

QP Code :811000

(3 Hours)

[ Total Marks : 80

- N. B. :** (1) Question No.1 is **compulsory**.  
 (2) Attempt any **three** questions out of remaining questions.  
 (3) **Figures** to the **right** indicate **full** marks.  
 (4) **Assume** suitable **data** if **necessary**.

1. Attempt any **four** :- 20
- (a) What is Partial discharge? Differentiate between internal and external partial discharges.
- (b) What is non-destructive testing of insulating materials? State briefly the characteristics of these methods.
- (c) Explain the phenomenon of 'treeing' in solid insulating materials under electrical Stress.
- (d) With a neat sketch explain Hall Generators for measurement of high currents.
- (e) Describe in brief the charge simulation method for estimation of Electric Field Intensity.
2. (a) What is 'Cascaded Transformer'? Explain why cascading is necessary? 10  
 With neat diagram, explain a three stage Cascaded transformer system.
- (b) With a neat sketch, explain the working of a Van-De-Graff generator. 10  
 What are the factors that limit the maximum output voltage obtained
3. (a) Define Townsend's first and second ionization constant. How the condition for breakdown is obtained in a Townsend's discharge? 10
- (b) Describe in brief various tests carried out on 'Bushings'. 10
4. (a) 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? 10
- (b) A ten stage cock-croft Walton circuit has all capacitors of  $0.06 \mu\text{F}$  each. 10  
 The maximum value of secondary voltage of the supply transformer is 100 KV at a frequency of 150Hz. If the load current is 1mA, determine  
 i) voltage regulation ii) percentage ripple iii) optimum no. of stages  
 for max. output voltage iv) Max. output voltage.

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5. (a) Explain the various theories that explain breakdown in commercial liquid dielectrics. **10**
- (b) What are the various factors to be considered while designing a High Voltage Laboratory ? **10**
6. (a) Describe the construction, principle of operation and application of 3-stage Marx generator circuit. **10**
- (b) Explain the process of Electromechanical breakdown in solid dielectrics and hence derive the condition for highest apparent electric stress before breakdown. **10**