

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

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B. Tech 6th Semester Examination
High Voltage Techniques & HVDC (OS)

EE-6003

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one from each of sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) Why gaseous insulations are gaining popularity in manufacture of high voltage apparatus? (5)
(b) Explain various mechanisms of ionization in gaseous insulation. Explain practical significance of same in ageing process. (15)
2. (a) Enumerate solid insulation characterization. Which properties play dominant role in longevity of electrical apparatus? (12)
(b) Define Inter Facial Tension (IFT)? How it affects performance of insulating oil in power transformer? (8)

SECTION - B

3. (a) Explain lightning phenomena in clouds. What is estimated charge intensity in an average lightning stroke? (10)

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- (b) What kind of protective devices are used to prevent damage due to lightning in electric substations? (10)
4. (a) Explain significance of power frequency tests on electrical high voltage equipments. (7)
(b) Why cascade connection of transformers is done? (6)
(c) How high voltage DC tests are carried out in laboratory? (7)

SECTION - C

5. (a) Why impulse testing of electrical high voltage transformer is carried out? (8)
(b) With the help of equivalent circuit, determine the front and tail resistances to produce a given wave shape. (12)
6. (a) How HVAC, HVDC and HV Impulse Voltage are measured in a high voltage laboratory? (12)
(b) What are various applications of a standard capacitor in high voltage measurements? (8)

SECTION - D

7. (a) Write merits and demerits of HVDC transmission systems. (10)
(b) Draw a typical layout of a HVDC substation. (10)
8. (a) Differentiate between a bipolar, monopolar, back to back and normal operation of HVDC link. (12)
(b) What is a HVDC circuit breaker? (8)

[P.T.O.]

SECTION - E

9. Write brief answers. All carry equal marks.

- (a) Define gaseous discharge.
- (b) How non uniform fields are produced in HV systems?
- (c) Define Paschen's law.
- (d) What do you mean by Corona?
- (e) Draw chemical structure of transformer oil.
- (f) What is a switching surge?
- (g) Define insulation co-ordination.
- (h) What is electrical breakdown strength of dry air?
- (i) Define rise time of standard impulse wave.
- (j) What is highest HVDC transmission voltage level in India?
(2×10=20)