DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. **Branch : Electrical Engineering** **Semester : VII**

Subject Code & Name: BTEEC702 High Voltage Engineering

Max Marks: 60 **Date: 18/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	**What is secondary ionization? Explain the various causes in detail for secondary ionization.**		**6**
B)	**Derive the equation for Townsend's second coefficient of ionization and also state the Townsend's criteria.**		**6**
C)	**What is Paschen's Law? Derive an equation to prove that the breakdown voltage is a function of distance between the electrodes.**		**6**
Q.2	**Solve Any Two of the following.**		
A)	**Explain the various theories for breakdown in liquids.**		**6**
B)	**What is electric stress? Suggest various methods to control electric stress.**		**6**
C)	**Describe breakdown in Solid insulating materials.**		**6**
Q. 3	**Solve Any One of the following.**		
A)	**State the need for inulation co-ordination. Also explain Basic Insulation Level and its significance.**		**6**
B)	**Discuss various theories explaining the cause of natural lightning.**		**6**
C)	**What are travelling waves? Explain various causes for generation of travelling waves.**		**6**
Q.4	**Solve Any Two of the following.**		
A)	**Draw a neat circuit diagram for a Marx Impulse Generator. Also explain the working of the Impulse Generator.**		**6**
B)	**What is a switching surge? Explain its effects and causes in detail.**		**6**
C)	**Discuss the need for high voltage generation and explain various sources for obtaining high voltage.**		**6**

Q. 5 Answer the following in brief (ANY 2)

A) Write a short note on requirements of high voltage laboratories and explain the requirements of small, large and very large laboratories. **6**

B) Explain the test procedure for Lightning Impulse test and Double Voltage Double Frequency tests carried out on quipments like transformer. Also state the relevant Indian Standard. **6**

C) State the significance of Lightning arrester and also explain its working in detail. **6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2022

Course: B. Tech. Final Year **Branch : Electrical & Instrumentation Engineering**

Semester :VII **Subject Code & Name: BTEIEC703/High Voltage Engineering**

Marks: 60 **Date: 01/02/2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Define electric field stress. Derive Poisson's equation.	**Evaluation**	**6**
B)	Explain the estimation and control of electric stress.	**Understand**	**6**
C)	What do you mean by surge voltages? How they are distributed and controlled?	**Remember**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Explain Townsend's criterion for breakdown in gases.	**Evaluation**	**6**
B)	State and explain Paschen's law.	**Evaluation**	**6**
C)	Write a note on glow and arc discharge.	**Remember**	**6**
Q.3	**Solve Any Two of the following.**		**12**
A)	Explain breakdown in commercial liquids.	**Understand**	**6**
B)	What is 'Thermal breakdown' in solid dielectrics, and how is it practically more significant than other mechanisms?	**Understand**	**6**
C)	Explain application of insulating materials in rotating machines.	**Remember**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	Explain propagation of lightning voltage and current waves on transmission lines.	**Evaluation**	**6**
B)	Explain the concept of insulation coordination on high voltage power systems.	**Understand**	**6**
C)	Explain with a neat sketch, surge diverter with its function.	**Remember**	**6**

Q.5	**Solve Any Two of the following.**		**12**
A)	Explain in detail Van de Graff generator with a neat sketch.	**Remember**	**6**
B)	Explain the measurement of high a.c. voltage using capacitive voltage transformer.	**Understand**	**6**
C)	Explain the testing of pin type insulators and bushings.	**Remember**	**6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Winter Examination – 2022

Course: B. Tech. **Branch : Electrical Engineering** **Semester : VII**

Subject Code & Name: High voltage Engineering (BTEEC702)

Max Marks: 60 **Date: 30/01/2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Derive Poisson's Equation. Also Write the Laplace's equation.	Evaluation	6
B)	Explain Estimation and Control of Electric Stress.	Understand	6
C)	Define the terms: (a) Disruptive Discharge Voltage (b) Withstand Voltage (c) Fifty Percent Flashover Voltage (d) Hundred Percent Flashover Voltage (e) Creepage Distance (f) B.C. Test Voltages	Remember	6
Q.2	**Solve Any Two of the following.**		**12**
A)	Explain Ionization by Collision and Photo-ionization.	Understand	6
B)	Write a short note on Time lags for Breakdown.	Remember	6
C)	Explain the Streamer theory of breakdown in air at atmospheric pressure.	Understand	6
Q. 3	**Solve Any Two of the following.**		**12**
A)	With neat Sketch explain Liquid purification system with test cell in case of Pure and commercial liquids.	Understand	6
B)	Explain i) Suspended Particle Mechanism ii) Cavitation and Bubble Mechanism	Understand	6
C)	Prove that $\frac{V}{d_0} = E_a = 0.6 \left[\frac{\gamma}{\epsilon_0 \epsilon_r}\right]^{\frac{1}{2}}$ In case of Electromechanical Breakdown	Evaluation	6
Q.4	**Solve Any Two of the following.**		**12**
A)	Explain with suitable figures the principles and functioning of (a) expulsion gaps and (b) protector tubes.	Understand	6
B)	What is a surge diverter? Explain its function as a shunt protective device.	Remember	6
C)	Explain Power Frequency Tests, Impulse Voltage Tests and Thermal Tests of Bushings.	Understand	6

Q. 5 **Solve Any Two of the following.** **12**

A)	**Explain with neat circuit diagram and waveform the generation of High DC Voltages using Half wave and Full Wave rectifier circuit.**	**Understand**	**6**
B)	**Explain with circuit diagram the generation of High AC Voltages using Cascade transformer.**	**Understand**	**6**
C)	**Discuss Measurement of High Direct Current Voltages using high ohmic series resistance with Microammeter and Resistance Potential Divider.**	**Create**	**6**

***** End *****