SNGCE
Beyond Engineering
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SREE NARAYANA GURUKULAM
COLLEGE OF ENGINEERING
Approved by AICTE and affiliated to A.P.J. Abdul Kalam
Technological University & Mahatma Gandhi University
(Managed by Sree Narayana Gurukulam Charitable Trust
Promoted by SNDP Yogam, Kunnathunadu Union)

Sree Narayana Gurukulam College of Engineering, Kadayiruppu

SNGCE/AD/B-1/FL041

28/11/2022

NOTICE

This is to inform all concerned that the 2nd internal examinations to S3, S5 & S7 students will be conducted from 12th December 2022 to 14th December 2022. Detailed Time Table will be published soon.

14.06.23
PRINCIPAL

Copy to:-

1. Reception – Website & to circulate among S3, S5 & S7 groups
2. File

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COLLEGE OF ENGINEERING
Approved by AICTE and affiliated to A.P.J. Abdul Kalam
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Promoted by SNDP Yogam, Kunnathunadu Union)

Sree Narayana Gurukulam College of Engineering, Kadayiruppu

SNGCE/AD/B-1/FL041 13/01/2023

NOTICE

This is to inform all concerned that the 2nd internal examinations to the 1st year students will be conducted on 27th, 30th and 31st January 2023. Detailed Time Table will be published soon.

14.06.23
PRINCIPAL

Copy to:-

1. Reception – Website & to circulate among 1st year student groups
2. File

Kadayiruppu P.O., Kolenchery, Ernakulam Dist, Kerala, Pin - 682 311
Tel : 0484 2597800 (30 Lines), Website : www.sngce.ac.in, E-Mail : info@sngce.ac.in

25/3/2023

NOTICE

First internal examination of S4 ,S6 & S8 B.Tech is scheduled to be conducted from 3/4/2023 to 5/4/2023. Concerned staff are requested to submit the question papers to the department coordinators on or before 30/3/2023.

NB : Minor/Honor exams also to be conducted in the same week during the respective periods.

Copy to:

1. All HODs
2. Exam cell
3. File
4. Circulation among staff

25.03.23
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SREE NARAYANA GURUKULAM COLLEGE OF ENGINEERING

FIRST INTERNAL EXAM - APRIL 2023

TIMETABLE

SEMESTER 6

DAY	DATE	TIME	BRANCH	SUBJECT
MON	3/4/2023	9.15 am-11.15 am	CE	STRUCTURAL ANALYSIS – II
			ME	HEAT & MASS TRANSFER
			EEE	LINEAR CONTROL SYSTEM
			ECE	ELECTROMAGNETICS
			CSE	COMPILER DESIGN
			NASB	SHIP DESIGN I
		2.15 pm - 4.15 pm	CE	INDUSTRIAL ECONOMICS & FOREIGN TRADE
			ME	MANAGEMENT FOR ENGINEERS
			EEE	MANAGEMENT FOR ENGINEERS
			ECE	MANAGEMENT FOR ENGINEERS
			CSE	INDUSTRIAL ECONOMICS & FOREIGN TRADE
			NASB	MANAGEMENT FOR ENGINEERS
TUE	4/4/2023	9.15 am-11.15 am	CE	ENVIRONMENTAL ENGINEERING I
			ME	DYNAMICS & DESIGN OF MACHINES
			EEE	POWER SYSTEM II
			ECE	VLSI CIRCUIT DESIGN
			CSE	COMPUTER GRAPHICS AND IMAGE PROCESSING
			NASB	STRENGTH OF SHIPS II
		2.15 pm - 4.15 pm	CE	DESIGN OF HYDRAULIC STRUCTURES
			ME	ADVANCED MANUFACTURING ENGINEERING
			EEE	POWER ELECTRONICS
			ECE	INFORMATION THEORY AND CODING
			CSE	ALGORITHM ANALYSIS AND DESIGN
			NASB	MARINE ENGINEERING
WED	5/4/2023	9.15 am-11.15 am	CE	ADVANCED CONCRETE TECHNOLOGY
			ME	NON DESTRUCTIVE TESTING
			EEE	RENEWABLE ENERGY SYSTEM
			ECE	DIGITAL IMAGE PROCESSING (ELECTIVE 1)
			CSE	ELECTIVE I (DATA ANALYTICS/ FOUNDATIONS OF SECURITY IN COMPUTING)
			NASB	MATERIAL SCIENCE

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SNG COLLEGE OF ENGINEERING * KADAYIRUPPU KOLENCHERY 682 311

SREE NARAYANA GURUKULAM COLLEGE OF ENGINEERING

SECOND INTERNAL EXAM - DEC 2022

TIMETABLE

SEMESTER VII

DAY	TIME	BRANCH	SUBJECT
12/12/2022 Monday	9.15 am-11.15 am	CE	Design of Steel Structures
		ME	Design of Machine Elements
		EEE	ADVANCED CONTROL SYSTEMS
		ECE	MICROWAVES & ANTENNAS
		CSE	ARTIFICIAL INTELLIGENCE
		NASB	Ship Design II
	2.15 pm - 4.15 pm	CE	Industrial Safety Engineering
		ME	
		EEE	
		ECE	
		CSE	
		NASB	
13/12/2022 Tuesday	9.15 am-11.15 am	CE	Construction Planning & Management
		ME	Operations Management
		EEE	ELECTRIC DRIVES
		ECE	COMPUTER NETWORKS
		CSE	ELECTIVE II (CLOUD COMPUTING, SECURITY IN
		NASB	Ship production
	2.15 pm - 4.15 pm	CE	Open Elective
		ME	
		EEE	
		ECE	
		CSE	
		NASB	

06.12.22

6/12/2022

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BTECH FIRST INTERNAL EXAM HALL ARRANGEMENT
(03/04/2023 FN & AN)

S4			
CLASS	ROLL NO	HALL NO	TOTAL NO
C4	1..19	W142	19
E4	1..13	W159	13
L4	1..20	W148	20
	21..31	W152	11
M4	1..20	W147	20
N4	1..20	W153	20
	21..40	W154	20
R4A	1..48	W242	48
R4B	1..52	W241	52

S6			
CLASS	HALL NO	ROLL NO	TOTAL NO
C6	W155	1..16	16
E6	W242	1..5	5
L6	W143	1..18	18
M6	W241	1..14	14
N6	S139	1..20	20
	S137	21..37	17
R6A	W142	1..20	20
	W143	21..40	20
R6B	S139	1..20	20
	S137	21..41	21

S8			
CLASS	HALL NO	ROLL NO	TOTAL NO
C8	W147	1..20	20
E8	W241	1..10	10
L8	W159	1..12	12
M8	W155	1..20	20
	W159	21..31	11
N8	W245	1..47	47
R8A	W148	1..23	20
	W152	24-43	20
R8B	W153	1..20	20
	W154	21..37	17

29.03.23
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KADAYIRUPPU
KOLENCHERY
682 311

BTECH FIRST INTERNAL EXAM HALL ARRANGEMENT
(04/04/2023 FN & AN)

S4			
CLASS	ROLL NO	HALL NO	TOTAL NO
C4	1..19	W142	19
E4	1..13	W159	13
L4	1..20	W148	20
	21..31	W152	11
M4	1..20	W147	20
N4	1..20	W153	20
	21..40	W154	20
R4A	1..48	W242	48
R4B	1..52	W241	52

S6			
CLASS	HALL NO	ROLL NO	TOTAL NO
C6	W155	1..16	16
E6	W242	1..5	5
L6	W143	1..18	18
M6	W241	1..14	14
N6	S139	1..20	20
	S137	21..37	17
R6A	W142	1..20	20
	W143	21..40	20
R6B	S139	1..20	20
	S137	21..41	21

S8			
CLASS	HALL NO	ROLL NO	TOTAL NO
C8	W147	1..20	20
E8	W241	1..10	10
L8	W159	1..12	12
M8	W155	1..20	20
	W159	21..31	11
N8	W245	1..47	47
R8A	W148	1..23	20
	W152	24-43	20
R8B	W153	1..20	20
	W154	21..37	17

