**Gyan Ganga Polytechnic,Heengakheri(Kurukshetra)**

# Electrical Engineering Department

**Lesson plan**

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| **Name of Faculty** |  **Manish Kumar** |
| **Discipline** | **Electrical Engineering** |
| **Semester** | **5th** |
| **Subject** | **Electrical Machines-II** |
| **Lesson Plan Duration** | **September 2022 to Jan 2023** |
| **Work load [Theory + Practical] Per Week** | **[05+02]** |
| **Week** | **Day** | **Theory Topic/ Assignment/ Test** | **No.** | **Practical** |
| **1st** | **1** | Unit1: Introduction Synchronous Machines | **1** | Demonstration of revolving field set up by a 3-phase wound stator |
| **2** | Constructional features of synchronousmachine |
| **3** | Generation of three phase emf |
| **4** | Production of rotating magnetic field in a threephase winding |
| **5** | Revision/ Review of above Topics |  |  |
| **2nd** | **1** | Concept of distribution and coil span factor | **2** | To plot relationship between no load terminal voltage and excitation current in a synchronousgenerator at constant speed |
| **2** | Drive Emf equation, synchronous speed |
| **3** | Armature reaction at unity, lag and lead powerfactor |
| **4** | Voltage regulation using synchronousimpedance method |
| **5** | Revision/ Review of Topics |  |  |
| **3rd** | **1** | Need and necessary conditions of paralleloperation of alternators | **3** | Determination of the relationship between the voltage and load current of an alternator,keeping excitation and speed |
| **2** | Operation of synchronous machine as a motor–its starting methods |
| **3** | Effect of change in excitation of a synchronousmotor |
| **4** | Concept and Cause of hunting and itsprevention |
| **5** | Revision/ Review of above Topics |  |  |
| **4th** | **1** | Rating and cooling of synchronous machines | **4** | Revision/ file checking |
| **2** | Applications of synchronous machines (as analternator, as a synchronous condenser) |
| **3** | Revision of important topics |
| **4** | Assignment / Class test |
| **5** | Revision/ Review of above Topics |  |  |
| **5th** | **1** | Problem solution/ test check | **5** | Determination of the regulation and efficiency of alternator from the open circuit and shortcircuit test |
| **2** | Unit2: Introduction to Induction Motors |
| **3** | constructional features of squirrel cage and slipring 3-phase induction Motors |
| **4** | Principle of operation, slip and its significance |
| **5** | Revision/ Review of above Topics |  |  |
|  | **1** | Locking of rotor and stator fields |  |  |

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| **6th** | **2** | Rotor resistance, inductance | **6** | Synchronization of polyphase alternators and load sharing |
| **3** | Emf Equation and current relations |
| **4** | Relationship between copper loss and motorslip |
| **5** | Revision/ Review of above Topics |  |  |
| **7th** | **1** | Power flow diagram of an induction motor | **7** | Determination of the effect of variation of excitation on performance of a synchronous motor |
| **2** | Factors determining the torque, Torque-slipcurve, stable and unstable zones |
| **3** | Effect of rotor resistance upon the torque sliprelationship |
| **4** | Double cage rotor motor and its applications |
| **5** | Revision/ Review of above Topics |  |  |
| **8th** | **1** | Starting of 3-phase induction motors, DOL | **8** | Study of ISI/BIS code for 3- phase induction motors |
| **2** | Star-delta, auto transformer starting |
| **3** | Causes of low power factor of induction motors |
| **4** | Testing of 3-phase induction motor on no load |
| **5** | Revision of Unit No-01 |  |  |
| **9th** | **1** | And blocked rotor test and to find efficiency | **9** | Revision/ file checking |
| **2** | Speed control of induction motor |
| **3** | Harmonics and its effects |
| **4** | cogging and crawling in Induction Motors |
| **5** | Revision of Unit No-01 |  |  |
| **10th** | **1** | Revision of important topics | **10** | Determination of efficiency by(a) no load test and blocked rotor test on an induction motor |
| **2** | Assignment / Class test |
| **3** | Problem solution/ ClassTest check |
| **4** | Unit3: Fractional Kilo Watt (FKW) Motors |
| **5** | And its description |  |  |
| **11th** | **1** | Single phase induction motors | **11** | Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **2** | Construction characteristics and applications |
| **3** | Nature of field produced in single phaseinduction motor |
| **4** | Split phase induction motors |
| **5** | Type of Induction Motor |
| **12th** | **1** | Capacitors start and run |
| **2** | Shaded pole, Reluctance start motor | **12** | Revision/ file checking |
| **3** | Alternating current series motor and universalmotors |
| **4** | 1-phase synchronous motor Reluctance type |
| **5** | Brief description about Synchronous Motor |  |  |
| **13th** | **1** | Hysteresis motor | **13** | To study the effect of a capacitor on the single phase induction motor to reverse thedirection of rotation. |
| **2** | Revision of important topics |
| **3** | Assignment / Class test |
| **4** | Problem solution/ test check |
| **5** | Revision of important topics |  |  |
|  | **1** | Unit4:Special Purpose Machines |  |  |

