



You Choose, We Do It

St. JOSEPH'S COLLEGE OF ENGINEERING

(An Autonomous Institution)

St. Joseph's Group of Institutions

Jeppiaar Educational Trust

OMR, Chennai - 119.



**SUMMARY OF CLASS WORK
RECORD OF ATTENDANCE AND ASSESSMENT**

Name of the staff: Venkatesh kumar C

Department of the Staff: EEE

Semester From: July 2022 To Oct 2022

Class & Branch : IV EEE 'A'

Code No. / Subject Name: EE8701-HVE

Dr. VADDI SESHAGIRI RAO, M.E., M.B.A., Ph.D.
PRINCIPAL
ST. JOSEPH'S COLLEGE OF ENGINEERING
(AN AUTONOMOUS INSTITUTION)
OLD MAMALLAPURAM ROAD, CHENNAI-600 119.

LESSON PLAN

Unit : I

From 18/7/22 To 05/8/22

No. of Hours : 12

Sl. No.

TOPICS TO BE COVERED

BOOKS TO BE REFERRED

UNIT I - OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS

Target Period: 9

Planned Periods: 12

S.NO	Topics to be Covered	Course Outcome	Hours Required	Text /Reference Book	Teaching Aid	Knowledge Level
1.	Causes of over voltages and its effects on power system	C401.1	1	T1	BB	R,U
2.	Mechanism of Lightning, Mathematical model of lightning		1	T1	PPT	R,U
3.	Causes of Switching surges		1	T1	PPT	R,U
4.	Causes of Power frequency over voltages		1	T1	PPT	R,U
5.	Controlling methods of switching and power frequency over voltages		1	T1	PPT	R,U
6.	Protection against Over Voltages, expulsion gap, protector tube etc.		1	T1	PPT	R,U
7.	Reflection and Refraction of Travelling waves		2	T1	PPT	R,U,An,A
8.	Bewley's Lattice Diagram - cases		2	T1	BB	R,U
9.	Problems		2	T1	BB	R,U,An,A,E

Assignment submission:

Seminar/Tutorial:

IAE 1 Test: 29/8/22

LESSON PLAN

5/9/22 - 26/8/22 12

UNIT-II DIELECTRIC BREAKDOWN

Planned Periods: 12

Target Period: 9

S.NO	Topics to be Covered	Course Outcome	Hours Required	Text /Reference Book	Teaching Aid	Knowledge Level
1.	Gaseous breakdown in uniform and non uniform fields	C401.2	1	T1	PPT	R, U
2.	Townsend's criterion of breakdown in gases (Primary/Secondary)		2	T1	PPT	R, U, A & An
3.	Corona discharges and its effects		1	T1	PPT	R, U, A & An
4.	Vacuum breakdown mechanisms		1	T1	PPT	R, U, A & An
5.	Conduction and breakdown in pure liquids		1	T1	PPT	R, U, A & An
6.	Conduction and breakdown in commercial liquids		1	T1	PPT	R, U, A & An
7.	Maintenance of oil Quality		1	T1	PPT	R, U
8.	Breakdown mechanisms in solid and composite dielectrics		1	T1	PPT	R, U, A & An
9.	Applications of insulating materials in electrical equipment's.		1	T1	PPT	R, U, A & An
10.	Problems		2	T1	BB	R, U, A & An

Assignment submission:

Seminar/Tutorial:

IAE 2 Test:

13/9/22

LESSON PLAN

27/8/22 - 15/9/22 12

UNIT-III GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS

Planned Periods: 12

S.NO	Topics to be Covered	Course Outcome	Hours Required	Text /Reference Book	Teaching Aid	Knowledge Level
1.	Generation of High DC voltages, Rectifier, Voltage doubler circuits	C401.3	2	T2	PPT	R, U, A
2.	Cock-croft Walton voltage multiplier and Ripple derivation		2	T2	PPT	R, U, A, An & E
3.	Electrostatic machines - Vande graff generator, Electrostatic generator		1	T2	PPT	R, U, A, An & E
4.	Generation of High AC voltages, cascaded transformer		1	T2	BB	R, U, A, An & E
5.	Resonant transformer- series and parallel		1	T2	PPT	R, U, A, An & E
6.	Generation of High frequency AC using Tesla coil - derivation		1	T2	PPT, BB	R, U, A & An
7.	Generation of impulse waves and Marx circuit		1	T2	PPT, BB	R, U, A & An
8.	Generation of switching surges and impulse currents		1	T2	PPT, BB	R, U, A & An
9.	Triggering and control of impulse generators		1	T2	PPT, BB	R, U, A & An
10.	Problems		1	T2	PPT, BB	R, U, A, E & An

Assignment submission:

Seminar/Tutorial:

IAE 3 Test: 4/10/22 - M-D

LESSON PLAN

16/9/22 - 7/10/22 / 2
 UNIT-IV MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS

Target Period: 12

Planned Periods: 12

S.NO	Topics to be Covered	Course Outcome	Hours Required	Text / Reference Book	Teaching Aid	Knowledge Level
1.	Introduction to HV measurement, High Resistance with series ammeter	C401.4	1	T1,R2	PPT	R, U,A, An & E
2.	Dividers, Resistance, Capacitance and Mixed dividers for voltage measurement		1	T1,R2	PPT	R, U,A, An & E
3.	Peak Voltmeter - measurement		1	T1,R2	PPT	R, U, A, An & E
4.	Generating Voltmeters - construction, working, merits and demerits		1	T1,R2	BB	R, U,A & An
5.	Capacitance Voltage Transformers		1	T1,R2	PPT	R, U,A & An
6.	Electrostatic Voltmeters- construction, working, merits and demerits		1	T1,R2	PPT	R, U,A & An
7.	Sphere Gap Measurements - Factors affecting - construction, working		1	T1,R2	PPT, BB	R, U,A & An
8.	High current shunts measurements		1	T1,R2	BB	R, U,A & An
9.	Digital techniques in high voltage measurement		1	T1,R2	BB	R, U,A & An
10.	Problems		2	T1,R2	BB	R, U,A & An
Assignment submission:						
Seminar/Tutorial:						
IAE 4 Test: 11/10/22 - M-D						

