



FARWESTERN UNIVERSITY
FACULTY OF ENGINEERING
Mahendranagar, Kanchanpur, Nepal
Syllabus for Lab Assistant (Electrical Engineering)

Full Marks: 75
Pass marks:30
Time: 3 hrs

1	General knowledge in electrical engineering and laboratory works.
2	Electric Circuit : Definition, Unit, Explanation and applications of Ohm's Law and Kirchoff's Law, Connection of resistors in series, parallel and series parallel Combination
3	Introduction, Types, Constructional details and principle of operation of Synchronous Generator (Alternator) and Synchronous Motor, Parallel operation and Synchronizing of Alternator
4	Electromagnetism and Electrostatics : Definition and formation of hysteresis loop, force on a current carrying conductor placed in magnetic field, Self Inductance, Factors affecting the inductance of coil, Capacitor, Factors affecting the capacitance of capacitor, Time Constant ($T=RC$)
5	Principles of Illumination (Primary and Secondary illumination, street lighting)
6	Fundamentals of Protection systems: Fuses, MCB Isolators, Contactors, Circuit Breakers - Classification, Construction Operating principle
7	A.C. Fundamentals : Comparison between A.C. & D.C. Voltage and current, Generation of A. C. emf, Frequency, Angular velocity, phase & phase difference, A. C. Circuit with R. L. C. use of J-operator in circuit analysis
8	Fundamental principles of Star and Delta connection of Three phase Windings, Effect of unbalanced load in three phase system, Voltage drop, Principles and applications of Super Position Theorem, Thevenin's theorem and Norton's theorem
9	Objective of earthing of Power system, Causes of Over voltages and its protection, Neutral earthing, Body earthing, Lightning Arrestors- Types, Ratings and Characteristics, applications & locations
10	Principles of A. C. Transformer : Operating principle, connecting load, No load operation, Reactance, Losses and Efficiency, Cooling, Parallel operation of Single phase and Three phase transformer, Tap changing, Noises and Temperature Rise
11	D. C. Generator : Introduction and Principle of operation, constructional details, types, Losses and efficiency, Parallel operation of d. c. generators
12	Ammeters and voltmeters : Principle of operation, Power factor meter, General concept of measurement of Power, Energy, Frequency
13	Operating Principle, characteristics, construction features of Current Transformer and Potential Transformer and their application
14	General concept of load factor, maximum demand, diversity factor, system and line losses, power factor corrections, measurement of resistance, inductance and capacitance
15	Generation of Electrical Energy : Types of generating plants, Diesel and Hydro (Working principle, equipments, Bus bars and Reactors, Automatic Voltage Regulator, Circuit Breakers, CTs, PTs, Relays etc.)
16	Three phase induction motor : Construction, Principle of operation, torque speed

	characteristics, stand still and running condition, method of starting
17	<p>Basic Electronics: Characteristics of diode, transistor and thyristor, Rectifier and filter, inverter, speed control of DC and AC motor by using thyristor.</p> <p>Basic Electronics Circuit, Introduction to binary system and binary calculations, Gates, truth tables, electric analogy of gates, Concept of memory, flip-flop, IC counters, decade counters, seven segment display</p> <p>Digital Electronics, Half wave, full wave and bridge rectifiers, and filter, Amplifier and Opamp, Regulated power supply, Difference amplifier, comparator, adder circuits</p> <p>Sensing Devices, Mechanical sensors, Electrical sensors, Electronic Sensors, Magnetic sensors, Optical sensors, Thermal sensors,</p> <p>Motor Control circuits, Servo-mechanism, Thyristor controlled DC motors, DC motor control by SCR, AC motor control using triac, Stepper motor, Motor control using PLC</p>
18	<p>Maintenance and Safety- Repair and maintenance of electrical motors, control and protective devices, Safety use of electrical system – concept and safety rules & regulation</p> <p>First Aid in accident, steps to be taken in electrical accidents.</p>

Type of Questions	Number of questions	Marks for each question	Total marks
Subjective Type Questions	6	10	60
Objective Type Questions	15	1	15
Total			75