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BTECH FIRST INTERNAL EXAM HALL ARRANGEMENT (05/04/2023 FN)

S4			
CLASS	ROLL NO	HALL NO	TOTAL NO
C4	1..19	W142	19
E4	1..13	W152	13
L4	1..20	W148	20
	21..31	W241	11
M4	1..20	W147	20
N4	1..20	W152	20
	21..40	W153	20
R4A	1..48	W241	48
R4B	1..52	W242	52

S6			
CLASS	HALL NO	ROLL NO	TOTAL NO
C6	W147	1..16	16
E6	W242	1..5	5
L6	W143	1..18	18
M6	W241	1..14	14
N6	W148	1..20	20
	W153	21..37	17
R6A	W142	1..20	20
	W143	21..40	20
R6B	W245	1..41	41

29.03.23

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BTECH FIRST INTERNAL EXAM HALL ARRANGEMENT (05/04/2023 AN)

S4			
CLASS	ROLL NO	HALL NO	TOTAL NO
C4	1..19	W142	19
E4	1..13	W152	13
L4	1..20	W148	20
	21..31	W241	11
M4	1..20	W147	20
N4	1..20	W152	20
	21..40	W153	20
R4A	1..48	W241	48
R4B	1..52	W242	52

29.03.23

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SREE NARAYANA GURUKULAM COLLEGE OF ENGINEERING
FIRST INTERNAL EXAM -APRIL 2023
INVIGILATION DUTY

	SI.NO	NAME	3/4/2023		4/4/2023		5/4/2023	
			FN	AN	FN	AN	FN	AN
SH	1	Dr.Vijesh V V	D			D		
	2	Beena T. Balan						
	3	Gisha G.R		D	D		D	
	4	Remya C Soman	D			D	D	
	5	Reji P R						
	6	Silgy EG	D				D	
	7	Jitha T S		D	D			
	8	Dr. Hitha H						
	9	Ajisha Vijayan						
	10	Avarachan M P		D	D			D
EEE	11	Saritha Sathyan		D	D			
	12	Shemi P A	D			D		
	13	Loveleen K V		D		D		
	14	Smitha N P	D			D		
	16	Brinta N R				D	D	
	17	Aruna T A	D		D		D	
	18	Aleena Joseph		D				
CSE	19	Dr.Vidhya P M						
	20	Saini Jacob Soman			D		D	
	21	Sindhu M.P	D		D			
	22	Anil C. B		D	D			
	23	Nimmi M K	D			D	D	
	24	Nisha P K		D	D			
	25	Shimi P S	D			D	D	
	26	Divya K S		D	D			
	27	Dhakshu Sivan	D			D	D	
	28	Archana P S		D	D			D
	29	Ansu Miriam Varkey	D			D		D
ME	30	Rajesh Kumar R		D	D		D	
	31	Prashanth K	D		D			
	32	Abhilash P S	D			D		
	33	Jobin Joy		D	D		D	
	34	Vysakh R Pillai				D		
	35	Joe Joy Olickal		D	D			
	36	Hari Vijayan					D	
ECE	37	Seena George	D			D		D
	38	Divya S		D	D		D	
	39	Prathibha Varghese	D			D		
	40	Nitha S Unni		D	D			
	41	Soumya A.M.						
	42	Neethu Bhaskaran	D			D		
CE	43	Binu.P				D		
	44	Manju P.M		D	D			
	45	Ajith A V	D			D		
	46	Jeena Mathew		D		D		
	47	Shilpa Sara Kurian		D				D
	48	Ananya John	D					
NASB	49	Anandhu C B	D			D	D	
	50	Rohit K Anand		D	D			D

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B.Tech. SECOND INTERNAL EXAMINATION FEB 2022

INVIGILATORS REPORT

Date : 21/2/2022

Hall	Invigilator	Reporting time	Signature	Remarks
W142	Smitha ND	9.00		
W143	Divya S.	9.00		
W147	DHANYA SIVAN	9.00		
W148	Lovaleen K.V	9:00		Shemi PA's Duty.
W152	Nimmi .M.K	9.00		
W153	Alen John	9.01		
W154	Anna Rajan	9:00		
W155	Geeta G.R	9.00		
W159	Reji P.R	9.00		
E 121	JOBIN JOY	9:00		
E122	Jasilla. KS.	9.05		
E124	Reshmi. P.R	9.05		
E125	Shilpa Sam	9.03		
S139	Anandhu CB	9.09		
E223	Nithin S Unni	9.09		
E224	Tintu	9.10		

SNG COLLEGE OF

R8B 21-37
N4 21-40

R8.B

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN Hall: W154

Attendance Sheet

Roll No.	Name	Signature
21	Safna Azeez	Safna
22	Sam Saju	[signature]
24	Sandra. P.B	Sajuth
25	Shine Suresh	Shine
26	Shreya Gireesh	Shreya
29	Sooryadas B	Sooryadas
30	Sreerag K	[signature]
31	Sukanya M.D	[signature]
32	Theertha M. Shylaja Shaju	theertha M Shaju
33	Thomas George	[signature]
34	Varun Pradeep	[signature]
36	Vishnunath. M.S	[signature]
37	Yadhukrishna P.K	[signature]

R_8^D => 23, 27, 29, 35, => Absent

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N4

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 3/4/23 FN Hall: W154

Attendance Sheet

Roll No.	Name	Signature
21.	Fathima hiba	
22.	Ganesh A Nair	
23	Govind KR	
24	Nisa Muneer A	
26	Jeni Justin	
27	Jijosh Jose	
28	Jismon Martin	
29	JOYEL JOMON	
30	JUSTIN GEORGE	
31	Karthik R	
32	Mervin Sankar V	
33	Muhammed Afeen	
34	← ABSENT →	
35	Nesja KA	
36.	Nimra Rijas	
37.	Ramjith K	
38	Sadasivanadh K Sunil	
39	Shibila P S	
40.	OM Suryavanshi	

N4 => 25, 34 => Absent

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M8 21-31
E4 1-13
L8 1-12

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN **Hall:** W159

Attendance Sheet

	Roll No.	Name	Signature
M8	21	← ABSENT →	
	22	Sivaprakash K.D.	
	23	SREEHARI S	
	24	Sreejith MV	
	25	Thanooja M	
	26	← ABSENT →	
	27	Vishnu V Anil	
	28	Vysakh C V	
	29	← ABSENT →	
	30	Abin Oweph	
	31	← ABSENT →	
L8	1	Anandakrishnan	
	2	Arjun Sudharsan	
	3	Ashwin Shaji	
	4	Devakrishna Deep	
	5	Edric Thomas	
	6	Elana Varghese George	
	7	← ABSENT →	
	8	Parvathi K.G	
	9	Rajalakshmi V.S NCW	
	10	← ABSENT →	
	11	Saeelakshmi Somasekharan	
	12	Vishnu S	
E4	1	Abhijith P.V	
	2	Antony Varghese	
	3	Bhavana Babu	

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
4	Cristo Kuriakose	
5	Gayathri Arayalkandy	
6	Gopika S. Nair	
7	Gouri Rajeev	
8	Hiba Mustafa	
9	Krishnaveni P S	
10	Sivendu Krishna	
11	Sreelakshmi Babu	
12	Vaishnavi K.	
~~13~~	~~Sreelakshmi Babu~~	
13	Alwin Denny	
~~15~~		

Sdgg E-G

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SNG COLLEGE OF ENGINEERING KADAYIRUPPU KOLENCHERY

CG 1-16
M8 1-20

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN **Hall:** W155

Attendance Sheet

M8

Roll No.	Name	Signature
1	Abhiram. N. Sabu	
2	Abhishek Baby	
3	Ajay. Rajendran	
4	Amal Sajeed	
5	Anirudh Gopikrishna	
6	ANOOP VARKEY	
7	← ABSENT →	
8	ARJUN V.P	
9	← ABSENT →	
10	Athul S. Komath	
11	Chando Prasad	
12	Cristy Robin	
13	Deekshithdeva	
14	GIRISANKER B	
15	← ABSENT →	
16	Harikrishnan. A.R	
17	← ABSENT →	
18	Kiran. S	
19	Pranav. J	
20	Riyas Jaleel	

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

L 4

Roll No.	Name	Signature
21	Jinjol Thompy	
22	JOHN SIMON SHOBY	
23	Krishna Priya v s	
24	Martin. k . Jacob	
25	Nafshana Shirin H.N	
26.	Nandana. Rajesh	
27	Nidha.P	
28	Poornima Mahesh	
29	SACHIN G KRISHNA	
30	Shahanas N.S	
31	T.S Aleenamol	

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Shinu P.S.

