



RAMCO INSTITUTE OF TECHNOLOGY

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Department of Electrical and Electronics Engineering Academic Year 2023 – 2024 (Odd Semester)

Degree, Semester & Branch: VII Semester B.E EEE

Course Code & Title: EE8701 – High Voltage Engineering

Name of the Faculty member: Mr. E. Thangam

Innovative Practice Description

- **Unit / Topic:** Unit I / Corona and its effects
- **Course Outcome:** CO 1
- **Topic Learning Outcome:** TLO 1
- **Activity Chosen:** One minute paper
- **Justification:**
 - The chosen topic is of theoretical nature with lot of points involved. This activity helps the students to reflect on the day's lesson in response to my question and helps them in remembering and recollecting the important points.
 - The activity provides me with useful feedback about how the students have understood my concepts.
 - One minute paper is an in-class writing activity taking one-minute or less to complete. Hence it is easily implementable.
- **Time Allotted for the Activity:** 5 minutes
- **Details of the Implementation:**
 - At the end of the lecture (about 40 minutes), the students are asked to write down the important points they learned during the class in a piece of paper. The paper has been given to the students by the teacher.
 - The students have been given with three minutes of time. They need to write the points learned in the class in the paper.
 - At the end of the 3 minutes, all the papers are collected by the teacher. Randomly few papers are selected. The points written on it are discussed to the class by the students themselves. Teacher facilitated the process and added the explanation to the student points.
- **CO – PO / PSO mapping:**

CO	PO 1	PO 2	PO 12	PSO 1	PSO 3
CO 1	3	2	1	1	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO 8	PO 10
	1	1
Justification for correlation	The students are writing the points without discussing and coping with others. Hence it is mapped with level 1	The students are writing the points and explaining the points to the class. Hence their communication skills are getting improved. Hence it is mapped with level 1

- **Reflective Critique:**

- ❖ *Feedback of practice from students and other stakeholders:*

- ✓ The students have enjoyed the session even though they have been asked to write the important points on the paper. I told them to consider it as a practice not as a test. Hence they felt calm and did the work.

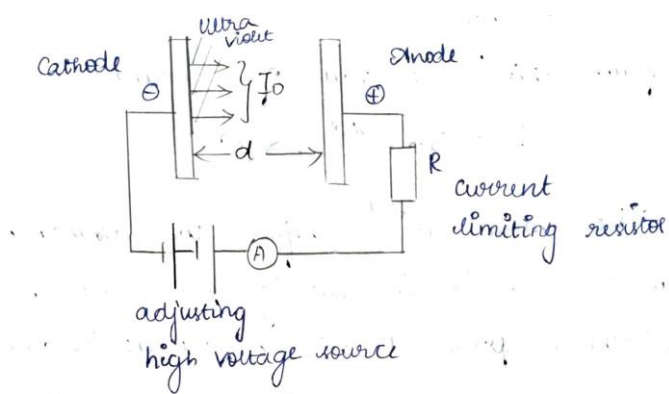
- ❖ *Benefit of the practice:*

- ✓ The students have understood the concepts clearly and it has been evident from the points they have written on the one minute paper.
- ✓ The students have presented the points to the class; it cleared any ambiguity in understanding the important points in the chosen topic.

- ❖ *Challenges faced in implementation:*

- ✓ Managing the non-participating students in the class. Mostly the slow learners have not participated in the activity. They have not written any points on the paper.
- ✓ When I discussed with them, they said they had a fear of asking points to them. Hence they have not participated.

Proof:



$$dn = \alpha \cdot n dx \rightarrow (1)$$

$$\frac{dn}{n} = \alpha dx$$

$$\ln n = \alpha x + A \rightarrow (2)$$

where $n = n_0$; $x = 0$,

$$\ln n_0 = \alpha(0) + A \rightarrow \text{Therefore the}$$

value of A will be

$$A = \ln n_0 \rightarrow (3)$$

Substitute (3) in (2),

$$\ln n = \alpha x + \ln n_0$$

$$\ln \left(\frac{n}{n_0} \right) = \alpha x$$

$$\frac{n}{n_0} = e^{\alpha x}$$

References:

- ❖ https://en.wikipedia.org/wiki/Corona_discharge
- ❖ S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013
- ❖ <https://www.rochester.edu/college/cetl/faculty/one-minute-paper.html>

Signature of Faculty Member

HoD/EEE



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Innovative Practice Description

• **Unit / Topic: Unit II / Applications of insulating materials in electrical equipment**

• **Course Outcome: CO 2**

• **Topic Learning Outcome: TLO 8**

• **Activity Chosen: Class poll**

• **Justification:**

- The insulating material for electrical equipment will vary according to various classifications. The students must be able to identify which insulating material is suitable for which apparatus. Hence the class poll is conducted for the chosen topic “Applications of insulating in electrical equipment”.