Books: Text/Reference:

8/10/22 - 22/10/22
12
UNIT-V HIGH VOLTAGE TESTING & INSULATION COORDINATION
Planned Periods: 12

Target Period: 9

S.NO	Topics to be Covered	Course Outcome	Hours Required	Text /Reference Book	Teaching Aid	Knowledge Level
1.	Standard Definitions and Necessity of Testing	C401.5	1	T1, R2	PPT	R, U & An
2.	High voltage testing of electrical power apparatus as per International and Indian standards		1	T1, R2	PPT	R, U & An
3.	Power frequency and impulse testing of Insulators		2	T1, R2	PPT	R, U & An
4.	Power frequency and impulse testing of circuit breakers		2	T1, R2	BB	R, U & An
5.	Power frequency and impulse testing of bushing		2	T1, R2	PPT	R, U & An
6.	Power frequency and impulse testing of Isolators		1	T1, R2	PPT	R, U & An
7.	Power frequency and impulse testing of transformers		2	T1, R2	PPT	R, U & An
8.	Testing of Cables - Insulation Coordination		1	T1, R2	PPT	R, U & An

Assignment submission:

Seminar/Tutorial:

Model exam: 1/11/22



STAFF SIGNATURE



HOD SIGNATURE



PRINCIPAL

DAILY RECORD OF CLASS WORK

Month & Year: July & August 2022

Date*	Day	Allotted Period	Period Handled	Reason for Alteration
18/7/2022	Monday	1	1	
19/7	Tuesday	9,10	9,10	
20/7	Wednesday	3	3	
21/7	Thursday	7	7	
22/7	Friday	9	9	
23/7	Saturday	1	1	Monday TT
25/7	Monday	1	-	}
26/7	Tuesday	9,10	-	
27/7	Wednesday	3	-	} placement
28/7	Thursday	7	-	
29/7	Friday	9	-	} Holiday.
30/7	Saturday	-	-	
01/8/22	Monday	1	-	} placement
2/8	Tuesday	9,10	-	
3/8	Wednesday	3	-	} placement
4/8	Thursday	7	-	
5/8	Friday	9	-	} Tuesday TT
6/8	Saturday	9,10	-	

8/8	Monday	1	—	
9/8	Tuesday	9,10	—	Placement
10/8	Wednesday	3	—	
11/8	Thursday	7	—	Placement
12/8	Friday	9	—	
13/8	Saturday	3	—	Wednesday TT
15/8	Monday	1	—	Placement training / Independence day
16/8	Tuesday	9,10	9,10	
17/8	Wednesday	3	3	
18/8	Thursday	7	7	
19/8	Friday	9	9	
20/8	Saturday	7	7	Thursday TT
22/8	Monday	1	1	
23/8	Tuesday	9,10	9,10	
24/8	Wednesday	3	3	
25/8	Thursday	7	7	
26/8	Friday	9	9	
27/8	Saturday	9	9	Friday TT Placement

* Holidays / CL and OD days to be mentioned against the corresponding dates

Signature of HOD :

DAILY RECORD OF CLASS WORK

Month & Year: August & September 2022

Date*	Day	Allotted Period	Period Handled	Reason for Alteration
29/8	Monday	1	4 -	IAE - 1 Exam
30/8	Tuesday	9/10	9/10	
31/8	Wednesday	3	3	
1/9/22	Thursday	7	7	
2/9	Friday	9	9	
3/9	Saturday	1	4 -	Monday 9/9 - IAE (Exam)
5/9	Monday	1	1	
6/9	Tuesday	9/10	9/10	
7/9	Wednesday	3	3	
8/9	Thursday	4	7	
9/9	Friday	9	9	
10/9	Saturday	4 -	-	Leave.
12/9	Monday	1	4 -	IAE - 2 Exam
13/9	Tuesday	9/10	9/10	
14/9	Wednesday	3	3	
15/9	Thursday	7	7	
16/9	Friday	9	9	
18/9	Saturday	9/10	7/10	Tuesday 18/9

19/9	Monday	1	1	
20/9	Tuesday	9:10	9:10	
21/9	Wednesday	3	3	
22/9	Thursday	7	7	
23/9	Friday	9	9	
24/9	Saturday	—	—	Wednesday day order leave
26/9	Monday	1	1	
27/9	Tuesday	9:10	9:10	
28/9	Wednesday	3	3	
29/9	Thursday	7	7	
30/9	Friday	9	9	
1/10	Saturday	3	3	Thursday order
2/10	Monday	1	1	
4/10	Tuesday	9:10	9:10	
5/10	Wednesday	3	3	
6/10	Thursday	7	7	
7/10	Friday	9	9	
8/10	Saturday	7	7	Thursday order

* Holidays / C.T. and O.D days to be mentioned against the corresponding dates

Signature of HOD:

DAILY RECORD OF CLASS WORK

Month & Year : October & November

Date*	Day	Allotted Period	Period Handled	Reason for Alteration
10/10/10	Monday	1	—	Model II Exam
11/10	Tuesday	9,10	10 —	
12/10	Wednesday	3	—	Exam
13/10	Thursday	7	—	
14/10	Friday	9	—	Friday only.
15/10	Saturday	9	—	
17/10	Monday	1	1	
18/10	Tuesday	9,10	9,10	
19/10	Wednesday	3	3	
20/10	Thursday	7	7	
21/10	Friday	9	9	
22/10	Saturday	1	D—	Monday order / Cancelled
24/10	Monday			
	Tuesday			
	Wednesday			
	Thursday			
	Friday			
	Saturday			

Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					

* Holidays / CL and OD days to be mentioned against the corresponding dates



Signature of HOD :

ATTENDANCE

Roll No.	Reg.No.	Name	No. of Periods Attended			
			Report Period			
			18/17 1	19/17 2	20/17 3	21/17 4
19EE 291	312319105001	ABHISEKA MANIKANTAN V	a	/	/	/
19EE 274	5002	ABHISHEK.A	/	/	/	/
19EE 211	5003	ABINA.S	/	/	/	/
19EE 250	5004	ABINAYA.M	/	/	/	/
19EE 134	5005	ABINAYA.V.J	/	/	/	/
19EE 135	5006	ABINAYAA SRI.T	/	a	/	a
19EE 156	5007	ABISHEK.T	/	/	/	/
19EE 246	5008	ABISHLAL.N.S	/	a	a	a
19EE 236	5009	AJITH.V.A	/	/	/	/
19EE 148	5010	AJMAL ABDUL KADER.H	/	/	/	/
19EE 239	5011	AKSHAYAKRISHNEN	/	/	/	/
19EE 120	5012	ALFRED EINSTEIN.G	/	a	a	a
19EE 132	5013	AMIRTHA VARSHINI.M	/	/	/	/
19EE 289	5014	ANANYA.P.K	/	/	/	/
19EE 234	5015	ANTO BHARATH.R	/	/	/	/
19EE 263	5016	ARAVINDHRAJ.S	/	/	/	/
19EE 139	5017	ARAVINTHAN.R	/	/	/	/
19EE 229	5018	ASHWIN.S	a	/	/	/
19EE 257	5019	AYESHA PARVEEN.I	/	/	/	/
19EE 284	5020	BALAJI.S	a	a	/	/
19EE 280	5021	BALA MURUGIAN.D	/	/	/	/
19EE 146	5022	BERTINA.S	/	a	a	a
19EE 127	5023	BHARATHKUMAR.M	/	/	/	/
19EE 207	5024	BIVIN JOE.A	/	/	/	/
19EE 233	5025	CHERAN K	a	/	/	/

MONTH

7	7	8	8	8	8	8	8	8	8	8	8	8
22	23	16	17	18	20	22	23	24	25	26	29	30
9	1	9, 10	3	7	7	±	9, 10	3	7	10	1	9, 10
/	/	a	a	a	a	a	a	a	a	/	/	a
/	/	/	/	/	/	a	a	/	/	a	/	a
/	/	/	/	/	a	/	a	a	a	/	a	/
/	/	a	/	/	a	/	a	a	a	a	a	a
/	/	a	/	a	a	a	a	a	a	a	a	a
a	/	/	/	a	a	a	a	a	a	a	a	a
/	/	a	/	/	/	a	/	/	a	/	/	a
a	/	/	/	a	a	/	a	a	a	/	a	a
/	/	/	/	a	a	a	a	a	a	a	a	/
/	/	a	/	/	/	a	a	/	/	a	a	a
/	/	a	/	/	a	a	/	a	/	/	/	a
/	/	a	/	a	a	a	a	a	a	a	a	a
a	/	a	/	a	a	a	a	a	a	a	a	a
/	/	/	/	/	/	/	a	a	/	a	/	/
/	/	a	/	/	/	a	a	/	a	a	a	a
/	/	a	a	a	/	a	a	a	a	a	/	a
/	/	a	/	/	/	a	a	/	/	a	/	a
a	a	/	/	/	/	a	a	/	/	a	/	/
/	/	a	a	a	a	/	/	/	/	/	a	/
/	/	/	/	a	/	a	a	a	a	a	/	/
/	/	a	/	a	/	a	a	a	a	a	a	a
4	0	17	4	14	14	20	20	17	18	18	14	19
21	25	8	21	11	11	5	5	8	7	7	11	6

NT MARKS

Total ABSENT
Total PRESENT

MONTH

DATE

PERIOD

9	9	9	9	9	9	9	9	9	9	9	9	9
2	5	6	7	9	10	13	15	20	21	22	23	26
9	1	9	2	9	7	9	7	9	3	7	9	1
a	/	a	a	a	/	a	a	a	a	a	/	a
/	/	a	/	/	/	/	/	a	/	a	/	/
/	a	a	a	a	a	a	/	a	a	a	a	/
a	/	a	a	a	a	a	/	a	a	a	a	/
a	/	a	a	a	a	a	a	a	a	a	a	/
a	/	a	a	a	a	a	a	a	a	a	a	/
/	/	/	/	a	/	/	/	a	/	a	/	/
/	a	/	/	a	a	/	/	/	/	a	a	/
a	/	a	a	a	a	a	a	a	a	a	a	/
a	/	a	a	a	a	a	a	a	a	a	a	/
/	/	a	a	a	a	/	/	a	a	a	a	/
a	/	/	/	a	/	/	/	a	/	a	/	/
/	/	a	/	/	/	/	/	/	/	a	a	/
a	a	a	/	a	a	a	/	a	/	a	/	/
a	a	a	a	a	a	a	/	a	a	/	a	/
a	/	/	a	a	/	a	a	/	a	/	a	/
/	a	/	/	a	a	/	/	/	/	a	a	/
/	/	/	/	/	/	/	/	/	/	/	/	/
/	/	a	/	/	/	/	/	/	/	a	/	/
/	/	/	/	/	/	/	/	/	/	a	/	/
a	/	/	/	a	/	a	a	/	a	/	a	/
Total ABSENT	14	5	14	13	18	13	13	10	19	11	22	41
Total PRESENT	11	20	11	12	7	12	12	15	6	14	3	11

