| Course | B.E – I | Electrical and Electronics Engineering (Marine) |
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| Batch EEEM-7 | | |
| Semester | VII | |
| Subject Cod | е | EE1702 |
| Subject Nan | ne | High Voltage on Merchant Ships |
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UNIT-I

PART A

- 1 What are overvoltage?
- 2 What are the Causes for Switching surges?
- 3 What are the effects of Switching surges on power system?
- 4 Mention the different kinds of over voltages?
- 5 What are temporary over voltage?
- 6 What is a lightning arrester or surge diverter?
- 7 Draw the V-I characteristics of non linear resistor lightning arrester.
- 8 compare switching surge and lightning.
- 9 Define lightning phenomenon
- 10 What is direct strock?
- 11 What are the advantages of valve type arrester?
- 12 What are the effects of overvoltage.
- 13 What is indirect strock?
- 14 What is the necessity of lightning arrester.

- 15 What are the different types of lightning arrester.
- 16 List out the various voltage level and its range.
- 17 What are the disadvantages of HVAC over HVDC systems?
- 18 What is arcing ground.
- 19 What are switching surges?

PART B

- 1 Explain the different types of lightning stroke?
- 2 Explain in details about protection against lightning.
- 3 Explain lightning arrester and its necessity in power system.
- 4 Explain the different levels of voltage in detail?
- 5 Write short notes on Horn gap arrester.
- 6 Write short notes on Multi gap arrester.
- 7 Write short notes on Explusion type arrester.
- 8 List out the advantages and disadvantages of HVAC over HVDC systems
- 9 Discuss the cause of over voltage and its effects on power system.
- 10 Explain the types of lightning arrester according to class?

PART C

1 Explain the control of overvoltage due to switching and effects of switching surge in detail.

2 Discuss the working principle of lightning arrester and draw the VI characteristic of non linear resistor?

3 Write a short note on (a) valve type arrester (b) Rod gap arrester

- 4 Discuss the mechanism of lightning disharge?
- 5 Explain the different theories of charge formation in clouds?

UNIT-II

PART A

- 1 What is called composite dielectric?
- 2 State Paschen's law.
- 3 Define uniform and nonuniform field and give examples of each.

4 Which insulation is used in high voltage circuit breakers of large power rating?

- 5 What are the different theories related with liquid dielectric breakdown?
- 6 Define gas law
- 7 Discuss about ionization by collision.
- 8 Define Townsend's first ionization coefficient
- 9 Give the criterion for breakdown in nonuniform fields?
- 10 State the factors which affect breakdown of gaseous dielectrics.
- 11 What is meant by Townsend's discharge?
- 12 What are pure liquid dielectrics?
- 13 What is collision processes
- 14 What is photo ionisation.
- 15 What are the different theories related with solid dielectric breakdown?

