02/BTCSE/2020/007	SURAJ MAJUMDER	18.00	26.00	44.00	88.00
AU/2020/0004463	UG/02/BTCE/2020/002	ROHIT KUMAR SHIT	18.50	27.00	48.50	94.00
AU/2020/0004464	UG/02/BTCSE/2020/008	ARKADEEP CHATTERJEE	18.00	26.00	38.50	82.50
AU/2020/0004465	UG/02/BTECE/2020/001	ARYA PAUL	16.00	29.00	49.50	94.50
AU/2020/0004466	UG/02/BTCSE/2020/009	RITUSHNA ROY	16.50	26.00	43.00	85.50
AU/2020/0004467	UG/02/BTCSE/2020/010	NIRVIK SARKAR	0.00	0.00	0.00	0.00
AU/2020/0004468	UG/02/BTCSE/2020/011	PRIMA GIRI	19.00	26.00	44.50	89.50
AU/2020/0004471	UG/02/BTME/2020/001	SUMAN HAIT	17.00	26.00	40.00	83.00
AU/2020/0004472	UG/02/BTCSE/2020/012	SOUGATA DUTT	20.00	27.00	45.50	92.50
AU/2020/0004479	UG/02/BTCSE/2020/018	PROTYUSH KR CHATTERJEE	18.00	27.00	46.00	91.00
AU/2020/0004481	UG/02/BTEE/2020/001	SAPTARSHI BHATTACHARJEE	18.00	29.00	47.00	94.00
AU/2020/0004484	UG/02/BTME/2020/002	KOUSHIK GHOSH	18.00	29.00	49.00	96.00
AU/2020/0004486	UG/02/BTECE/2020/002	UTSAB BOSE	18.00	28.00	44.00	90.00
AU/2020/0004494	UG/02/BTCSE/2020/022	INDRANIL DAS	12.00	29.00	35.50	76.50
AU/2020/0004495	UG/02/BTME/2020/004	RAKESH KUMAR MOZUMDER	0.00	22.00	2.00	24.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                          C: 4

AU/2020/0004523	UG/02/BTCSE/2020/026	SAYAN DAS	0.00	0.00	0.00	0.00
AU/2020/0004529	UG/02/BTCSE/2020/027	ATANU PRAMANICK	7.00	26.00	48.50	81.50
AU/2020/0004530	UG/02/BTCSE/2020/028	AYAN KUMAR DAS	12.00	27.00	45.00	84.00
AU/2020/0004536	UG/02/BTCE/2020/003	ARJYA DAS	8.50	27.00	45.50	81.00
AU/2020/0004540	UG/02/BTCSE/2020/032	MD ALNAS HOSSAIN	15.50	27.00	47.00	89.50
AU/2020/0004549	UG/02/BTCSE/2020/033	VIVEK RAJ	16.00	26.00	42.00	84.00
AU/2020/0004555	UG/02/BTME/2020/005	REETAM MONDAL	17.50	27.00	46.50	91.00
AU/2020/0004557	UG/02/BTCSEAIML/2020/006	SOUMYADWIP MAITY	15.50	26.00	33.00	74.50
AU/2020/0004560	UG/02/BTEE/2020/002	ARKA JYOTI DAS	17.50	28.00	45.50	91.00
AU/2020/0004562	UG/02/BTCSE/2020/034	SOYATA SAHA	8.00	26.00	23.00	57.00
AU/2020/0004563	UG/02/BTCSEAIML/2020/009	ROHIT KUMAR ROY	9.00	24.00	45.00	78.00
AU/2020/0004565	UG/02/BTCSE/2020/035	NIKHIL KUMAR JHA	15.00	26.00	47.00	88.00
AU/2020/0004566	UG/02/BTECE/2020/004	ROHIT RAJ HALDER	0.00	24.00	33.50	57.50
AU/2020/0004569	UG/02/BTCSE/2020/036	NANDINI ROY	18.00	28.00	48.00	94.00
AU/2020/0004572	UG/02/BTCSEAIML/2020/011	SUBARNA BHOWMIK	17.50	27.00	47.00	91.50
AU/2020/0004578	UG/02/BTCSEAIML/2020/013	MD SOHAIL IRFAN	19.50	27.00	46.00	92.50
AU/2020/0004580	UG/02/BTCSE/2020/041	RAJA BANIK	18.50	26.00	46.00	90.50
AU/2020/0004583	UG/02/BTCSE/2020/042	ARSHAD RAJA	19.00	26.00	44.50	89.50
AU/2020/0004587	UG/02/BTCSECSF/2020/006	SABYASACHI PAUL	20.00	27.00	47.00	94.00
AU/2020/0004588	UG/02/BTCSEAIML/2020/015	CHANDRACHUR MAJHI	17.00	26.00	46.00	89.00
AU/2020/0004593	UG/02/BTCSE/2020/046	HRITIK KUMAR DUTTA	16.50	27.00	41.50	85.00
AU/2020/0004596	UG/02/BTCSE/2020/047	SHIULI MAHATA	17.00	26.00	35.00	78.00
AU/2020/0004600	UG/02/BTBIOME/2020/002	RAVI LAL	15.50	26.00	47.00	88.50
AU/2020/0005281	UG/02/BTBIOME/2020/008	GAURAV GAIN	17.00	27.00	36.00	80.00