R&A 24-43
L4 21-31

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN **Hall:** W152

Attendance Sheet

Roll No.	Name	Signature
24	Bincy yohannan	
	ABSENT	
26	C M Thajudheen	
27	CP Sivakumar	
28	Eldho Sunny	
29	Emal Anand · P. Martin	
30	Evin John	
	ABSENT	
	ABSENT	
33	Gladsy Joshy	
34	Harikrishnan R	
35	Hrishikesh TS	
36	Jayanth. K. John	
37	Jerson Varughese	
38	ABSENT	
39	Archa Sudhakaran	
40	Arya KV	
41	CV Anandhraman	
42	GOPIKA · M·S	
43	Sandra Sunil	

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

N4

Roll No.	Name	Signature
01	Aarian - K	[signature]
02	Abhith K S	[signature]
03	Abijith K Vinod	[signature]
04	Achyutan J.P	[signature]
05	Adithyanath.S	[signature]
06	AGNA C. RAJAN	[signature]
07	AKASH ASHOK	[signature]
08	AKSHAYA PRAVEECH	[signature]
09	——————→	Absent ←
10	AKSHAY Dimple	[signature]
11	Alby K. Sam.	[signature]
12	Ammuhammed Faisal	[signature]
13	Ananthapadmanabhan	[signature]
14	Arjun Suresh	[signature]
15	Arjun Vidyadharan	[signature]
16	Asish krishna Prem	[signature]
17	——————→	Absent ←
18	Davis George	[signature]
19	Devan Parameswaran	[signature]
20.	——————→	Absent ←

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[signature]

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R&B 1-20
N4 1-20

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** W153

Attendance Sheet R&B

Roll No.	Name	Signature
1	Jeswin Antony Perumbo	
2	Jiya M A	
3.	JOEL ELDO	
4.	Justin Jacob	
5		Absent
6.	Midhunraj C	
7.	Mighayel A.S	
8	Mohit. A.A	
9.	Mohammed Hanhan	
10	Manduta James	
11.	Muhammed Arshad	
12	NANDU V NAIR	
13	NAVYA NARAYANAN	
14	Neha Joy	
15	Niranjan Ravi	
16	Preguth Jayan	
17	Ratu Reji	
18	Robin Rajan	
19	ROSHAN P AJITH	
20	Sabik	

Absentees: R&B - 5

N4 - 9, 17, 20

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SNG COLLEGE OF ENGINEERING KADAYIRUPPU

L4 (1-20)

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
1	Abdusaad Salaja O	
2	Abhishek Kabudbalan	
3	Adila Amrath	
4.	Adithyd Prasad	Adithyd
5	AJFAR T.A	
6	Akshaya. T.R	
7.	Alshay Rajeev	
8.	Alan Joby	
9.	Ananthu Krishna. M	
10.	Arjun. V.S	
11.	Arshak Rehuman.S	
12.	Arun C.S	
13.	Asna Sidhique	
14	BASIL MATHAI	
15	DEVICHANDANA	
16	Dilna T K	
17.	Drishya Ramesh	
18.	Farsana. Baiju	
19.	Fathima Nourin	
20	Gopika M. Sivaraj	

(All present)

Ajith AV

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R&A 1-23
L4 1-20

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** W148

Attendance Sheet

Roll No.	Name	Signature
1	Absent	
2	Abhiram.A	
3	AISHA M.A	
4	AISWARYA V.B	
5	Ajith Santhosh	
6	Alias Benny	
7	Alvin Joy	
8	Amal Basheer	
9	Anandbakrishnan G	
10	Absent	
11	Andriya Jayan	
12	Ardra Biju	
13	Ardra Unni	
14	Absent	
15	Arjun MR	
16	Arya Santhosh	
17	Aswanth Viswanathan	
18	Aswin Baiju	
19	Aswin Gopakumar	
20	Athresh	
21	Absent	
22	Basil Lenin	
23		

1, 5, 11, 15, 22 (Absentees)

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C8

C8 · 1-20
M4 1-20

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** W147

Attendance Sheet

Roll No.	Name	Signature
1	Akshaya	
2.	Amitha Rose Babu	
3.	Anisa Saju	
4.	Anjana Manoj	
5.	Ansu Johny	
6.	Gokul KP	
7.	Gokul Sathyan.	
8.	Gopika Sajan	
9.	HARIKRISHNA S	
10.	ABSENT	
11.	KARTHIK UNNI	
12.	Keerthana V Sunil	
13.	Keerthana Vinod	
14.	Maria Denita Teresa	
15.	Reshma Ramesh	
16.	Shamil Raj S R	
17.	SILPA T S	
18.	Sreedha A Baiju	
19	Vishnu Vigil	
20	ABSENT	

SINDHU M P

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MA

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
1	Abhijith Ajayan	
2	ABSENT	
3	Adithyan Biju	
4	Alen Baby	
05	Amruthraj B N	
06	Ashik Manoj	
07	Indrajith N. A	
08	Indrajith S	
09	Jaisil Lal	
10	Jagadamakrishnan T	
11	ABSENT	
12	Muhammed Ameen T.A	
13	Muhammed Insaf. V.M	
14	Sagar shoby	
15	Sidharth P Sudheesh	
16	Sneha K.S	
17	Sreeraj P	
18	Vaadu krishnan k.R	

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SREE NARAYANA GURUKULAM COLLEGE OF ENGINEERING

RGA 1-20
C4 1-19

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN Hall: W142

Attendance Sheet

Roll No.	Name	Signature
1	← AB	→
2	Abhijith K B	AKB
3	Abhimanyu V. M	AVM
4	Abhinav P S	[illegible]
5	Abhiram K. Rajan	[illegible]
6	← AB	→
7	← AB	→
8	Adarsh Anil	Adarsh
9	Adheena Dev	Adh
10	Aiswarya Binu	Aswh
11	AJAY JOY	Ajay
12	Ajin Johnson	[illegible]
13	Akshay Shaj	[illegible]
14	Alan Tomy	[illegible]
15	Ammu Vijayan	[illegible]
16	Anagha P	Anagha
17	Anandha Krishnan C.A	[illegible]
18	Anandhu Saji	[illegible]
19	Anandu Ajithkumar	[illegible]
20	Ananya Santhosh	[illegible]
1	Adithya Vinod kumar	[illegible]
2	Agna V. Paulson	[illegible]
3	Akshara. M	[illegible]
4	Akshay. J	[illegible]
5	← Akshay. V Raj AB	→

R6A

C4

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 3/4/23 FN Hall: W142

Attendance Sheet

Roll No.	Name	Signature
6	← AB →	
7	Ashitha K.T	
8	Ashna R.B	
9	Atheendra Bose.N	
10	Bibitha Babu	
11	Devanandana shibu	
12	Fidha Sirajj	
13	Krishnapriya Shibu	
14	Navya Balakrishnan	
15	~~Rohith Shibu~~ AB	
16	← AB →	
17	Sreelakshmi N.S	
18	Vandana S	
19	Vismaya P V	
	Ab:	
	R_6 A - 1, 6, 7	
	C_4 - 1, 6, 16	

C4

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RGA 21-40
LG 1-18

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** W143

Attendance Sheet

Roll No.	Name	Signature
21	Ancila Ansari	
22	Anjima Hadeer	
23	Anjitha P S	
24	Ankit Sudev	
25	Ann Mary George	
26	ANTONY C ROBERT	
27	Aravind Venugopal	
28	Arzra Suresh	
29	Aromal Biju	
30	Ashin Girish	
31	Ashly Shaji	
32	Ashna Suresh	
33	Aswal R Sunil	
34	Aswan KS	
37	Basilios paul	
36	Basil Baby	
38	Basil Kunjumon	
35	Guru prasad	← ABSENT →
39	Bhagya Lakshmi	← ABSENT →

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 3/4/23 Hall:

Attendance Sheet

Roll No.	Name	Signature
1	← Absent →	
2	Abhiram Mohan	
3.	← Absent →	
4.	Abraham Tonyl	
5	← Absent →	
6		
7	Alen Sabou	
8		
9	← Absent →	
10		
11	Anindh. JS	
12	Arya Manoj	
13	← Absent →	
14		
15	Blesson K. Jose	
16	CHARUDUTH. S	
17.	Fahad. M	
18.	Gautham V.S.	