ATTENDANCE

Roll No.	Reg.No.	Name	No. of Periods Attended			
			Report Period			
			18/7 1	19/7 2	20/7 3	21/7 4
19EE 119	5026	CHRIS AUSTIN. A	1	1	1	1
19EE 114	5027	CHRIS KEVIN. A	1	1	1	1
19EE 265	5028	CHRISTEL PEERIS. R	1	1	1	1
19EE 286	5029	DEEPANA. E	1	1	1	1
19EE 150.	5030	DENORA. S	1	1	1	a
19EE 107	5031	DHANALAKSHMI. R	1	1	1	1
19EE 262	5032	DHANRAAJ. G	1	1	1	1
19EE 248	5033	DHARANI BALAN. G	a	a	1	1
19EE 273	5035	DHIYANESH. P	1	1	1	1
19EE 283	5036	DIVYALAKSHMI. G	1	1	1	1
19EE 215	5037	ELANCHEZHIAN. R. J	1	1	1	1
19EE 155	5038	EUREAK S SINGH	1	1	1	1
19EE 753	5039	EVANGIELENE. M	a	a	a	a
19EE 152	5040	GODSON S V NOBLE	1	1	1	1
19EE 223	5041	GOKUL N	1	1	1	1
19EE 275	5042	GOPINATH M	1	1	1	1
19EE 104	5043	GOWTHAM R	a	a	a	a
19EE 278	5044	HARIHARAN N	1	a	a	a
19EE 220	5045	HARISHKUMAR K	1	1	1	1
19EE 201	5046	HEMA APSARA. A	1	a	a	a
19EE 705	5047	ILAKKIYA. K	1	1	1	1
19EE 125	5048	IRAIANBU. G	1	1	1	1
19EE 227	5049	JAGAN K	1	1	1	1
19EE 235	5050	JAYASRUTHI. R. V	1	1	1	a
19EE 240	5051	JAYASURYA MS	1	1	1	1

SUMMARY OF CLASS WORK

DATE: 18/7

PERIOD: 1

TOTAL NO. OF CLASS 1

UNIT: 1

Introduction to overvoltages in power system
Subject Introduction.

DATE: 19/7

PERIOD: 9,10

TOTAL NO. OF CLASS 3

UNIT: 1

→ Internal causes
→ External causes of overvoltage.

DATE: 20/7

PERIOD: 3

TOTAL NO. OF CLASS 4

UNIT: 1

Various Theories of charge formation in clouds.
→ Symphonis theory

SUMMARY OF CLASS WORK

DATE: 21/7

PERIOD: 7

TOTAL NO. OF CLASS 5

UNIT: 1

Milson Theory, Reynolds and Masons theory.

DATE: 22/7

PERIOD: 9

TOTAL NO. OF CLASS 6

UNIT: 1

Mechanism of Lightning strokes.
→ Various stages.
→ Derivation for charge generated.

DATE: 23/7

PERIOD: 1

TOTAL NO. OF CLASS 7

UNIT: 1

Mathematical Model of Lightning


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 16/8

PERIOD: 9, 10

TOTAL NO. OF CLASS 9 UNIT: 1

- Causes of switching surge
- Power frequency over voltages.

DATE: 17/8

PERIOD: 3

TOTAL NO. OF CLASS 10 UNIT: 1

- Control methods of switching and power frequency over voltages.
- Travelling waves.

DATE: 18/8

PERIOD: 7

TOTAL NO. OF CLASS 11 UNIT: 1

- Protection devices of overhead power lines.
- Bewley's lattice diagram.

SUMMARY OF CLASS WORK

DATE: 19/8

PERIOD: 9

TOTAL NO. OF CLASS 12 UNIT: 1

- Reflection and Refraction of Travelling waves.
- problems on Bewley's lattice diagram.

DATE: 20/8

PERIOD: 7

TOTAL NO. OF CLASS 13 UNIT: 2

- Dielectric Breakdown in power systems
- Unit - II Introduction.
- Gaseous Breakdown.

DATE: 22/8

PERIOD: 1

TOTAL NO. OF CLASS 14 UNIT: 2

- Townsend's Breakdown Mechanism.
- Current growth equation.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 23/8 PERIOD: 9,10 TOTAL NO. OF CLASS 16 UNIT: 2

→ Townsend's primary and secondary
ionization process.

DATE: 24/8 PERIOD: 3 TOTAL NO. OF CLASS 17 UNIT: 2

Corona discharge and its effect
Breakdown in non-uniform field

DATE: 25/8 PERIOD: 7 TOTAL NO. OF CLASS 18 UNIT: 2

Vacuum Breakdown mechanisms.
Streamer theory of Breakdown in gases.