• **Time Allotted for the Activity: 15 minutes**

• **Details of the Implementation:**

- The students sitting adjacent are made as a team of four for doing this activity.
- The class poll questions have been shown to the class using the classroom projector.
- The teams have provided their choices of the answers along with their reasons.
- Finally, the correct and explanation have been provided by me.

• **CO – PO / PSO mapping:**

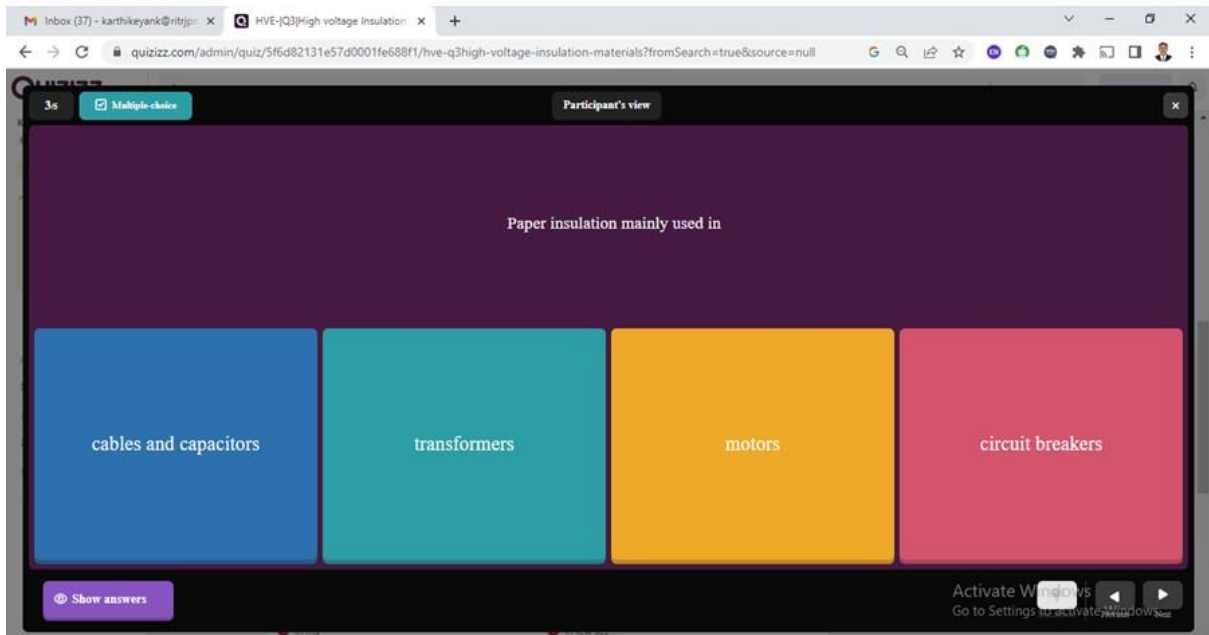
CO	PO 1	PO 2	PO 5	PO 8	PO 12	PSO 1
CO 2	3	2	1	1	1	1

(1 – Low 2 – Moderate 3 – High)

• **PO / PSO mapped:**

Innovative practice	PO 9	PO 10
	1	1
Justification for correlation	The students are working in a small group while doing this activity. Hence it is mapped with level 1.	The students are communicating with each other in a team for getting the answer for the poll. Hence their communication skills are getting improved. Hence it is mapped with level 1.

- **Images / Screenshot of the practice:**



- **Reflective Critique:**

- ❖ ***Feedback of practice from students and other stakeholders:***

- ✓ The students have enjoyed the learning since the activity made them to the mood of small competition. At the same time, they have cleared their doubts about the concept. Most of the student told me to conduct such activity also in the future classes.

- ❖ ***Benefit of the practice:***

- ✓ The activity helped the students to gain insights about one another and build confidence in their own learning.
- ✓ It helped me to identify the gaps in my student's comprehension about the topic.
- ✓ The activity is incredibly useful in avoiding the monotony of a lesson by breaking up the content flow.