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RGB 1-20
NG 1-20

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** S139

Attendance Sheet

Roll No.	Name	Signature
1.	Christy Paulose	Christy
2.	Cyril P Tom	
3	← Absent →	
4.	Dona Shaji	
5	Ebin K.J	
6	Eldhose Biju	
7	E.S. Adhithya	
8	Fremin Cruz	
9.	George Joseph K.	
10	Gokul Unnikrishnan	
12	Indrajith S.	
13	Jerrymol JOJO	
14	← Absent →	
15	Joseph Varghese	
16	Kavya P	
17	Kuriakose Baby	
18	← Absent →	
19		
20.	MILAN JOSEPH	

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COLLEGE OF ENGINEERING

N6

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
21	JUSTIN PAUL Jose	
22	Ligana Yasmin Shammad	
23	} Absent	
24		
25		
26	Neeraja Gopakumar	
27	Nida. S. Praju	
28	Nithin Pradeep	
29	} Absent	
30		
31	Sandra Saiju	
32	} Absent	
33	Selvin S Joshua	
34	} Absent	
35		
36	Surya. E.S	
37	VISHNU VARDHAN S	

Prathibha Varghese

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R6B 21-41
N6 21-37

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN   Hall: S/137   R6 B

Attendance Sheet

Roll No.	Name	Signature
21	Absent	
22		
23	NAMITHA-CV	Nam
24	Naveen Babu	[signature]
25	Neeraja. M	Neeraja
26	Nimisha . J	[signature]
27	NIRANJANA TS	Niranjana
28	Absent	
29	PRIYA THAMPI	[signature]
30	Rebin Roy	[signature]
31	Revathy. salimon	Revathy
32	Absent	
33		
34		
35	Sreelakshmi · Jayaraj	[signature]
36	Sukrutha Suresh	[signature]
37	Absent	
38		
39		
40	VIVEK T.M	Vivek T.M
41	V. Ranjana Priya.	Ranjana Priya

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E8 → 1-10
M6 → 1-14

RAB

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN **Hall:** W241

Attendance Sheet

Roll No.	Name	Signature
1	Aathira Joshy	
2	Gautam Gopa	
3.	Greeshma Elsa	
4.	Gopika Krishna S	
5	Hariharan C.V	
6	Harith. H	
7.	Hima Haridas	
8.	Hrithik Suresh	
9.	Jayasurya. K. Nair	
10.	Jayakrishnan K.B	
11	Jeeva Manoja Benny	
12	Jisna Mary Jeny	
13	JOMIN JOSHY	
14	absent	
15		
16	Kashmeera Vasavan	
17	absent	
18	Krishna Paroosh	
19	Leo Antony C.A	
20	Leon Jype Thomas	
21	Manu C Madhu	
22	Manu Madhu	
23	meera shaju	
24	Mehanath M	
25	Micheal Elias	
26	Mohammed Nihad	

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Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
27	Nibu Krishna V P	
28	Naufal Ismail	
29	P.S Azra Aysha	
30	absent	
31		
32	Rejo Raji	
33	Rivin Jose Melvin	
34	Rohith Ranjan	
35	Rudra	
36	Sachin . k. thomas	
37	Sagar babu M.	
38	Sabik Younas	
39	Sandra MP	
40	Saniga. AS	
41	Shiva Krishna M.M	
42	Siva.S	
43	Sooraj Subhash	
44	Soupamika Abhilash	
45	Sravya P Naik	
46	Sreehari. V. V	
47	Sreelakshmi.k.Anil	
48	VHARIKRISHNAN	
49	Vaishnav Krishnan. P	
50	Vinaya Venugopal	
51	VIVEK N P	
52	Vysakh. M. Sudhakaran	

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ASHIKA H.P.S.

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R4B
(1-52)
M6

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN Hall: W241

Attendance Sheet

Roll No.	Name	Signature
01	AKASH wilson	
02	← absent →	
03	ASHIL-K. AJAYAKUMAR	
04		
05	← absent →	
06		
07	MANAS JO POTHOSSERY	
08	← absent →	
09		
10	Prudhviraj V S Nair	
11	Sreehari. V. M	
12	VISHNU NANDAKUMAR	
13	← absent →	
14	VIVEK RATHEESH	

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Prudhvi

ABHILASH. P.S

E8 ~~R4B~~ ~~1-52~~

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 Hall: W241

Attendance Sheet

Roll No.	Name	Signature
1	← absent →	
2	GOUTHAM VINOD	
3	Harikrishnan. k s	
4	Harisankar P S	
5	Mohammad shabi	
6	Muhammed: fouosan	
7	← absent →	
8	Sanu John	
9	Vyshakh. T	

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Prasoodh.i

ABHILASH. P.S

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R4A 1-48

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date: 03/04/23 FN **Hall:** W 242

Attendance Sheet

Roll No.	Name	Signature
1	Aadithya Suresh	
2	Aatmaja Roy	
3.	Abel Binu	
4	Abel Mathew. Cherian	
6	Abhinav M Rajesh	
7.	Abhirami Sajeev. K	
8	Abhishek Unnikrishnan.	
9.	Adarsh. P	
10	Adhithiyan Maliackal	
11	Adhith R Menon	
12	Afsam M	
13	Aiswarya Binoy	
14	Akshikesh. A	
15	Akshay. E	
16	Akshay K. Sunil	
17	Albin Biju	
18	Althaf Ameer	
19	Alvin Joy	
20	Alwaj Pearin	
21	Amaswara	
22	Ansiya P Shan	
23	ANSON Mathai	
24	Anu Krishna P M	
25	ANURAG M.S	
26	Arathy Joshy	
27	Archana Menon	

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Date :

Hall:

Attendance Sheet

Roll No.	Name	Signature
28	Anomol Dileep	
29	Ajwath G Pillai	
30	Aswathy Rajan	
31	Aswin krishna T.S	
32	Aswin sunil	
33	Athisa S M	
34	Athul George	
35	Athulya Palanadan	
36	ABSENT	
37	BEVIN ELDHOSE BABU	
38	Bevas Babu	
39	Calvin Johnson	
40	Cheruth Mathew Joseph	
41	Christon Jose	
42	Devanand C	
43	Devika Devan	
45	Diya Santhosh	
46	Eldho Cherian	
47	Eldhose kuriakose	
48	Sarika. PP	

36

Aruna T.A

3/4/23.