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana** **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                      C: 4

AU/2020/0005498	UG/02/BTBIOME/2020/003	SOUMYADEEP SAMADDAR	14.00	28.00	44.00	86.00
AU/2020/0005499	UG/02/BTBIOME/2020/004	SPANDAN BHATTACHAARYA	15.00	27.00	46.50	88.50
AU/2020/0005541	UG/02/BTCSE/2020/051	ANANYA MONDAL	0.00	0.00	0.00	0.00
AU/2020/0005542	UG/02/BTCSE/2020/052	ANIRBAN ROY	19.00	27.00	44.00	90.00

Signature of Dean/HOD   **Signature of Faculty**

Date: **Date: 26.03.2021**

Year: I

Semester: I

6. Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana   Course Code: MTH11501
7. Course   : Engineering Mathematics I   L: 3
8. Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)   T: 1
9. Target   : 60%   P: 0

                                                                C: 4

CO ATTAINMENT – GAP ANALYSIS & REMEDIAL MEASURES

<table>
<tr><td colspan="7" align="center">ADAMAS UNIVERSITY, KOLKATA</td></tr>
<tr><td colspan="7" align="center">SCHOOL OF ENGINEERING & TECHNOLOGY</td></tr>
<tr><td colspan="7" align="center">ALL ENGINEERING DEPARTMENT</td></tr>
<tr><td colspan="7" align="center">CO ATTAINMENT - GAP ANALYSIS & REMEDIAL MEASURES</td></tr>
<tr><td colspan="3">Batch: 2020-22</td><td colspan="2"></td><td>Academic Year:</td><td>2020-21</td></tr>
<tr><td colspan="2" align="center">Course Code & Name</td><td colspan="2" align="center">Name of the Coordinator</td><td colspan="3" align="center">Year & Semester</td></tr>
<tr><td colspan="2" align="center">MTH11501 & Engineering Mathematics I</td><td colspan="2" align="center">Dr. Avik Pradhan & Dr. Sudip Jana</td><td colspan="3" align="center">I & I</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td>CO</td><td>Direct Assessment</td><td>Indirect Assessment</td><td>CO Attainment</td><td>Target</td><td>CO Attainment Gaps*</td><td>Action for Bridge the Gap</td><td>Target Modification</td></tr>
<tr><td>CO1</td><td>83.33333333</td><td>100</td><td>86.66666667</td><td>70</td><td>-16.66666667</td><td></td><td>80</td></tr>
<tr><td>CO2</td><td>83.33333333</td><td>100</td><td>86.66666667</td><td>70</td><td>-16.66666667</td><td></td><td>80</td></tr>
<tr><td>CO3</td><td>87.5</td><td>100</td><td>90</td><td>70</td><td>-20</td><td></td><td>80</td></tr>
<tr><td>CO4</td><td>87.5</td><td>100</td><td>90</td><td>70</td><td>-20</td><td></td><td>80</td></tr>
</table>

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 07.04.2021**

Year: I

        Semester: I

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course**   **: Engineering Mathematics I**   **L: 3**
8. **Program**   **: B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target**   **: 60%**   **P: 0**
                                             C: 4

CO-PO ATTAINMENT

ADAMAS UNIVERSITY, KOLKATA														
SCHOOL OF ENGINEERING & TECHNOLOGY														
ALL ENGINEERING DEPARTMENT														
CO-PO ATTAINMENT														
Programme:	B.Tech	Year & Sem:	I & I		Academic Year:	2020-21					Batch:		2020-22	
Course Code	Course Title	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
MTH21517	Quantitative Techniques for Management	Relationship	CO1,CO2, CO3, CO4	CO1, CO2, CO3, CO4	NA	NA	CO1, CO2, CO3, CO4	NA	NA	NA	NA	NA	NA	NA
		Mapping Value	3	3	NA	NA	3	NA	NA	NA	NA	NA	NA	NA
		Attainment	2.65	2.65	*	*	2.65	*	*	*	*	*	*	*

