

# National Institute of Technology, Hamirpur (H.P.)

Examination: M.Tech. End-Semester Examination, December-2020

Branch : Electrical Engineering

Semester : I<sup>st</sup>

Course : HV Diagnostic Techniques

Code : EE-652

Time: 02:00 Hours

Maximum Marks: 50

---

**Instructions:** Write your Name, Roll No, Subject Name and Subject Code on top of first sheet and put Signature with Date at the bottom of each sheet of the answer booklet.

---

- [1] Explain the Duval Triangle Method (DTM) for dissolve gas analysis. Which are the other methods? Give a detailed comparison. [9]
- [2] Describe the principle and procedure of SFRA test for transformer. [7]
- [3] What are the important parameters for the condition monitoring of OLTC module. Explain the different characteristic parameters, evaluated to analyze the power consumption of OLTC drive. [7]
- [4] A sheet of bakelite 4.57 mm thick is tested at 50 Hz between electrodes 12.10 cm in diameter. The Schering bridge employed has a standard compressed air capacitor of 106 pF a non-inductive resistor of  $1000/\pi$  ohm in parallel with a variable capacitance  $C$ , and a non-inductive variable resistor  $R$ . Balance is obtained with  $C = 0.5 \mu F$  and  $R = 260$  ohm. Calculate the p.f. and the permittivity of the sheet. [7]
- [5] What are the significances of various power frequency tests on bushings? How are they conducted in the laboratory. [7]
- [6] A solid specimen of dielectric constant of 4.0, has an internal void of thickness 1 mm. The specimen is 10 cm thick and is subjected to a voltage of 120 kV (rms). If the void is filled with air and if the breakdown strength of air can be taken as 30 kV(peak)/cm, find the voltage at which an internal discharge can occur. [4]
- [7] Derive an expression for critical electric field and show that the field is independent of the critical temperature of the solid dielectric. State the assumptions made. [9]
-