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N8 1-47

SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 FN **Hall:** W245

Attendance Sheet

Roll No.	Name	Signature
1		
2	Ajay Shaji	
3		
4	Ajmal Albert	
5	Aju Paul	
6	Akash. Ic	
7	Alib. K	
8		
9		
10		
11		
12		
13		
14	ASHIQ SHEEBAN	
15	Athul Dileep	
16	Athul Krishna M.R.	
17	Avani Dineshan Kadoor	
18	Avany B	
19		
20		
21		
22		
23	Gautham Dhanesh	
24	Geethu GM	
25		
26	Gokul A	

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SNGCE Kadayiruppu, B.Tech degree Internal Exam, Jan 2022

Date : 03/04/23 Hall: M245

Attendance Sheet

Roll No.	Name	Signature
27	J. JIBIN RAJ	
28	MANU. M	
29		
30		
31		
32	Neha Venugopal	
33	Nishanth. Vasu	
34		
35	Nivedya M.S	
36		
37	Rithik M	
38		
39	Sanjeeth Ajithkumar	
40		
41		
42		
43	Sreeram M.R	
44		
45	Varsha. V.B	
46	Vidhyashankar.	
47	Yadhu M.P	

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W154
W155
W152
W153
W148
W147
W142
W143
& 139
& 137
W 241
W 242
W 245

FIRST INTERNAL EXAM - APRIL 2023

DATE: 3/4/23 FN

CLASS	Absentees
C4	6, 16
~~M4~~	2, 11,
E4	
L4	
R4A	36
R4B	14, 17, 30, 31
N4	25, 34, 9, 17, 20
C6	
~~M6~~	2, 4, 5, 6, 8, 9, 13
E6	1, 2, 3, 4, 5
L6	
R6A	1, 6, 7, 35, 39, 3, 14, 18, 19
R6B	21, 22, 28, 32, 33, 34, 37, 38, 39
N6	1, 3, 5, 6, 8, 9, 10, 13, 14, 23, 24, 25, 29, 30, 32, 34, 35
C8	10, 20
~~M8~~	21, 26, 29, 31, 7, 9, 15, 17
E8	[illegible] 1, 7
L4	
R8A	25, 31, 32, 38, 1, 11, 15, 22
R8B	23, 27, 29, 35, 5

L8 7, 10

N8 1, 3, 8, 9, 10, 11, 12, 13, 19, 20, 21, 22, 25
29, 30, 31, 34, 36, 38, 40, 41, 42, 44

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SNG COLLEGE OF ENGINEERING, KOLENCHERY

Department of Science and Humanities

B. Tech Degree First Internal Examination

MAT 201 Partial Differential Equations & Complex Analysis

Semester: III | Date: 05.01.2022

Time: 2 Hours | Max. Marks: 50

Branch: CE, ME, EEE, ECE & NASB

Faculty: Dr. Vijesh V. V., Dr. Preetha Varghese, Ms. Deepthi V. S. & Ms. Reji P. R.

PART A

Answer *all* questions. Each question carries 3 marks.

1. Derive a partial differential equation from the relation $z = f(x + at) + g(x - at)$. [L 1 & CO 1]
2. Solve the partial differential equation $x^2p + y^2q = z^2$. [L 2 & CO 1]
3. State any three assumptions in deriving the one dimensional wave equation. [L 1 & CO 2]
4. What are the possible solutions of one dimensional heat equation. [L 1 & CO 2]
5. Write the conditions in which a tightly stretched string of length L with fixed ends is initially in equilibrium position and is set vibrating by giving each point a velocity $v_0 \sin^3\left(\frac{\pi x}{L}\right)$. [L 2 & CO 2]

PART B

Answer *all* questions. Each question carries 7 marks.

6. Solve the partial differential equation $\left(y^2 + z^2\right)p - xyq + xz = 0$. [L 2 & CO 1]
7. Using Charpit's method, find the complete integral of $z = px + qy + p^2 + q^2$. [L 2 & CO 1]
8. Find the deflection of a vibrating string of unit length having fixed ends with velocity 0 and initial deflection $f(x) = k(\sin x - \sin 2x)$. [L 3 & CO 2]
9. Derive one dimensional heat equation. [L 2 & CO 2]
10. A tightly stretched string has ist ends fixed at $x = 0$ and $x = L$. At time $t = 0$, the string is given a shape defined by $f(x) = \mu x(L - x)$ where μ is a constant and then released. Find the displacement of any point x of then string at any time $t = 0$. [L 3 & CO 2]

Dr. Preetha Varghese
HoD (S&H)

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Dr. Vijesh V.V.
DQAC

SNG COLLEGE OF ENGINEERING, KOLENCHERY
Department of Science and Humanities
B. Tech Degree First Internal Examination
MAT 201 Partial Differential Equations & Complex Analysis
Scheme for Valuation

Semester: III | Date: 05.01.2022
Time: 2 Hours | Max. Marks: 50

Branch: CE, ME, EEE, ECE & NASB
Faculty: Dr. Vijesh V. V., Dr. Preetha Varghese, Ms. Deepthi V. S. & Ms. Reji P. R.

1. $\dfrac{\partial^2 z}{\partial t^2} = a^2 . \dfrac{\partial^2 z}{\partial x^2}$ [1 + 2 = 3 marks]

2. General solution is $\varphi\left(\dfrac{1}{y} - \dfrac{1}{x}, \dfrac{1}{z} - \dfrac{1}{y}\right) = 0.$

   Auxiliary Equation is

   $$\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$$

   $$\frac{dx}{x^2} = \frac{dy}{y^2} = \frac{dz}{z^2}$$ [1 mark]

   $$\frac{dx}{x^2} = \frac{dy}{y^2} \Rightarrow \frac{1}{y} - \frac{1}{x} = a$$ [1 mark]

   $$\frac{dy}{y^2} = \frac{dz}{z^2} \Rightarrow \frac{1}{z} - \frac{1}{y} = b$$ [1 mark]

3. Three assumptions [1 + 1 + 1 = 3 marks]

4. (a) $u(x,t) = \left(C_1 e^{px} + C_2 e^{-px}\right) C_3 e^{c^2 p^2 t}$ [1 mark]

   (b) $u(x,t) = (C_4 \cos px + C_5 \sin px)\, C_6 e^{-c^2 p^2 t}$ [1 mark]

   (c) $u(x,t) = (C_7 x + C_8)\, C_9$ [1 mark]

5. (a) $y(0,t) = 0$ [1 mark]

   (b) $y(L,t) = 0$ [1 mark]

   (c) $y(x,0)) = 0$ [1 mark]

   (d) $\dfrac{\partial y}{\partial t}(x,0) = v_0 \sin^3\left(\dfrac{\pi x}{L}\right)$ [1 mark]

   Answer any three above.

6. Auxiliary Equation is $\dfrac{dx}{y^2 + z^2} = \dfrac{dy}{-xy} = \dfrac{dz}{-xz}$ [1 mark]

   $$\frac{dy}{-xy} = \frac{dz}{-xz} \Rightarrow \frac{dy}{-y} = \frac{dz}{-z}$$

   $$\Rightarrow \frac{z}{y} = a$$ [2 marks]

   Taking multipliers x, y, z

   $x\,dx + y\,dy + z\,dz = 0 \Rightarrow x^2 + y^2 + z^2 = b$ [3 marks]

   General solution is $\varphi\left(\dfrac{z}{y}, x^2 + y^2 + z^2\right) = 0.$ [1 mark]

Preetha Varghese
Dr Preetha Varghese
HoD (S&H)

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Dr. Vijesh V.V.
DQAC

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7. Charpit's A. E is

$$\frac{dx}{x+2p} = \frac{dy}{y+2q} = \frac{dz}{xp = 2p^2 + yq + 2q^2} = -\frac{dp}{0} = -\frac{dq}{0}$$ [3 marks]

$dp = 0 \Rightarrow p = a$ [1 mark]

$dq = 0 \Rightarrow q = b$ [1 mark]

$\therefore \quad z = ax + by + a^2 + b^2.$ [2 marks]

8. By D' Alembert's equation

$$y(x,t) = \frac{1}{2}[f(x+ct) + f(x-ct)]$$ [2 + 2 + 2 + 1 marks]

$$= \frac{k}{2}[2\sin x \cos ct - 2\sin 2x \cos 2ct]$$

9. Derivation [7 marks]

10. Wave equation [1 mark]

Boundary conditions [1 mark]

Suitable solution [2 marks]

Most general solution is

$$y(x,t) = \sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}\cos\frac{n\pi x}{l}$$ [2 marks]

where

$$b_n = \frac{4\mu l^2}{n^3 pi^3}(1-(-1)^n)$$ [1 mark]

Dr. Preethi Varghese
HOD S&H

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Dr. Vijesh V.V.
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50/50

SREE NARAYANA GURUKULAM COLLEGE OF ENGINEERING

Kolenchery, Kadayiruppu P. O.