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 07.04.2021**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
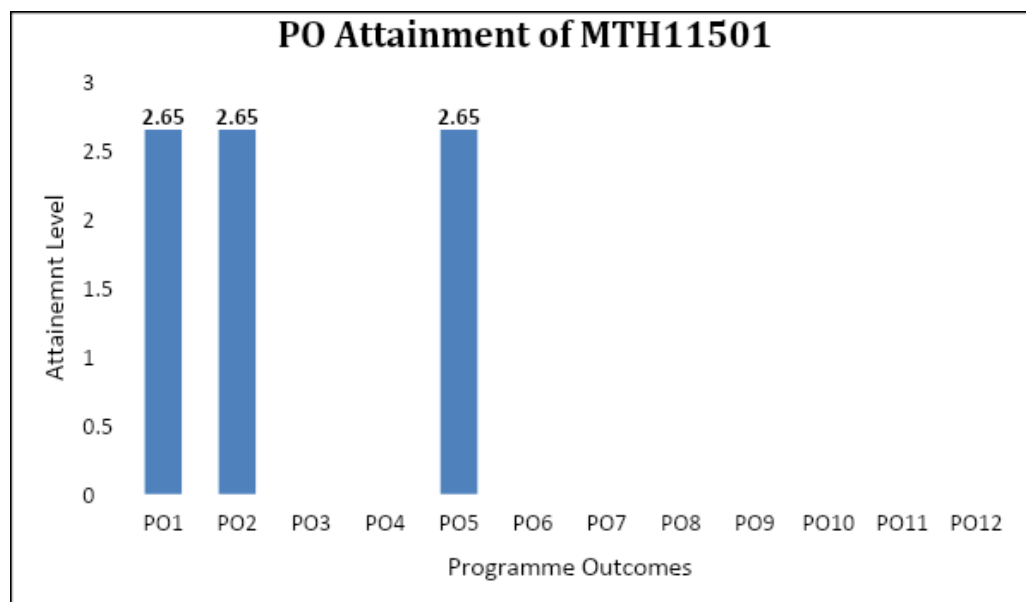8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                              C: 4

PO ATTAINMENT OF THE COURSE

Signature of HOD/Dean   **Signature of Faculty**

Date: **Date: 07.04.2021**

6. **Name of the Faculty: Dr. Avik Pradhan & Dr. Sudip Jana**   **Course Code: MTH11501**
7. **Course   : Engineering Mathematics I**   **L: 3**
8. **Program   : B.Tech (BioMed/CSE/EE/ECE/CE/ME)**   **T: 1**
9. **Target   : 60%**   **P: 0**
                                                                                              C: 4

INSTRUCTIONS FOR FACULTY

Instructions for Faculty

- Faculty should keep track of the students with low attendance and counsel them regularly.
- Course coordinator will arrange to communicate the short attendance (as per University policy) cases to the students and their parents monthly.
- Topics covered in each class should be recorded in the table of RECORD OF CLASS TEACHING (Suggested Format).
- Internal assessment marks should be communicated to the students twice in a semester.
- The file will be audited by respective Academic Monitoring and Review Committee (AMRC) members for theory as well as for lab as per AMRC schedule.
- The faculty is required to maintain these files for a period of at least three years.
- This register should be handed over to the head of department, whenever the faculty member goes on long leave or leaves the Colleges/University.
- For labs, continuous evaluation format (break-up given in the guidelines for result preparation in the same file) should be followed.
- Department should monitor the actual execution of the components of continuous lab evaluation regularly.
- Instructor should maintain record of experiments conducted by the students in the lab weekly.
- Instructor should promote students for self-study and to make concept diary, due weightage in the internal should be given under faculty assessment for the same.
- Course outcome assessment: To assess the fulfilment of course outcomes two different approaches have been decided. Degree of fulfillment of course outcomes will be assessed in different ways through direct assessment and indirect assessment. In Direct Assessment, it is measured through quizzes, tests, assignment, Mid-term and/or End-term examinations. It is suggested that each examination is designed in such a way that it can address one or two outcomes (depending upon the course completion). Indirect assessment is done through the student survey which needs to be designed by the faculty (sample format is given below) and it shall be conducted towards the end of course completion. The evaluation of the achievement of the Course Outcomes shall be done by analyzing the inputs received through Direct and Indirect Assessments and then corrective actions suggested for further improvement.
- **Submission Targets of Course Contents:**
    - o   **S. No. 1 to 8   : Before Starting the Course**
    - o   **S. No. 9 & 10   : After Mid Semester Examination**
    - o   **S. No. 11 to 18 : Immediately After End Semester Examination**
    - o   **S. No. 19 to 22 : After Declaration of Result of the Course**