PART B

1 Deduce the Townsend's break down criteria. Also define the townsend's Primary and secondary ionization coefficients.

2 Explain clearly breakdown in non-uniform fields and corona discharges.

3 Explain breakdown in uniform field (streamer mechanism).

4 Derive the criterion for breakdown in electronegative gases.

5 Describe the current growth equation by townsend's Theory

6 What is meant by Townsend's discharge? Explain its main features.

7 Explain why electronegative gaese have high breakdown stress.

8 Discuss the properties of composite dielectrics.

9 Explain the composite dielectrics and how the breakdown occurs in it.

PART C

1 Explain the various theories of breakdown mechanism of vacuum.

2 Explain the difference between photo-ionization and photo electric emission.

3 Explain the various breakdown mechanism involving in solid dielectrics breakdown.

4 Explain the various breakdown mechanism involving in commercial liquid dielectrics breakdown.

5 Explain the process of ionisation by townsend's theory.

UNIT-III

PART A

1 Give some uses of HVDC.

2 What are the applications of impulse current wave forms of high magnitude?

3 How are capacitances connected in an impulse current generator?

4 What type of wave form will be available in impulse current generator output?

5 Draw a circuit diagram of simple voltage doublers

6 Write the expressions to find the optimum number of stages and % ripple in a voltage Multiplier circuits.

7 Draw a simple Tesla Coil equivalent circuit for generation of high frequency A.C high voltage.

8 Explain the superiority of cascaded transformer over two winding transformer.

9 Define the specification of impulse voltage as per Indian standard.

10 What is the need for generating impulse currents?

11 What is a tesla coil?

12 What are the factors influencing the measurements using sphere gap?

13 Define the front and tail times of an impulse wave.

14 What are the advantages of marx circuit?

15 What are the different types to generate high DC voltage.

PART B

1 What is the principle behind the electrostatic method of energy conversion? Explain the construction and operation of vande graff generator with neat sketch

2 Explain in detail about cascade transformer connections to generate high alternating voltage.

3 Discuss the generation of high DC voltage and AC voltage.

4 Explain the generation of impluse voltages.

5 Explain the tripping and control of impulse generators.

PART C

1 Explain in detail about resonant transformer to generate high alternating voltage.

2 Explain the operation of Marx circuits with neat diagram.

3 Explain in details, the generation of switching surges with neat sketch.

4 Explain in detail how the impulse current is generated using capacitor bank.

UNIT-IV

PART A

- 1 Define sphere gap.
- 2 Define brushless alternator.

3 what is megger test.

- 4 Define polarity test
- 5 Define earthing down.
- 6 What are the disadvantage of high voltage?
- 7 Define circuit breaker.
- 8 what are the types of circuit breakers.
- 9 what are the measure to be taken in the maintenance of high voltage system?
- 10 Define bus bar earthing?
- 11 Define Circuit earthing?
- 12 What are the advantage of High Voltage?
- 13 Define High Voltage?

PART B

1 What is earthing systems and explain the different types of earthing systems?

2 Explain the vaccum and gas filled circuit breaker used in high voltage system.

3 Describe the maintaneance procedure in the circuit breaker.

4 Explain the testing methods of motor in high voltage.

5 Explain the testing methods of alternator in high voltage.

PART C

1 Explain the working principle of alternator and explain various testing of alternator due to high voltage.

2 Explain the working principle of motor and explain various testing of motor due to high voltage.

3 Explain in details, the megger testing of high voltage system.

4 Explain the different types of circcuit breakers with neat diagram.

5 Explain earthing down, bus bar earthing and circuit earthing.
UNIT-V

PART A

- 1 What is insulation coordination?
- 2 What are the different tests done on insulators?
- 3 What are the demerits of synthetic testing of circuit breakers?
- 4 what is the purpose of insulation coordination.
- 5 what are the test conducted on bushings?
- 6 Define withstand voltage.
- 7 Define impulse Voltage.
- 8 Differentiate type test and routine test.
- 9 Define Disruptive discharge voltage.
- 10 what is the significance of impulse tests?
- 11 Name the different types of tests conducted on high voltage apparatus.
- 12 What are the different types of test done on surge diverters.

- 13 define safety margin as applied to be insulation co-ordination.
- 14 What are the significances of power factor tests?
- 15 What are the different test done on transformer.
- PART B
- 1 What are the impulse tests done on insulators? Explain.
- 2 Discuss the variious types of test carried out in a cables.
- 2 Explain the synthetic of circuit breaker.
- 3 Explain insulation coordination?

4 Explain the terms: (i) Disruptive discharge voltage (ii) impulser voltage (iii) 100% flash over voltage

5 What are the different power frequency tests done on bushings? Mention the procedure for testing.

6 Explain the terms: (i) with stand voltage (ii) Flash over voltage (iii) wet and dry power frequency tests are referred to HV testing.

PART C

1 Explain with neat diagram the impulse testing of transformer. What is procedure adopted in location of fault?

2 Discuss the variious types of test carried out in a circuit breaker.

3 Briefly explain the various types of tests carried out the insulator.

- 4 Explain the various tests carried out the surge diverter.
- 5 Explain the different test conducted on bushings.