SUMMARY OF CLASS WORK

DATE: 26/8 PERIOD: 9 TOTAL NO. OF CLASS 19 UNIT: 2


→ Particle exchange mechanism
→ Field emission theory
→ Clump mechanism

DATE: 27/8 PERIOD: 9 TOTAL NO. OF CLASS 20 UNIT: 2

→ Breakdown in liquid dielectrics.

DATE: 30/8 PERIOD: 9,10 TOTAL NO. OF CLASS 22 UNIT: 2

→ Cavitation and Bubble theory
→ Stressed oil volume theory
→ Suspended particle theory.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 31/8

PERIOD: 3

TOTAL NO. OF CLASS 23 UNIT: 2

Breakdown in solid dielectrics.

→ different solid Breakdown mechanisms.

DATE: 1/9/22

PERIOD: 7

TOTAL NO. OF CLASS 24 UNIT: 2

Electro Chemical Breakdown

Electro mechanical Breakdown.

Electronic & Intrinsic Breakdown

Thermal Breakdown.

DATE: 2/9

PERIOD: 9

TOTAL NO. OF CLASS 25 UNIT: 2

Breakdown due to Treeing & Tracking

Breakdown due to internal discharge.

SUMMARY OF CLASS WORK

DATE: 5/9

PERIOD: 1

TOTAL NO. OF CLASS 26 UNIT: 2

Breakdown in Composite Dielectrics.

→ Short term breakdowns.

→ Long term breakdowns.

DATE: 6/9

PERIOD: 9, 10

TOTAL NO. OF CLASS 28 UNIT: 3

Introduction to unit - II - Generators of
high voltages and high currents.

Problems of unit - II

DATE: 7/9

PERIOD: 3

TOTAL NO. OF CLASS 29 UNIT: 3

Different Circuits to generate HV and High currents.

→ methods.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 8/9 PERIOD: 7 TOTAL NO. OF CLASS 30 UNIT: 3

Rectifier circuits - Half wave and full wave.
Voltage doubler

DATE: 9/9 PERIOD: 9 TOTAL NO. OF CLASS 31 UNIT: 3

Cockcroft Walton voltage multiplier

DATE: 13/9 PERIOD: 9,10 TOTAL NO. OF CLASS 33 UNIT: 3

Cockcroft Ripple derivation, regulation,
optimum number of stages.

SUMMARY OF CLASS WORK

DATE: 14/9 PERIOD: 3 TOTAL NO. OF CLASS 34 UNIT: 3

Electrostatic machine - Van de graff Generator
→ Principle working.

DATE: 15/9 PERIOD: 7 TOTAL NO. OF CLASS 35 UNIT: 3

Generator of High AC voltages
→ Cascaded Transformer

DATE: 16/9 PERIOD: 9 TOTAL NO. OF CLASS 36 UNIT: 3

Resonant Transformer working and types.
→ Series & Parallel.
Switching Systems


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 17/11

PERIOD: 9,10

TOTAL NO. OF CLASS 38 UNIT: 3

Impulse voltage Generators - Marx circuit.
→ Tripping and control of Impulse Generation.

DATE: 19/11

PERIOD: 1

TOTAL NO. OF CLASS 39 UNIT: 4

Introduction to High voltage measurements - Methods.

Series resistance Ammeter

DATE: 20/11

PERIOD: 9,10

TOTAL NO. OF CLASS 41 UNIT: 4

Dividers: Resistance, capacitance dividers.
for voltage measurements.

SUMMARY OF CLASS WORK

DATE: 21/11

PERIOD: 3

TOTAL NO. OF CLASS 42 UNIT: 4

Peak voltmeter measurement.

DATE: 22/11

PERIOD: 7

TOTAL NO. OF CLASS 43 UNIT: 4

Generating voltmeter → principle and working.

→ Merits & demerits.

DATE: 23/11

PERIOD: 9

TOTAL NO. OF CLASS 44 UNIT: 4

Capacitance voltage Transformer → working

Phasor diagrams.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 17/9 PERIOD: 9,10 TOTAL NO. OF CLASS 38 UNIT: 3

Impulse voltage Generator - Marx circuit
→ Tripping and control of Impulse Generation.

DATE: 19/9 PERIOD: 1 TOTAL NO. OF CLASS 39 UNIT: 4

Introduction to High voltage measurements - Methods.
Series resistance ammeter

DATE: 20/9 PERIOD: 9,10 TOTAL NO. OF CLASS 41 UNIT: 4

Dividers, Resistance, capacitance dividers,
for voltage measurements.

SUMMARY OF CLASS WORK

DATE: 21/9 PERIOD: 3 TOTAL NO. OF CLASS 42 UNIT: 4

Peak voltmeter measurement.

DATE: 22/9 PERIOD: 7 TOTAL NO. OF CLASS 43 UNIT: 4

Generating voltmeter → principle and working.
→ Merits & demerits.

DATE: 23/9 PERIOD: 9 TOTAL NO. OF CLASS 44 UNIT: 4

Capacitance voltage Transformer → working
Phasor diagram.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 26/9 PERIOD: 1 TOTAL NO. OF CLASS 45 UNIT: 4

Electrostatic Voltmeter \rightarrow Construction
and working.

DATE: 27/9 PERIOD: 9/10 TOTAL NO. OF CLASS 47 UNIT: 4

Sphere Gap measurement \rightarrow Horizontal and
Vertical Configuration.

DATE: 28/9 PERIOD: 3 TOTAL NO. OF CLASS 48 UNIT: 4

High Current shunt measurement

SUMMARY OF CLASS WORK

DATE: 29/9 PERIOD: 7 TOTAL NO. OF CLASS 49 UNIT: 4

Digital Techniques in HV measurements.
 \rightarrow IRO.