Series Test for the year 201.22. Month of JANUARY

Branch: ECE

Name of Subject: Partial Differential Equation & Complex Analysis **Semester:** 3 **Batch:**

Name of the Student: ALEENA RANJU **Roll No** CA

Date: 5/03/22

Qn.No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Marks	3	3	3	3	3	7	7	7	7	7						50

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Empowering the masses to achieve economic and social freedom through technical and management education.

Instructions to the Candidates

- Keep your books, notes and other belongings outside the examination hall
- Do not bring mobile phones inside the examination hall
- Do not bring any kind of manuscripts or loose sheets in the hall
- Occupy your seats at least 10 minutes before the commencement of the examination.
- Write examination neatly using Black/Blue ink only
- Any kind of malpractice is punishable
- In case of any help, stand up to draw the attention of the invigilator
- Hand over the answer book to the invigilator before leaving the hall.
- Student will be permitted to leave the hall only after the final bell.

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PART B

6. $(y^2+z^2)p - xyq + xz = 0$

The given Question is a lagrange equation;
which is of the form; $\boxed{Pp+Qq=R}$

$\Rightarrow (y^2+z^2)p - xyq = -xz$

$P = y^2+z^2$

$Q = -xy$

$R = -xz$

The Sol complete ~~integral~~ solution is of the form;

$\phi(u,v) = 0$.

$\Rightarrow$ By method of grouping, we can find the Solution;

i.e $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

$\Rightarrow \frac{dx}{y^2+z^2} = \frac{dy}{-xy} = \frac{dz}{-xz}$ ——(1)

(1) $\Rightarrow$ consides $\frac{dy}{-xy} = \frac{dz}{-xz}$

$\Rightarrow$ to Integrate both sides

$\log y = \log z + \log c$

i.e $\frac{y}{z} = c$ ——(2) ✓ ——(3)

Sub (3) in (1)

By considering

$$\frac{dx}{z^2c^2+z^2} = \frac{dz}{-xz}$$

$$\Rightarrow \frac{dx}{z^2(x^2+c^2)} = \frac{dz}{-xz}$$

$$\Rightarrow -x\,dx = (x+zc^2)\,dz$$

Integrate

$$\frac{-x^2}{2} = \frac{x^2}{2} + \frac{z^2}{2}c^2 + \frac{A^2}{2}$$

$$-x^2 = z^2(1+c^2) + A$$

$$\Rightarrow [x^2+z^2(1+c^2)] = B$$

$$x^2 + z^2\left(1+\frac{y^2}{z^2}\right) = B$$

$$x^2 + y^2 + z^2 = B \quad \text{——(4)}$$

V = constant

∴ from (2) & (3)

$$\frac{y}{z} = c \quad \& \quad x^2+y^2+z^2 = B$$

$\therefore \phi(u, v) = 0$

Solution is

=> The complete integral is

$$\phi\left(\frac{y}{z},\ x^2+y^2+z^2\right) = 0$$

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$z = px + qy + p^2 + q^2$

Charpit's method.

⇒ the above equation can be written of the form;

$f(z - px - qy - p^2 - q^2) = 0$ ——①

Charpit's formula)

$$\Rightarrow \frac{dx}{-f_p} = \frac{dy}{-f_q} = \frac{dz}{-pf_p - qf_q} = \frac{dp}{f_x + pf_z} = \frac{dq}{f_y + qf_z} = \frac{\partial F}{0}$$

——②

from ①

$\Rightarrow f_p = (-x - 2p)$

$f_q = (-y - 2q)$

$f_x = -p$

$f_y = -q$

$f_z = 1$

$-pf_p - qf_q = -p(-x - 2p) - q(-y - 2q)$

$= px + 2p^2 + qy + 2q^2$

$f_x + pf_z = -p + p$

$= 0$.

$f_y + qf_z = -q + q$

$= 0$

Substitute all these values in (2) (4)

$$\Rightarrow \frac{dx}{x+2p} = \frac{dy}{y+2q} = \frac{dz}{2p^2+2q^2+px+qy} = \frac{dp}{0} = \frac{dq}{0}.$$

consider $\frac{dx}{x+2p} = \frac{dp}{0}$

$$dp(x+2p) = 0.$$

$$dp = 0$$

Integrate

$$p = C \quad \text{——(3)}$$

consider $\frac{dy}{y+2q} = \frac{dq}{0}$

$$\therefore dq(y+2q) = 0$$

$$dq = 0$$

Integrate

$$q = A \quad \text{——(4)}$$

The solution is of the form

$$dz = p\,dx + q\,dy \quad \text{——(5)}$$

$\therefore$ Substitute (3) & (4) in (5)

$$\Rightarrow dz = C\,dx + A\,dy$$

Integrate

$$\Rightarrow \boxed{z = Cx + Ay + B}$$ is the solution

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The One dimensional wave Equation of a String is;

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}.$$

The Boundary conditions are;

$$u(0,t) = 0 \quad \text{—①}$$

$$u(l,t) = 0 \quad \text{—②}$$

The Initial condition are,

$$u(x,0) = 0 \quad \text{—③}$$

$$u(x,0) = f(x) \quad \text{—④}$$

where $f(x) = K(\sin x - \sin 2x)$

By method of Sepesaion of vanables the Solution of a One dimensional wave Equation is;

$$U(x,t) = (C_1 \cos px + C_2 \sin px)(C_3 \cos cpt + C_4 \sin cpt) \quad \text{—⑤}$$

Applying the B.C.s.

① ⇒

① ⇒ $C_1 = 0$

② ⇒ $p = n\pi$

∴ ⑤ ⇒ $U(x,t) = C_2 \sin n\pi x \,(C_3 \cos cn\pi t + C_4 \sin cn\pi t)$

∴ $n = 1, 2, 3$ etc.

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By method of Superposition the above eq. ⑤ can be

$$u(x,t) = \sum_{n=1}^{\infty} \left(a_n \cos c n\pi t + b_n \sin c n\pi t\right) \sin n\pi x \quad \text{——⑥}$$

By applying INCs on ⑤

$$\Rightarrow u_t(x,t) = \sum_{n=1}^{\infty} \left(a_n \cos c n\pi t \times c n\pi + b_n \sin c n\pi t \times c n\pi\right) \sin n\pi x .$$

$$u_t(0,t) = 0 \Rightarrow b_n = 0 .$$

∴ The soln is

$$⑥ \Rightarrow u(x,t) = \sum_{n=1}^{\infty} a_n \cos c n\pi t \sin n\pi x \quad \text{——⑦}$$

④ ⇒ Cin ⑦

$$u(0,t) = f(x)$$

$$u(x,0) = \sum_{n=1}^{\infty} a_n \sin n\pi x = f(x)$$

Where $f(x) = k(\sin x - \sin 2x)$

This is a half range Fourier Sine Series

where $a_n = \frac{2}{l} \int_0^l f(x) \sin n\pi x \, dx$

$l = 1$

$$\Rightarrow a_n = 2 \int_0^1 k(\sin x - \sin 2x) \sin n\pi x \, dx .$$

$$= 2k \int_0^1 (\sin x \sin n\pi x - \sin 2x \sin n\pi x) \, dx$$

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FIS - ∫DFIS

$$= 2K \left[\sin \pi x \frac{\cos n\pi x}{n\pi} + \int_0^1 \cos \pi x \frac{\sin n\pi x}{n} \right]$$

$$K \int_0^1 \sin(n\pi+1)x - \sin(x-n\pi x) - (\sin(2x+n\pi x) - \sin(2x-n\pi$$

$$= K \left[-\frac{\cos(n\pi+1)x}{n\pi+1} + \frac{\cos(1-n\pi x)x}{1-n\pi} + \frac{\cos(2+n\pi)x}{2+n\pi} - \frac{\cos(2-n\pi}{2-n\pi} \right]$$