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| **14th** | **2** | Construction and working principle of linearinduction motor | **14** | Quiz /viva-voice related to electrical machine |
| **3** | stepper motor |
| **4** | Servomotor |
| **5** | Revision of important topics |  |  |
| **15th** | **1** | submersible motor | **15** | Quiz /viva-voice related to electrical machine |
| **2** | introduction to energy efficient motors |
| **3** | Assignment / Class test |
| **4** | Problem solution/ test check |
| **5** | Revision/Review/Test of old HSBTE Papers |  |  |

# Gyan Ganga Polytechnic Heengakheri(Kurukshetra)

#  Electrical Engineering Department

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| **Lesson plan** |
| **Name of Faculty** | **Manish Kumar** |  |
| **Discipline** | **Electrical Engineering** |
| **Semester** | **5th semester** |
| **Subject** | **Electrical Power- I** |
| **Lesson Plan Duration** | **From September 2022 to****January 2023** |
| **Work load (Theory + Practical ) Per Week** | **(04+00)** |
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| **Week** | **Day** | **Topics** |
| **1st** |  1 | Unit1-Introduction to Power Generation |
| 2 | Main resources of energy, conventional and non-conventional |
| 3 | Different types of power stations, thermal power plant |
| 4 | Hydro Power plant Flow diagrams and operation |
| **2nd** | 1 | Gas power plant Flow diagrams and operation |
| 2 | diesel power station Flow diagrams and operation |
| 3 | nuclear power Plant Flow diagrams and operation |
| 4 | comparison of the generating stations on the basis of running cost, site, starting,maintenance |
|  | 1 | Revision/Assignment/ Class Test |
| **3rd** | 2 | Unit2: Introduction to Economics of Generation |
| 3 | Fixed and running cost, load estimation, load curves |
| 4 | Demand factor, load factor, diversity factor |
| **4th** | 1 | Power factor and their effect on cost of generation |
| 2 | Simple problems based on above relations |
| 3 | Revision/Assignment/ Class Test |
| 4 | Base load and peak load power stations |
| **5th** | 1 | inter-connection of power stations and its advantages |
| 2 | Concept of regional and national grid |
| 3 | Revision/Assignment/ Class Test |
| 4 | Revision/Assignment/ Class Test |
| **6th** | 1 | Unit3: Introduction to Transmission Systems |
| 2 | Layout of transmission system, selection of voltage for H.T and L.T lines |
| 3 | advantages of high voltage for Transmission of power in both AC and |
| 4 | Comparison of different systems: AC versus DC for power transmission, |
| **7th** | 1 | material and sizes from standard tables |
| 2 | Constructional features of transmission lines |
| 3 | Types of supports |
| 4 | Types of insulators |
| **8th** | 1 | Types of conductors, Selection of insulators |
| 2 | conductors, earth wire and their accessories |
| 3 | Transposition of conductors and string efficiency of suspension typeinsulators, Bundle Conductors |
| 4 | Mechanical features of line |
| **9th** | 1 | Importance of sag, calculation of sag, |
| 2 | effects of wind and ice related problems |
| 3 | Indian electricity rules pertaining to clearance |
| 4 | Electrical features of line: Calculation of resistance, inductance and capacitance |
| **10th** | 1 | A.C. transmission line, voltage regulation, and concept of corona.Effects of corona and remedial measures |
| 2 | Transmission Losses |
| 3 | Revision/Assignment/ Class Test |
| 4 | Revision/Assignment/ Class Test |
| **11th** | 1 | Unit 4: Distribution System Layout of HT and LT distribution system |
| 2 | constructional feature of distribution lines and their erection |
| 3 | LT feeders and service mains |
| 4 | Simple problems on AC radial distribution system |
| **12th** | 1 | Determination of size of conductor |
| 2 | Preparation of estimates of HT and LT lines |
| 3 | Constructional features of LT (400 V), HT (II kV) underground cables |
| 4 | Advantages and disadvantages of underground system with respect to overhead system. |
| **13th** | 1 | Calculation of losses in distribution system |
| 2 | Faults in underground cables-determine fault location by |
|  | 3 | Murray Loop Test, Varley Loop Test |
| 4 | Revision/Assignment/ Class Test |
| **14th** | 1 | Revision/Problem solution/ Class Test |
| 2 | Unit 5: Substations: Brief idea about substations |
| 3 | Outdoor grid sub-station 220/132 KV, 66/33 KV outdoorsubstations |
| 4 | Pole mounted substations and indoor substation |
| **15th** | 1 | Layout of 33/11 distribution substation and various auxiliaries |
| 2 | Layout of kV/400V distribution substation and various auxiliaries |
| 3 | Revision/Assignment/ Class Test |
| 4 | Unit 6: power factor, reasons and disadvantages of low power factor |
| **16th** | 1 | Methods for improvement of power factor using capacitor banks, VAR StaticCompensator (SVC) |
| 2 | Revision and problem solution |
| 3 | Revision/Review/Test of old HSBTE Papers |
| 4 | Revision/Review/Test of old HSBTE Papers |