DATE: 30/9 PERIOD: 9 TOTAL NO. OF CLASS 50 UNIT: 4

Problems on HV measurements.

DATE: 1/10 PERIOD: 3 TOTAL NO. OF CLASS 51 UNIT: 4

Problems.


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 3/10

PERIOD: 1

TOTAL NO. OF CLASS 52 UNIT: 5

Standard Definitions and
Need for testing.

DATE: 4/10

PERIOD: 9/10

TOTAL NO. OF CLASS 54 UNIT: 5

High voltage Testing Standards
Indian & British Standard.

DATE: 5/10

PERIOD: 3

TOTAL NO. OF CLASS 55 UNIT: 5

Testing of Insulators
→ power frequency and impulse Test

SUMMARY OF CLASS WORK

DATE: 6/10

PERIOD: 7

TOTAL NO. OF CLASS 56 UNIT: 5

Type test and Routine Test

Testing of circuit Breaker & Isolator.

DATE: 7/10

PERIOD: 9

TOTAL NO. OF CLASS 57 UNIT: 5

Testing of Busings.

DATE: 8/10

PERIOD: 7

TOTAL NO. OF CLASS 58 UNIT: 5

Testing of Isolators


Sign of HOD with Date

SUMMARY OF CLASS WORK

DATE: 17/10

PERIOD: 1

TOTAL NO. OF CLASS 59

UNIT: 5

Testing of Cables

DATE: 18/10

PERIOD: 9, 10

TOTAL NO. OF CLASS 61

UNIT: 5

Testing of Transformer

DATE: 19/10

PERIOD: 3

TOTAL NO. OF CLASS 62

UNIT: 5

Insulation Co-ordination.

SUMMARY OF CLASS WORK

DATE: 20/10

PERIOD: 7

TOTAL NO. OF CLASS 63

UNIT: 5

Revision - Important Questions.

DATE: 21/10

PERIOD: 9

TOTAL NO. OF CLASS 64

UNIT: Revision

Revision of all five units.

DATE:

PERIOD:



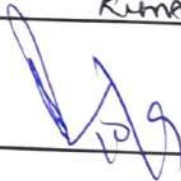
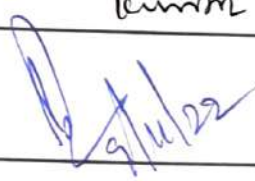
TOTAL NO. OF CLASS

UNIT:


Sign of HOD with Date

RESULT ANALYSIS

TERM - I

S.No	Description		IAE - I	IAE - II
1	Date of Exam	:	29/8/2022	13/9/22
2	Total No. of Students	:	54	54
3	No of Students Attended	:	54	52
4	No of Students Passed	:	53	50
5	Percentage of Pass	:	98.15	96.15
Signature of the Staff		:		
Name of the Staff		:	C. VENKATESH Kumar	C. VENKATESH Kumar
Signature of the HOD of the Concerned Department with Date (After distributing the answer scripts)		:		

Range of Marks		0 - 22	23 - 30	31 - 38	39 - 48	41 - 45	46 - 50
No. of Students	IAE - I	1	7	27	14	-	5
	IAE - II	2	8	26	14	-	2


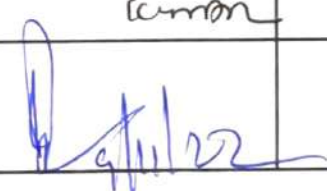
Range of Marks	0 - 44	45 - 60	61 - 70	71 - 80	81 - 90	91 - 100
No. of Students (IAE I & II Combined)						

Signature of the HOD of the
Concerned Department

: 

RESULT ANALYSIS

TERM - II

S.No	Description		Model ^{IP} IAE - III	Model (IP) IAE - IV
1	Date of Exam	:	11/10/22	
2	Total No. of Students	:	54	
3	No of Students Attended	:	45	
4	No of Students Passed	:	38	
5	Percentage of Pass	:	84.4%.	
Signature of the Staff		:		
Name of the Staff		:	C. Venkatesh Kumar	
Signature of the HOD of the Concerned Department with Date (After distributing the answer scripts)		:		

Range of Marks		0 - 22	23 - 30	31 - 35	36 - 40	41 - 45	46 - 50
No. of Students	IAE - III	7	16	14	7	1	—
	IAE - IV						

Range of Marks	0 - 44	45 - 60	61 - 70	71 - 80	81 - 90	91 - 100
No. of Students (IAE III & IV Combined)						

Signature of the HOD of the
Concerned Department

: 

RESULT ANALYSIS

MODEL EXAMINATION

- 1 Date of Exam : 1/11/22
- 2 Total No. of Students : 54
- 3 No of Students Attended : 54
- 4 No of Students Passed : 48
- 5 Percentage of Pass : 88.8%.

