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Electrical Testing and Commissioning — Complete Syllabus (Program Elective-4, Option 1)

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026-27
Subject 5.4.1 (Program Elective-4, Practicum) • Total 100 Marks • 3 Credits • L 1 – P 4 •
Choose this OR Illumination Practices

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.4	Program Elective-4: Electrical Testing and Commissioning	Practicum	1 - 4	3	60	40 (3 hrs)	100
Electrical Testing and Commissioning Total				3	60	40	100

What This Subject Aims To Do

To help students follow standard safety procedures in testing and commissioning of electrical equipment.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Electrical Safety and Insulation	03	20%

II	Installation & Erection Concept of foundation for installation of machinery	02	15%
III	Testing and Commissioning	03	20%
IV	Troubleshooting Plans	03	20%
V	Maintenance	03	25%

Unit - I: Electrical Safety and Insulation (03 Periods, 20%)

Topics: Do's and don'ts regarding safety in domestic electrical appliances as well for substation/ power station operators; Electrical safety in industry/power stations/ substations at the time of operation/ control/ maintenance; Fire detection alarm, fire-fighting equipment's, measuring insulation resistance by different methods such as i) Polarization, ii) Dielectric absorption, iii) Megger and to predict the condition of insulation; Reconditioning of insulation, insulating oil - properties of insulating oil, causes of deterioration of oil.

Unit - II: Installation & Erection Concept of foundation for installation of machinery (02 Periods, 15%)

Topics: Requirements of foundation for static and rotating electrical machinery; Concept of leveling and aligning; Procedure for leveling and aligning alignment of direct coupled drive, effects of mis-alignment; Installation of transformer and procedure of installation of transformer, Requirements of installation of pole mounted transformer; Devices and tools required for loading, unloading, lifting, and carrying heavy equipment and precautions to be taken while handling them.

Unit - III: Testing and Commissioning (03 Periods, 20%)

Topics: Concept of testing and Objective of testing; Roles of I.S.S. in testing of electrical equipment, Types of tests and concepts: Routine tests, supplementary test, special tests, Methods of testing - Direct/Indirect/Regenerative testing; Tolerances for the various items for equipment - transformer, induction motor, dc motor, synchronous machines; Commissioning, Tests before Commissioning for transformer, induction motor, alternator; Testing of three-phase Induction motor as per I.S.325; Testing of single-phase induction motor; Testing of synchronous machines and D.C. machines.

Unit - IV: Troubleshooting Plans (03 Periods, 20%)

Topics: Internal and external causes for failure / abnormal operation of equipment; List of mechanical faults, electrical faults and magnetic faults in the electrical equipment remedies, applications; Use of tools like bearing puller filler gauges, dial indicator; Common troubles in electrical equipments and machines; Preparation of trouble shooting charts for D.C. Machines, AC Machines and transformers.

Unit - V: Maintenance (03 Periods, 25%)

Topics: Concept of maintenance, types of maintenance, Routine, preventive and breakdown maintenance; Causes of failure of electrical machines; Preventive maintenance - procedure or developing maintenance schedules for electrical machines; Factors affecting preventive maintenance schedule: (a) Distribution transformer, (b) Single phase and three phase Induction motors, (c) Batteries.

Practical Work

- Unit I — Determine breakdown strength of transformer oil.
- Unit I — Perform insulation resistance test on any one motor/transformer using Megger.
- Unit II — Evaluating the parts of an Alternator and testing an assembled alternator same on a test bench for proper operation.
- Unit II — Evaluating the parts of a Transformer assembled Transformer same on a test bench for proper operation.
- Unit III — Find regulation and efficiency of single-phase transformer by direct loading and back-to-back connection method and compare the results.
- Unit III — Determine efficiency of D.C. machine by Swinburne's test.
- Unit III — Determine efficiency of D.C. machine by Hopkinson's test.
- Unit IV — Prepare trouble shooting charts for electrical machines such as Transformer, D.C. machines, Induction motor, and Synchronous machines.
- Unit IV — Use of tools like bearing puller, filler gauges, dial indicator.
- Unit V — Prepare the preventive maintenance schedule of Distribution transformer.
- Unit V — Prepare the preventive maintenance schedule of induction motor.
- Unit V — Prepare the preventive maintenance schedule of batteries.

Reference Books (as listed in the syllabus)

- Deshpande, M. V. PHI Learning Pvt. Ltd., 2010, Design and Testing of Electrical Machines ISBN No 8120336453, 9788120336452
- Rao, B V S Asia Club House, First Reprint, 2011, Operation and Maintenance of Electrical Equipment Vol-I, ISBN No 8185099022

- Rosenberg. Mc GRAW-HILL, 1st Edition, May 2003, Maintenance and Repairs, ISBN No 9780071396035
- Sharotri, S.K. Glencoe/ McGraw-Hill; 2nd Edition, June 1969; Preventive Maintenance of Electrical Apparatus, ISBN No 10: 007030839X 13: 978-0070308398

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.