# Gyan Ganga Polytechnic Heengakheri(Kurukshetra)

#  Electrical Engineering Department

Lesson Plan

Name of the Faculty:

Discipline: Electrical Engineering Semester: 5th

Subject: Utilization of Electrical Energy

**Lesson Plan Duration: 15 weeks** (**From September 2022 to January 2023**)

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| **Week** | **Day** | **Topic** |
| 1 | 1 | Introduction Of The Subject, Its Need, Applications |
| 2 | Nature Of Light, Visibility Spectrum Curve Of Relative Sensitivity Of Human EyeAnd Wave Length Of Light |
| 3 | Definition: Luminous Flux, Solid Angle, Luminous Intensity |
| 4 | Illumination, Luminous Efficiency, Depreciation Factor, Coefficient Of Utilization |
| 5 | Space To Height Ratio, Reflection Factor, Glare, Shadow, Lux |
| 2 | 1 | Laws Of Illumination - Simple Numericals |
| 2 | Different Type Of Lamps, Construction And Working Of Incandescent And Discharge Lamps - Their Characteristics, Fittings Required For Filament Lamp |
| 3 | Mercury Vapour Sodium Lamp, Fluorescent Lamp, Halogen Lamp, Neon Lamp |
| 4 | Compact Filament Lamp(Cfl), Led Lamp, Comparison Of Incandescent, Fluorescent, CFL & LED |
| 5 | Calculation Of Number Of Light Points For Interior Illumination, |
| 3 | 1 | Calculation Of Illumination At Different Points, Considerations Involved InSimple Design Problems |
| 2 | Illumination Schemes; Indoor And Outdoor Illumination Levels |
|  | 3 | Main Requirements Of Proper Lighting; Absence Of Glare, Contrast And Shadow |
| 4 | Awareness About Time Switches, Street Lighting, Flood Lighting |
| 5 | Monument Lighting And Decorative Lighting, Light Characteristics Etc. |
| 4 | 1 | Advantages Of Electrical Heating, Resistance Heating - Direct Resistance Heating |
| 2 | Indirect Resistance Heating, Electric Ovens, Their Temperature Range |
| 3 | Properties Of Resistance Heating Elements, Domestic Water Heaters |
| 4 | Other Heating Appliances, Thermostat Control Circuit |
| 5 | Induction Heating; Principle Of Core Type Induction Furnace, Their ConstructionAnd Applications |
| 5 | 1 | Principle Of Coreless Type Induction Furnace, Their Construction AndApplications |
| 2 | Electric Arc Heating; Direct And Indirect Arc Heating |
| 3 | Construction, Working And Applications Of Arc Furnace |
| 4 | Dielectric Heating, Applications In Various Industrial Fields |
| 5 | Infra-Red Heating And Its Applications |
| 6 | 1 | Microwave Heating And Its Applications |
| 2 | Solar Heating |
| 3 | Calculation Of Resistance Heating Elements |
| 4 | Advantages Of Electric Welding, Principles Of Resistance Welding |
| 5 | Spot, Projection And Seam Welding |
| 7 | 1 | Butt Welding, Welding Equipment |
| 2 | Principle Of Arc Production, Electric Arc Welding, Characteristics Of Arc |
| 3 | Carbon Arc And Metal Arc Welding |
| 4 | Hydrogen Arc Welding Method And Their Applications |