RESULT ANALYSIS

Range of Marks	0 - 44	45 - 60	61 - 70	71 - 80	81 - 90	91 - 100
No. of Students	6	16	26	4	—	1

Signature of the Staff :



Name of the Staff :

C. Venkatesh Kumar




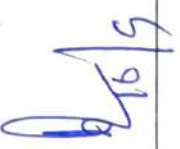






Signature of the HOD of the Concerned

Department with Date


(After distributing the answer scripts)



SYLLABUS COVERAGE

Unit No.	Started on	Completed on	No. of hours	Sign of staff with Date	Sign of HOD with Date
1	18/7/22	19/8/22	12	 20/8/22	 10/9
2	20/8/22	5/9/22	14	 5/9/22	 16/9
3	6/9/22	17/9/22	13	 19/10/22	 11/11/22
4	19/9/22	16/10/22	12	 3/10	 11/11/22
5	3/10/22	21/10/22	12	 21/10	 11/11/22

REMARKS

S.No.	Date	Remarks/Comments/Deviations, if any	HOD Signature with Date
1.	5/9/22	Extra classes taken for unit II	

	multiplier circuits? Explain its working with a schematic diagram when it is unloaded and loaded. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages.			
	OR			
13.b	Explain the different methods of producing switching impulses in test laboratories. Draw the typical impulse current generator circuit and explain its operation and applications.	(13)	BL1, BL2	C401.3
14.a	Explain with neat diagram the principle of operation of an electrostatic voltmeter. Discuss its advantages and limitations for high voltage measurements.	(13)	BL1, BL2	C401.4
	OR			
14.b	(i) Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltages. Explain the arrangement used to minimize the errors. (ii) What are the requirements of a digital storage oscilloscope for impulse and high frequency measurement in HV test circuits?	(13)	BL1, BL2	C401.4
15.a	Explain in detail the various test conducted on circuit breakers and isolators.	(13)	BL1, BL2	C401.5
	OR			
15.b	Explain insulation coordination in detail.	(13)	BL1, BL2	C401.5
	PART - C (1 X 15 = 15 Marks)			
16.a	A coaxial shunt is to be designed to measure an impulse current of 50 kA. If the bandwidth of the shunt is to be at least 10 MHz and if the voltage drop across the shunt should not exceed 50 V, find the ohmic value of the shunt and its dimensions.	(15)	BL1, BL2, BL5	C401.4
	OR			
16.b	A Cockcroft-Walton type voltage multiplier has twelve stages with capacitances, all equal to $0.05 \mu\text{F}$. The supply transformer secondary voltage is 150 kV at a frequency of 125 Hz. If the load current to be supplied is 4.5 mA, find (a) the percentage ripple, (b) the regulation, and (c) the optimum number of stages for minimum regulation or voltage drop.	(15)	BL1, BL2, BL5	C401.3



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OMR, Chennai - 119.



MODEL EXAM II - October - 2022

Subject : High Voltage Engineering

Code : EE8701

Branch : EEE

Sem : VII

DURATION : 3 hours

MAX MARKS: 100

PART - A (10 X 2 = 20 Marks)

1.	What are the disadvantages of half wave rectifier circuit?	(2)	BL2	C401.3
2.	What is a cascaded transformer?	(2)	BL2	C401.3
3.	Give any two methods of switching surge generation in laboratory.	(2)	BL2	C401.3
4.	What are the advantages of cascaded transformer over two winding transformer for generating high AC voltage?	(2)	BL2	C401.3
5.	What are the advantages of series resonant circuit?	(2)	BL2	C401.3
6.	What is the effect of nearby earthed objects on the measurements using sphere gaps?	(2)	BL2	C401.4
7.	List some advantages of Faraday generator.	(2)	BL2	C401.4
8.	Give the advantages of electrostatic voltmeter.	(2)	BL2	C401.4
9.	What are the drawbacks of series resistance micro ammeter technique in HVAC measurements?	(2)	BL2	C401.4
10.	Why are the capacitive voltage dividers preferred for high AC voltage measurements?	(2)	BL2	C401.4

PART - B (5 X 13 = 65 Marks)

11.a	Explain the Cockcroft -Walton voltage multiplier circuit with a schematic diagram when it is unloaded and loaded. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages.	(13)	BL3	C401.3
OR				
11.b	Describe with a neat sketch the working of a Van De Graff generator. What are the factors that limit the maximum voltage obtained?	(13)	BL2	C401.3
12.a	Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances?	(13)	BL2	C401.3

12.b	Explain the different methods of producing switching impulses in test laboratories. Draw the typical impulse current generator circuit and explain its operation and applications.	(13)	BL2	C401.3
13.a	Explain tripping and control of impulse generators with Trigatron gap arrangements. How are the wavefront and wavetail time controlled in impulse generator circuits?	(13)	BL2	C401.3
OR				
13.b	What is CVT? Explain how CVT can be used for high voltage ac measurement.	(13)	BL2	C401.4
14.a	Describe the construction, principle of operation of a Generating voltmeter and give its applications and limitations.	(13)	BL2	C401.4
OR				
14.b	Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement?	(13)	BL2	C401.4
15.a	Tabulate the different methods of High AC and DC voltage and current measurements.	(13)	BL2	C401.4
OR				
15.b	(i) Write short notes on Mixed R-C potential dividers. (ii) Explain the operation of Peak Reading Voltmeters for impulse voltages.	(13)	BL2	C401.4
PART - C (1 X 15 = 15 Marks)				
16.a	A six stage impulse generator designed to generate the standard waveform (1.2/50 μ s) has a per stage capacitance of 0.06 μ F to be used to test transformers with an equivalent winding to earth capacitance of 1nF. A peak output voltage of 550kV is required for testing the transformer. The wavefront time is to be defined based on 30% and 90% values. With the aid of appropriate calculations select the values of the resistive elements in the circuit to produce the required waveform. State any assumptions made.	(15)	BL5	C401.4
OR				
16.b	A Cockcroft-Walton type voltage multiplier has eight stages with capacitances, all equal to 0.05 μ F. The supply transformer secondary voltage is 150 kV at a frequency of 125 Hz. If the load current to be supplied is 4.5 mA, find (a) the percentage ripple, (b) the regulation, and (c) the optimum number of stages for minimum regulation or voltage drop.	(15)	BL5	C401.3



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Jayapriya Educational Trust

OMR, Chennai - 119.