$$K \left[-\frac{\cos(n\pi+1)}{n\pi+1} + \frac{\cos(1-n\pi)}{1-n\pi} + \frac{\cos(2+n\pi)}{2+n\pi} - \frac{\cos(2-n\pi)}{2-n\pi} \right.$$

$$\left. + \frac{1}{n\pi+1} \right.$$

$$= K \int_0^1 \cos$$

$$= 2K \int_0^1 \sin \pi x \sin n\pi x \, dx - 2K \int_0^1 \sin 2x \sin n\pi x \, dx$$

$$= K \left[\int_0^1 \cos(1-n\pi)x - \cos(1+n\pi)x \, dx \right]$$

$$- K \left[\int_0^1 \cos(2x-n\pi)x - \cos(2x+n\pi)x \right] dx$$

$$= K \left[\left[\frac{\sin(1-n\pi)x}{1-n\pi} - \frac{\sin(1+n\pi)x}{1+n\pi} \right]_0^1 - \left[\frac{\sin(2-n\pi)x}{2-n\pi} - \frac{\sin(2x+n\pi)x}{2+n\pi} \right]_0^1 \right]$$

$$= K \left[\frac{\sin(1-n\pi)}{1-n\pi} - \frac{\sin(1+n\pi)}{1+n\pi} - \frac{\sin(2-n\pi)}{2-n\pi} + \frac{\sin(2+n\pi)}{2+n\pi} \right]$$

∴ The Solution of ~~one dimen~~ Equation is

$$U(x,t) = \sum_{n=1}^{\infty} a_n \cos c n\pi t \sin n\pi x$$

6 where $a_n = k\left(\frac{\sin(1-n\pi)}{1-n\pi} - \frac{\sin(1+n\pi)}{1+n\pi} - \frac{\sin(2-n\pi)}{2-n\pi} + \frac{\sin(2+n\pi)}{2+n\pi} \right]$

9. One Dimensional heat Equation

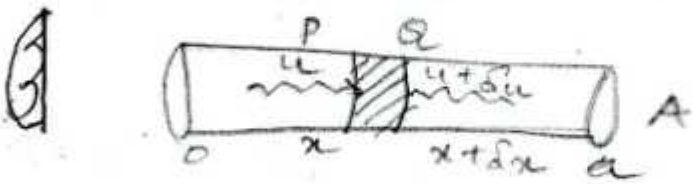
$$\text{Heat flux} = -KA\left(\frac{\partial u}{\partial x}\right)$$

Heat flux is directly proportional to the area & the temperature gradient normal to the surface

Here A → Area of cross

K → Thermal conductivity (const)

$\frac{\partial u}{\partial x}$ → Temperature gradient



consides a metal rod of length a, In that metal rod consides, a portion PQ.

The metal rod is raised to a temperature, by heat at t=0. The rod is insulated at its both ends, so that no other radiations entering to it through its sides.

we need to find the, $u(x,t)$, $t>0$.

The amount of heat entering P at δt

$$= -KA\left(\frac{\partial u}{\partial x}\right)_x \cdot \delta t \quad \text{——— (1)}$$

The amount of heat leaving from pat δt

$$= -KA\left(\frac{\partial u}{\partial x}\right)_{x+\delta x} \cdot \delta t \quad \text{——— (2)}$$

∴ The amount heat sustained in PQ
= Eq (1) — Eq (2)

$$\Rightarrow -KA\left(\frac{\partial u}{\partial x}\right)_x \cdot \delta t + KA\left(\frac{\partial u}{\partial x}\right)_{x+\delta x} \cdot \delta t$$

$$\Rightarrow KA\left[\left(\frac{\partial u}{\partial x}\right)_{x+\delta x} - \left(\frac{\partial u}{\partial x}\right)_x\right] \delta t \quad \text{——— (3)}$$

~~when the rod is subjected to heat, temperature~~
~~As the temperature is raised to~~

From the above, as heat is due to this, heat, the temperature is raised above, the heat by an amount δu.

By considering an 'm' mass element

$$\Rightarrow \rho(\rho A \delta x) = \delta u \quad \text{——— (4)}$$

ρ: density

$\therefore$ By Equating (3) & (4)

$$KA\left[\left(\frac{\partial u}{\partial x}\right)_{x+\delta x} - \left(\frac{\partial u}{\partial x}\right)_x\right]\delta t = \rho A \delta x \sigma \delta u.$$

$$\frac{\left[\left(\frac{\partial u}{\partial x}\right)_{x+\delta x} - \left(\frac{\partial u}{\partial x}\right)_x\right]}{x+\delta x \quad \delta x} = \frac{\sigma \rho}{K}\frac{\delta u}{\delta t}$$

$\delta x \to 0$ & $\delta t \longrightarrow 0$

$\Rightarrow$ The above equation becomes

$$\frac{\partial^2 u}{\partial x^2} = \frac{\sigma \rho}{K}\frac{\partial u}{\partial t}$$

$$\Rightarrow \frac{\partial u}{\partial t} = \frac{K}{\sigma \rho}\frac{\partial^2 u}{\partial x^2}$$

$$\boxed{\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}}$$

This is One dimensional heat Equation

10 The One dimensional wave Equation is

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}.$$

The B.Cs.

$$u(0,t) = 0 \quad \text{——(1)}$$

$$u(L,t) = 0 \quad \text{——(2)}$$

The I.NC.s

$$u_t(x,0) = 0 \quad \text{——(3)}$$

$$u(x,0) = f(x) \quad \text{——(4)}$$

where $f(x) = \mu x(L-x)$

By method of Sepesation of variables, the solution of a one dimensional wave equation is,

$$U(x,t) = (C_1 \cos px + C_2 \sin px)(C_3 \cos cpt + C_4 \sin cpt) \quad \text{——(5)}$$

By applying B.C.s

① $\Rightarrow C_1 = 0$

② $\Rightarrow p = \frac{n\pi}{L}$

$\therefore$ ⑤ $\Rightarrow U(x,t) = C_2 \sin \frac{n\pi}{L} x \left(C_3 \cos \frac{cn\pi}{L} t + C_4 \sin \frac{cn\pi}{L} t\right)$

$n = 1, 3, 3$

$\therefore$ By method of Supesposition

$$U(x,t) = \sum_{n=1}^{\infty} \left(a_n \cos \frac{cn\pi}{L} t + b_n \sin \frac{cn\pi}{L} t\right) \sin \frac{n\pi}{L} x$$

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By applying INCs. (13)

(3) $\Rightarrow u_t(x,t) = \sum_{n=1}^{\infty} \left(a_n \cos \frac{cn\pi t}{L} \times \frac{cn\pi}{L} + b_n \sin \frac{cn\pi t}{L} \times \frac{cn\pi}{L} \right) \times \sin \frac{n\pi x}{L}$

$u_t(x,0) = 0$

$\Rightarrow b_n = 0$.

(6) $\Rightarrow u(x,t) = \sum_{n=1}^{\infty} a_n \cos \frac{cn\pi t}{L} \cdot \sin \frac{n\pi x}{L}$ — (7)

(4) $\Rightarrow$

$u(x,0) = f(x)$

$= \sum_{n=1}^{\infty} a_n \sin \frac{n\pi x}{L} = f(x)$

$f(x) = \mu x (L-x)$

This is a half range fourier sine series

$a_n = \frac{2}{L} \int_0^L \mu x (L-x) \sin \frac{n\pi x}{L} \, dx$.