- ❖ ***Challenges faced in implementation:***

- ✓ The class poll can be created with so many online tools, so that each student can participate in the poll. But the lack of Computer / Laptop / Mobile and Internet connectivity not allowed me to conduct using those tools. Hence next time, I will plan this activity in laboratory.

References:

- ❖ S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013
- ❖ <https://www.elprocus.com/what-is-an-insulating-material-classification-its-applications/>
- ❖ <https://www.dunkirkcsd.org/cms/lib/NY19000564/Centricity/Domain/13/SAGE%20n%20Scribe%20English.pdf>

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Innovative Practice Description

- **Unit / Topic: Unit III & IV / High voltage and current generation and Sphere gaps**
- **Course Outcome: CO 3, CO 4**
- **Topic Learning Outcome: TLO 9, TLO 10, TLO 11**
- **Activity Chosen: Virtual laboratory**
- **Justification:**
 - The virtual lab experiments are available for the generation and measurement circuits such as Voltage doubler circuit, Cockcroft Walton Voltage multiplier circuit, Van-de-Graff generator and Sphere gap etc. It is developed by the IIT, Kharagpur. Hence this Virtual laboratory has been chosen for the topics.
- **Time Allotted for the Activity: 50 minutes**
- **Details of the Implementation:**
 - The students are taken to the Power system simulation laboratory and each one is occupying the one system with Internet connectivity.
 - The link for the virtual laboratory is shown to them through the LCD projector and I told them to go that page.
 - I explained about the virtual experiments and how to do those experiments step by step. I also told my students to do the same parallel.
 - I changed few parameters in those experiments and shown the waveform changes. I also explained the reasons for those changes.
 - I told my students to play with those parameters and write down the reasons for the waveform changes.
 - Finally, the students have taken the screenshots of their laboratory experiment setup and resultant waveform and submitted as an Assignment in CANVAS.

• CO – PO / PSO mapping:

CO	PO 1	PO 2	PO 5	PO 8	PO 12	PSO 1	PSO 3
CO 3	3	2	1	-	1	1	1
CO 4	3	2	1	1	1	1	1

(1 – Low

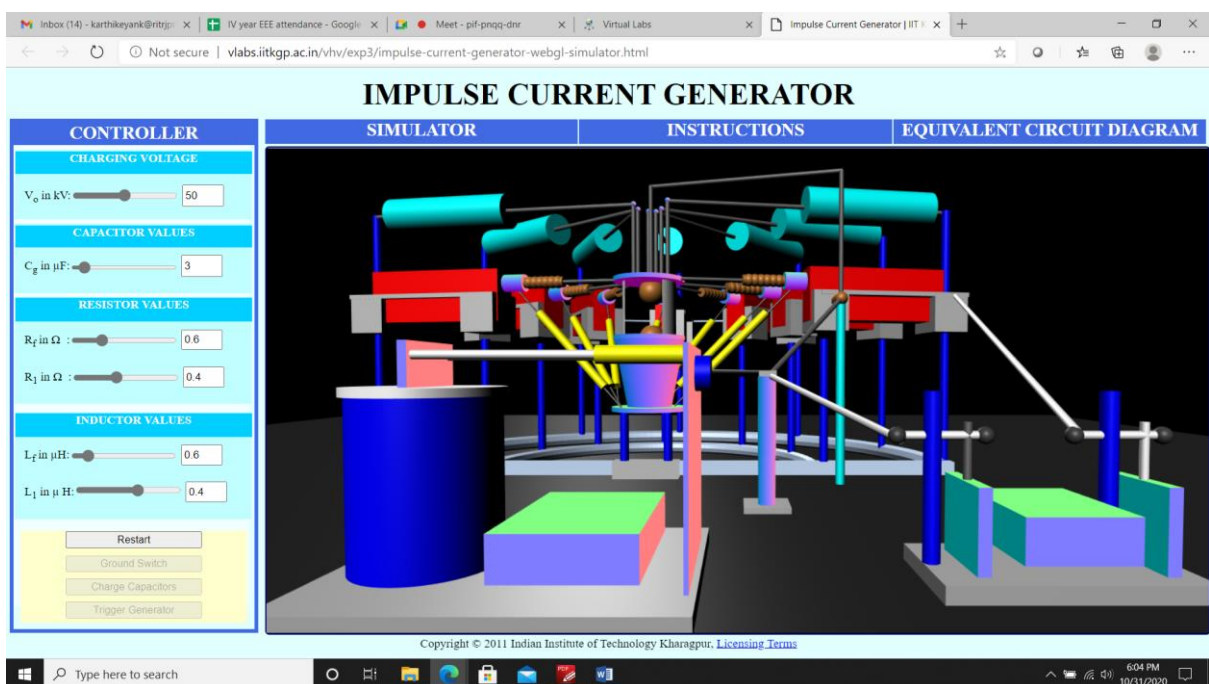
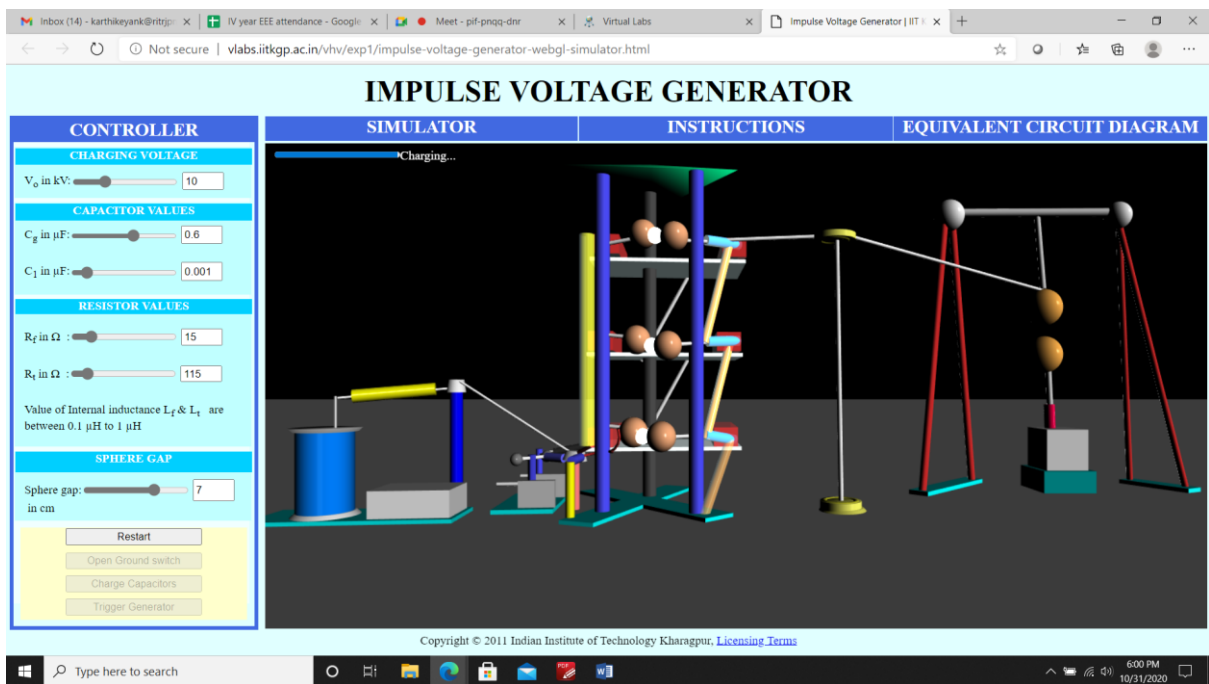
2 – Moderate