INTERNAL ASSESSMENT EXAM II - September - 2022

Subject : High Voltage Engineering

Branch : EEE

DURATION : 1 hour 30 Minutes

Code : EE8701

Sem : VII

MAX MARKS: 50

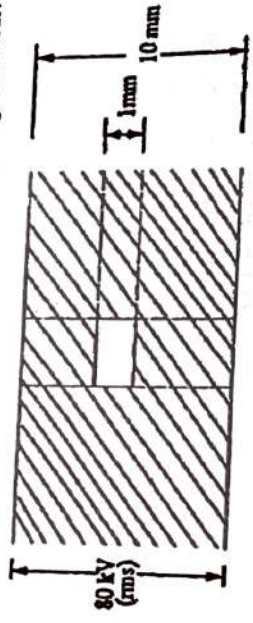
PART - A (10 X 2 = 20 Marks)

1.	What is a Townsend's first ionization coefficient?	(2)	BL2	C401.2
2.	State Paschen's law.	(2)	BL2	C401.2
3.	Define treeing and tracking.	(2)	BL2	C401.2
4.	What is meant by corona discharges?	(2)	BL2	C401.2
5.	What is meant by "Penning effect"?	(2)	BL2	C401.2
6.	What is the Townsend's condition for breakdown?	(2)	BL2	C401.2
7.	What do you mean by tracking index?	(2)	BL2	C401.2
8.	What is ionization by collision?	(2)	BL2	C401.2
9.	List the various properties of composite dielectrics.	(2)	BL2	C401.2
10.	Mention the gases used as the insulating medium in electrical apparatus?	(2)	BL5	C401.2

PART - B (3 X 10 = 30 Marks)

11.a	(i)What is meant by Electro negative gases? Why is the break down strength higher in these gases compared to that in other gases? (ii)Explain the streamer theory of break down in air at atmospheric pressure.	(10)	BL2	C401.2
OR				
11.b	From the fundamental principles, derive Townsend's criteria for the breakdown of gaseous dielectric medium.	(10)	BL2	C401.2
12.a	Discuss the various mechanisms of vacuum break down	(10)	BL3	C401.2
OR				

12.b	Explain in detail the breakdown mechanism in non-uniform fields and corona discharge.	(10)	BL2	C401.2
13.a	What do you understand by intrinsic strength of solid dielectrics? Explain different mechanisms by which breakdown occurs in solid dielectrics in practice	(10)	BL3	C401.2
OR				
13.b	A solid dielectric specimen of dielectric constant of 4.0 shown in the figure has an internal void of thickness 1 mm. The specimen is 1 cm thick and is subjected to a voltage of 80 kV (rms). If the void is filled with air and if the breakdown strength of air can be taken as 30 kV (peak)/cm, find the voltage at which an internal discharge can occur.	(10)	BL5	C401.2





INTERNAL ASSESSMENT EXAM I - August - 2022

Subject : High Voltage Engineering

Code : EE8701

Branch : EEE

Sem : VII

DURATION : 1 hour 30 Minutes

MAX MARKS: 50

PART - A (10 X 2 = 20 Marks)

1.	What are the different types of over voltages? Mention the internal and external causes.	(2)	BL2	C401.1
2.	Define Lightning phenomenon.	(2)	BL2	C401.1
3.	Define induced stroke.	(2)	BL2	C401.1
4.	What is meant by Bewley's Lattice diagram?	(2)	BL2	C401.1
5.	State the parameters and the characteristics of lightning strokes.	(2)	BL2	C401.1
6.	Define Isokeraunic level.	(2)	BL2	C401.1
7.	What are the Protective devices used to protect power system apparatus against lightning?	(2)	BL2	C401.1
8.	Explain the different theories of charge formation in clouds.	(2)	BL2	C401.1
9.	List some sources causing switching surges.	(2)	BL5	C401.1
10.	A transmission line surge impedance 250 ohms is connected to a cable of surge impedance of 50 ohms at the other end, if the surge of 400 kV travels along the line to the junction point, find the voltage build at the junction			
PART - B (3 X 10 = 30 Marks)				
11.a	Explain Wilson and Simpson's theory of charge formation in clouds.	(10)	BL2	C401.1
OR				

V-C - (long)
 POM
 A - A
 M&P

	induce over voltages on Overhead power lines?	(10)	BL2	C401.1
12.a	Explain with suitable figures the principles and functioning of (a) Expulsion gaps, (b) Protector tubes along with its advantages and disadvantages.	(10)	BL3	C401.1
OR				
12.b	What are the causes for switching and power frequency over voltages? How are they controlled in power system?	(10)	BL2	C401.1
13.a	An underground cable of inductance 0.189 mH/km and of capacitance 0.3 μ F/km is connected to an overhead line having an inductance of 1.26 mH/km and capacitance of 0.009 μ F/km. Calculate the transmitted and reflected voltage and current waves at the junction, if a surge of 200 kV travels to the junction, (i) along the cable, and (ii) along the overhead line.	(10)	BL5	C401.1
OR				
13.b	i) Describe the various steps to draw the Bewley-Lattice diagram of successive reflections. ii) A long transmission line is energized by a unit step voltage 1.0 V at the sending end and is open circuited at the receiving end. Construct the Bewley's lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.7$	(10)	BL5	C401.1