$\Rightarrow \frac{2\mu}{L} \left[(xL - x^2) \frac{-\cos \frac{n\pi x}{L}}{\frac{n\pi}{L}} - (L-2x) \frac{-\sin \frac{n\pi x}{L}}{\left(\frac{n\pi}{L}\right)^2} + (-2) \frac{\cos \frac{n\pi x}{L}}{\left(\frac{n\pi}{L}\right)^3} \right]_0^L$

$\Rightarrow \frac{2\mu}{L} \left[0 - 0 - 2 \cdot \frac{(-1)^n \times L^3}{(n\pi)^3} + 2 \cdot \frac{L^3}{(n\pi)^3} \right]$

$= $

$$\frac{2\mu l^2}{\not{l} \times (n\pi)^3}\left[1 - 2(-1)^n\right]$$

$$a_n = \frac{2\mu l^2}{(n\pi)^3}\left(1 - 2(-1)^n\right]$$

∴ The Solution is

$$u(x,t) = \sum_{n=1}^{\infty} a_n \cos\frac{cn\pi}{l}t \cdot \sin\frac{n\pi x}{l}$$

where $a_n = \frac{2\mu l^2}{(n\pi)^3}\left[1 - 2(-1)^n\right]$

PART: A

1. $z = f(x+at) + g(x-at)$ —— ①

Here the no: of arbitrary const : 1

no. of independent variables: 2

∴ Order: 2

$$① \Rightarrow \frac{\partial z}{\partial x} = p = f'(x+at) \times 1 + g'(x-at) \quad —— ③$$

$$① \Rightarrow \frac{\partial z}{\partial t} = q = f'(x+at) \times a + g'(x-at) \times -a \quad —— ④$$

$$\Rightarrow \frac{\partial^2 z}{\partial x^2} = r = f''(x+at) + g''(x-at) \quad —— ⑤$$

$$\Rightarrow \frac{\partial^2 z}{\partial x \partial t} = s = f''(x+at) \times a + g''(x-at) \times -a \quad —— ⑥$$

$$\frac{\partial^2 z}{\partial t^2} = t = f''(x+at) \times a^2 + g''(x-at) \times a^2 \quad —⑦$$ ⑮

$$\Rightarrow \frac{t}{a^2} = f''(x+at) + g''(x-at)$$

⑥ ⇒ Sr

PART A

1. $z = f(x+at) + g(x-at)$ —— ①

~~no. of functions = 2.~~

~~order: 2.~~

~~no of arbitary~~

no. of functions: 2

order: 2.

$\Rightarrow p = f'(x+at) + g'(x-at)$ —— ②

$q = af'(x+at) - ag'(x-at)$ —— ③

$r = f''(x+at) + g''(x-at)$ —— ④

$s = f''(x+at) \cdot a - g''(x-at)\, a$. —— ⑤

$t = a^2 f''(x+at) + a^2 (g''(x-at)$ —— ⑥

⑥ ⇒ $\frac{t}{a^2} = (f''(x+at) + g''(x-at)$ —— ⑦

Sub ⑦ in ④ or ⑤ ⇒ ~~$\frac{s}{a} = f''(x+at) - g$~~

$r = \frac{t}{a^2}$

$a^2 r = t$.

Thus PDE is $a^2 r = t$

2. Solve $x^2p + y^2q = z^2$

This is a lagrange's Eq.

It's soln is of the form $\phi(u, v) = 0$

$P = x^2$

$Q = y^2$

$R = z^2$

$$\therefore \frac{dx}{x^2} = \frac{dy}{y^2} = \frac{dz}{z^2}$$

$$\Rightarrow \frac{dx}{x^2} = \frac{dy}{y^2}$$

$$-\frac{1}{x} = -\frac{1}{y} + A$$

$$\frac{1}{y} - \frac{1}{x} = A \quad \text{———} (1)$$

u = constant

$$\Rightarrow \frac{dy}{y^2} = \frac{dz}{z^2}$$

$$\Rightarrow -\frac{1}{y} = -\frac{1}{z} + B$$

$$\frac{1}{z} - \frac{1}{y} = B \quad \text{———} (2)$$

v = const.

$$\therefore \phi\left(\frac{1}{y} - \frac{1}{x}, \frac{1}{z} - \frac{1}{y}\right) = 0$$

$$\Rightarrow \phi\left(\frac{x-y}{xy}, \frac{y-z}{zy}\right) = 0$$ is the solution

3. Three Assumptions in deriving one Dimension wave Equation

:-1 The string is stretched entirely in the x-y plane (of the surface) & the particle of the string moves ⊥ to the equilibrium position OA of the surface.

:-2 It is completely free of resistance, ∴ the ~~tension acts tangential across the curves~~ so no bending

:-3 The displacement y & slope $\frac{\partial y}{\partial t}$ are very small, so large powers can be considered neglected

:-4 Large tension, so forces are neglected

4. The One-dimensional heat Equation is;

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2} \quad \text{——— (1)}$$

Assume that the solution is of the form;

$U(x,t) = X(x) \cdot T(t)$

$U = X \cdot T$

$\frac{\partial u}{\partial t} = X T'$

$\frac{\partial u}{\partial x} = X' T$, $\frac{\partial^2 u}{\partial x^2} = X'' T$.

Substitute all these values in Eq (1)

$\Rightarrow XT' = c^2 X'' T$

$\Rightarrow \frac{1}{c^2}\frac{T'}{T} = \frac{X''}{X} = K$

$\Rightarrow X'' = KX$

$X'' - KX = 0$

$\frac{T'}{T} = Kc^2$

$T' - Kc^2 T = 0.$

Let us consider three cases

Case I

at first $K = 0$

$\Rightarrow X'' = 0.$

$X' = C_1$

$X = C_1 x + C_2.$

$T' = 0$

$T = C_3$

$\therefore U(x,t) = (C_1 x + C_2) C_3$ ——— (2)

(But this equation is not actually considered)

Case II

$K = +p^2$ (K = positive)

$\therefore X'' - p^2 X = 0$

$(D^2 - p^2) X = 0.$

$m^2 - p^2 = 0$

$m = \pm p.$

$\therefore X = (C_1 e^{px} + C_2 e^{-px})$

$T' - p^2 c^2 T = 0$

$(D - p^2 c^2) T = 0$

$m - p^2 c^2 = 0$

$m = c^2 p^2$

$T = C_3 e^{c^2 p^2 t}$

$\therefore U(x,t) = (C_1 e^{px} + C_2 e^{-px}) C_3 e^{c^2 p^2 t}$ ——— (3)

Case III

$K = -p^2$ (K = negative)

$\therefore x'' + p^2 x = 0$

$(D^2 + p^2)x = 0$

$m^2 + p^2 = 0$

$m = \pm ip$

$x = (C_1 \cos px + C_2 \sin px)$

$T' + p^2 c^2 T = 0.$

$(D + p^2 c^2) T = 0$

$m + p^2 c^2 = 0$

$m = -c^2 p^2$

$\therefore T = C_3 e^{-c^2 p^2 t}$

$\therefore u(x,t) = (C_1 \cos px + C_2 \sin px) C_3 e^{-c^2 p^2 t}$ ——— (4)

This is considered

$\therefore$ The possible solutions of one dimensional heat Eq; are (2), (3), (4)

Only this part enough for a mark qn.

At $K = 0$; $u(x,t) = (C_1 x + C_2) C_3$

At $K = p^2$, $u(x,t) = (C_1 e^{px} + C_2 e^{-px}) C_3 e^{c^2 p^2 t}$

At $K = -p^2$, $u(x,t) = (C_1 \cos px + C_2 \sin px) C_3 e^{-c^2 p^2 t}$

---

5. The conditions are;

Boundary conditions

1) $u(0,t) = 0$, i.e $u = 0$, when $x = 0$

or, $y(0,t) = 0$ or $y = 0$, when $x = 0$.

2) $u(l,t) = 0$ i.e $u = 0$, when $x = l$

or $y(l,t) = 0$. or $y = 0$, when $x = l$

The Initial conditions;

(20)

3) $u_t(x,0) = 0$ or $\frac{\partial u}{\partial t} = 0$, when $t = 0$

4) $y_t(x,0) = 0$ or $\frac{\partial y}{\partial t} = 0$, when $t = 0$.

4) $u(x,0) = f(x)$ i.e $u = f(x)$, when $t = 0$

$y(x,0) = f(x)$ or $y = f(x)$, when $t = 0$

Where $f(x) = Y_0 \sin^3(\pi x/L)$