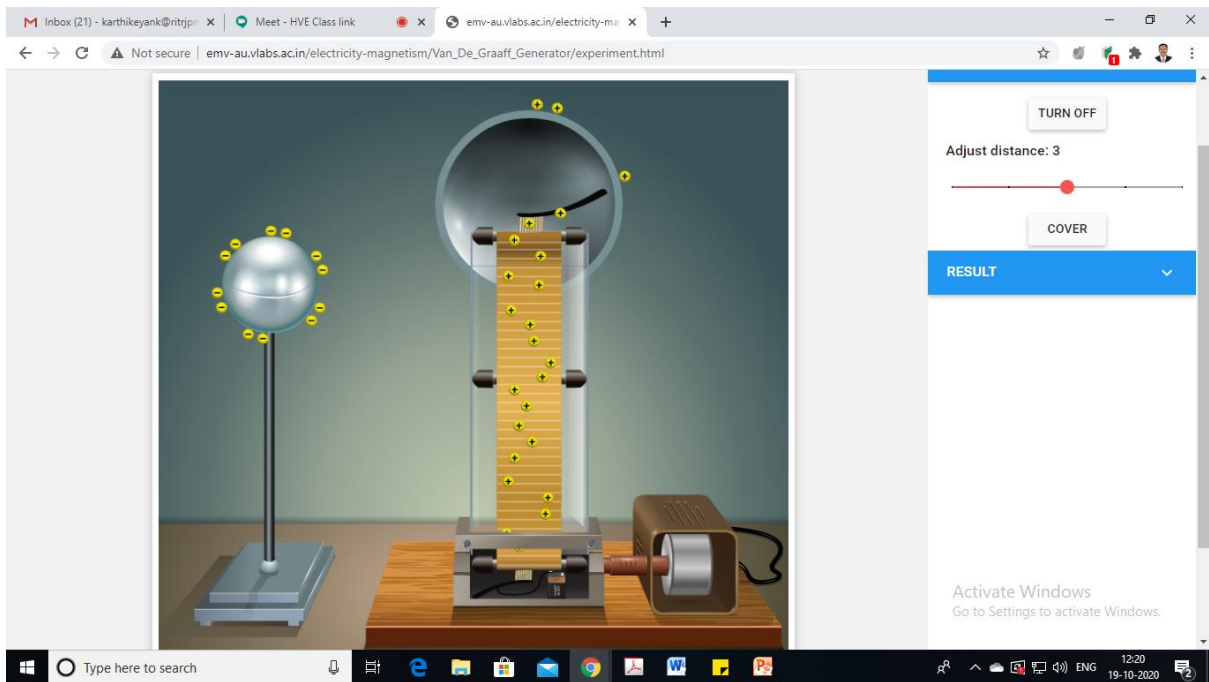
3 – High)

- PO / PSO mapped:

Innovative practice	PO 10
	1
Justification for correlation	The students are writing the report for the Virtual laboratory experiments. Hence their written communication skills are getting improved. Hence it is mapped with level 1.

- Images / Screenshot of the practice:





- **Reflective Critique:**

- ❖ **Feedback of practice from students and other stakeholders:**

- ✓ The students have enjoyed the hands-on experience on working with the circuits.
 - ✓ These concepts are learned only through theory-based lectures. But when I proposed this activity as an Assignment, they really liked it and did it very well.

- ❖ **Benefit of the practice:**

- ✓ The students are able to visualize about the operation of the circuit and devices virtually. It is made them to understand the concepts very well.
 - ✓ Since it is virtual environment, the students are able to do the experiment multiple times until they understand the topic.

- ❖ **Challenges faced in implementation:**

- ✓ Few students had a problem to navigate through the virtual experiments; I helped them to do it.
 - ✓ Managing the students, making them to do the experiments and clearing the doubts about the tool and concepts took lot of time. Hence, it is not possible to cover all the experiments in one period.

References:

- ❖ S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
- ❖ <http://vlabs.iitkgp.ernet.in/vhv/>

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Innovative Practice Description

- **Unit / Topic:** Unit IV / Generation of High Voltages & High Currents
- **Course Outcome:** CO 4
- **Topic Learning Outcome:** TLO 24
- **Activity Chosen:** Mind Map
- **Justification:**
 - The chosen topic will have lot of statistical methods to decide the generation value of High Voltages & High Currents. Usually the students will find it difficult to understand the methods and also to properly select the generator for the given power apparatus. By conducting this mind map, I tried to help them to understand the concepts better.
- **Time Allotted for the Activity:** 15 minutes
- **Details of the Implementation:**
 - The problem statement of the mind map has been shared with the students.
 - All the students have started the mind map at the same time. At the end of the activity, the correct answers will be shown to them in the screen.
 - Finally, I explained the correct answer for the mind map with proper reasons.
- **CO – PO / PSO mapping:**

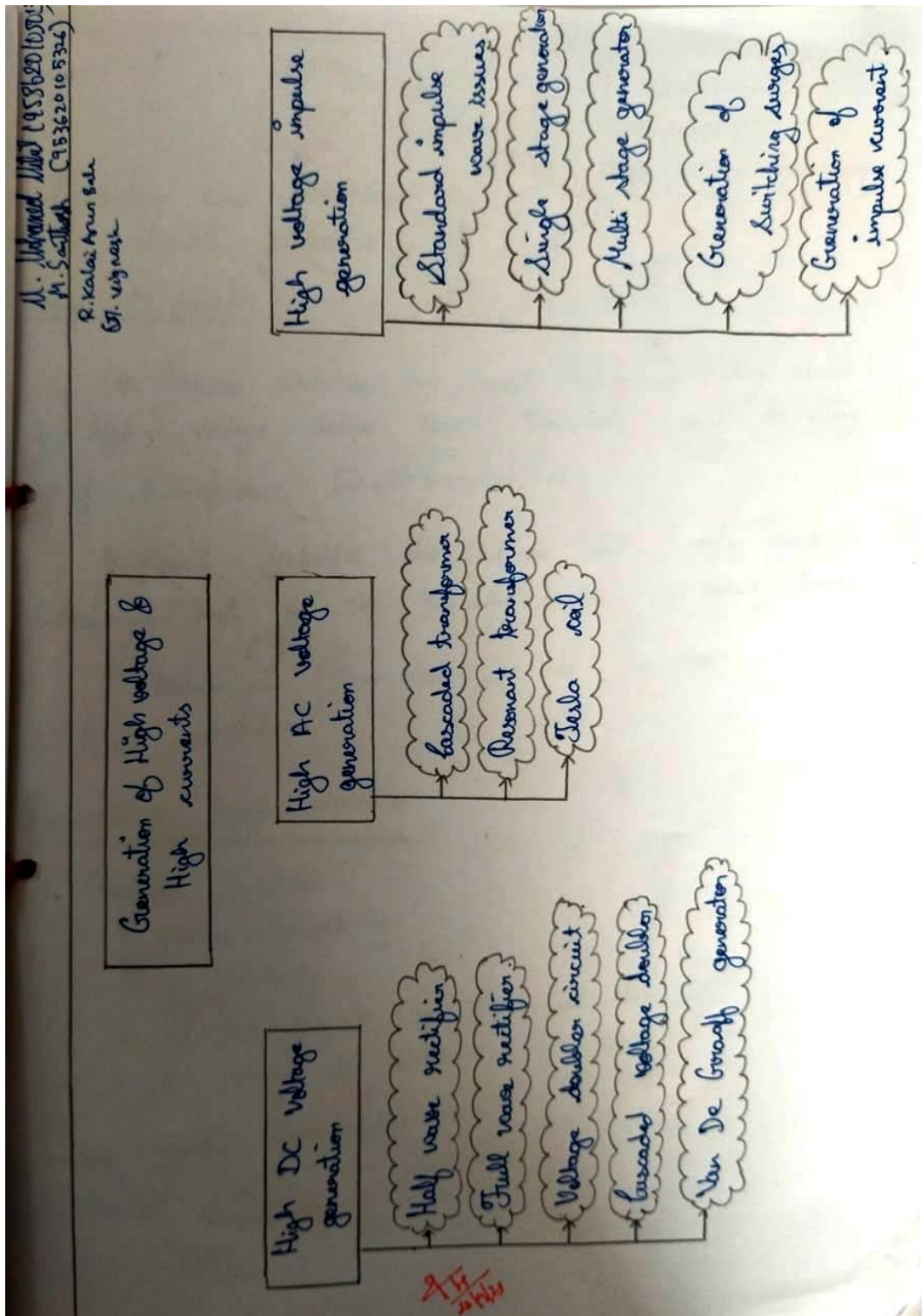
CO	PO 1	PO 8	PSO 3
CO 4	3	1	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO 3	PO 8
	3	1
Justification for correlation	The students are using mind map. Hence it is mapped with this PO at level 1	The students are doing this mind map without discussing and copying from others. Hence it is mapped with this

- Images / Screenshot of the practice:



- Reflective Critique:

- ❖ *Feedback of practice from students and other stakeholders:*

- ✓ The students have enjoyed the quiz. They told they have been given with the chance of remembering the concepts in the same class itself.

- ❖ *Benefit of the practice:*

- ✓ The students are getting the feel of involved in the learning process.
- ✓ Since the quiz is not included in the marks calculation, the students have done the quiz without any test fear. Hence, they participated freely.

❖ ***Challenges faced in implementation:***

- ✓ Few students have not much interest in attending the quiz sincerely, since the quiz is ungraded. Managing those students and making them to do the quiz is difficult task for me in this activity.

References:

- ❖ S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
- ❖ <https://site.ieee.org/sas-pesias/files/2020/02/InsulationCoordination.pdf>

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