| 5 | Power Supply Requirement. Advantages Of Using Coated Electrodes |
| 8 | 1 | Comparison Between Ac And Dc Arc Welding |
| 2 | Welding Control Circuits, Welding Of Aluminum And Copper |
| 3 | Introduction To Electro Deposition, Need Of Electro-Deposition |
| 4 | Laws Of Electrolysis |
| 5 | Process Of Electro-Deposition - Clearing, Operation, Depositionof Metals,Polishing And Buffing |
| 9 | 1 | Equipment And Accessories For Electroplating |
| 2 | Factors Affecting Electro-Deposition |
| 3 | Principle Of Galvanizing And Its Applications, Principles Of Anodizing And ItsApplications |
| 4 | Electroplating Of Non-Conducting Materials |
| 5 | Manufacture Of Chemicals By Electrolytic Process |
| 10 | 1 | Power Supplies For Electroplating |
| 2 | Principle Of Air Conditioning, Vapour Pressure, Refrigeration Cycle, Eco-FriendlyRefrigerants |
| 3 | Electrical Circuits Used In Refrigeration |
| 4 | Electrical Circuits Used In Air Conditioning |
| 5 | Electrical Circuits Used In Water Coolers. |
| 11 | 1 | Advantages Of Electric Drives, Characteristics Of Different Mechanical Loads |
| 2 | Types Of Motors Used As Electric Drive |
|   | 3 | Electric Braking - Plugging |
| 4 | Electric Braking - Rheostatic Braking |
| 5 | Electric Braking - Regenerative Braking |
| 12 | 1 | General Idea About The Methods Of Power Transfer By Direct Coupling And BeltDrive |
| 2 | Gears, Chain Drives Etc. |
| 3 | Examples Of Selection Of Motors For Different Types Of Domestic Loads |
| 4 | Selection Of Drive For Applications Such As General, Workshop, Textile Mill,Papermill |
| 5 | Selection Of Drive For Applications Such As Steel Mill, Printing Press, Crane AndLift Etc |
| 13 | 1 | . Application Of Flywheel, Specifications Of Commonly Used Motors E.G.Squirrel Cage Motors, Slip Ring Induction Motors |
| 2 | Specifications Of Ac Series Motors, Fractional Kilo Watt(Fkw) Motors |
| 3 | Selection Of Motors For Domestic Appliances |
| 4 | Advantages Of Electric Traction Over Other Types Of Traction |
| 5 | Different Systems Of Electric Traction, Dc And Ac Systems, Diesel ElectricSystem |
| 14 | 1 | Types Of Services - Urban, Sub-Urban, And Main Line And Their Speed-TimeCurves |
| 2 | Different Accessories For Track Electrification; Such As Overhead Catenary Wire |
| 3 | Conductor Rail System, Current Collector-Pentagraph |
| 4 | Factors Affecting Scheduled Speed |
| 5 | Electrical Block Diagram Of An Electric Locomotive With Description Of VariousEquipment And Accessories Used |
| 15 | 1 | Types Of Motors Used For Electric Traction |
| 2 | Power Supply Arrangements |
| 3 | Starting And Braking Of Electric Locomotives |
| 4 | Introduction To Emu And Metro Railways |
| 5 | Train Lighting Scheme |

# Gyan Ganga Polytechnic Heengakheri (Kurukshetra)

#  Electrical Engineering Department

**LESSON PLAN**

Name of the Faculty:

Discipline: Electrical Engineering Semester: 5th

Subject: Utilization of Electrical Energy

**Lesson Plan Duration: 15 weeks** (**From September 2022 to January 2023**)

# Work load (Lecture/Practical) per week: 05/02

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| **Week** | **Theory** | **Practical** |
| **Lecture day** | **Topic** | **Practic al day** | **Topic** |
| 1st |  1 | What is PLC, concept ofPLC | 1st | Components/ subcomponents of a PLC and learning functions of different modules of a PLC system |
| 2 | Building blocks of PLC |
| 3 | Functions of various blocks of PLC |
| 4 | Limitations of relays, Advantages of PLCs over electromagnetic relays |
|  | 5 | Revision and class test |
| 2nd |  1 | Different programming languages, | 2nd | Practical steps in programming a PLC using hand held programmer |
| 2 | PLC manufacturers and applications of PLC |
| 3 | Basic operation of PLC- |
| 4 | Principles of PLC |
|  | 5 | Revision and class test |
| 3rd |  1 | Architectural details of Processor-Part-I | 3rd | Practical steps in programming a PLC using computer interfacing |
| 2 | Architectural details ofProcessor-Part-II |
| 3 | Memory Structures |
| 4 | Input/output structures |
|  | 5 | Revision and class test |
| 4th |  1 | Programming Terminals of PLC | 4th | Introduction to step 5programming language, ladder diagram concepts, instruction list syntax |
| 2 | Power supply to PLC |
| 3 | Basic instructions forlatch |
| 4 | Master control self holding |

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|  |  | relays |  |  |
|  | 5 | Revision and class test |
| 5th |  1 | Timer instructions-ON and OFF delay | 5th | Basic logic operations, AND, Or, NOT functions |
| 2 | Retentive timers, resetting of timers |
| 3 | Counter instructions like up counter, down counter, resetting ofcounters |
| 4 | Arithmetic Instructions (ADD,SUB,DIV,MUL etc.) |
|  | 5 | Revision and class test |
| 6th |  1 | MOV instruction, RTC (Real Time Clock function) | 6th | Logic control systems with time response as applied to clamping operation |
| 2 | Comparison instructions like equal, not equal, greater, greater than equal, less than, lessthan equal |
| 3 | Programming on Basic instructions |
| 4 | Programming on Timer instructions |
|  | 5 | Revision and class test |
| 7th |  1 | Programming on Counter instructions | 7th | Sequence control system in lifting a device for packaging and counting |
| 2 | Programming on Sequencer instructions |
| 3 | Programming on comparison instructions |
| 4 | Revision of Ladderdiagram Programming |
|  | 5 | Revision and class test |
| 8th |  1 | Assembly line, Packaging, Process control | 8th | Use of PLC for Door Bell operation |
| 2 | Car parking, Doorbell operation, Traffic light control |
| 3 | Microwave oven, Washing machine, Motor in forwardand reverse direction |
| 4 | Star delta, DOL Starter, paint industry ,filling of bottles, room Automation |
|  | 5 | Revision and class test |

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| 9th |  1 | Microcontroller -Overview | 9th | Use of PLC for Traffic light system |
| 2 | Block diagram and architecture ofMicrocontroller |
| 3 | Overview of MCS-51 |
| 4 | 8051 -Pin details |
|  | 5 | Revision and class test |
| 10th |  1 | Input port structures | 10th | Use of PLC for Packing process control |
| 2 | Output port structures |
| 3 | Memory organisation |
| 4 | Special function registers |
|  | 5 | Revision and class test |
| 11th |  1 | Revision of Microcontroller | 11th | Use of PLC for Car parking system |
| 2 | Instruction set of MCS-51 |
| 3 | Addressing modes |
| 4 | Timer operation |
|  | 5 | Revision and class test |
| 12th |  1 | Serial port operation and communication | 12th | Familiarization with the study of architecture of 8085 kit, basic sub systems and input output connectors, function keys |
| 2 | Interrupts and its types |
| 3 | Assemblers operations & compilers |
| 4 | Assembler directives |
|  | 5 | Revision and class test |
| 13th |  1 | keypad interfacing | 13th | Familiarization of Microcontroller 8051 kit |
| 2 | 7- segment interface, LCD |
| 3 | Stepper motor interfacing |
| 4 | A/D, D/A interfacing |
|  | 5 | Revision and class test |
| 14th |  1 | RTC interfacing | 14th | Testing of general input/output on microcontroller board |
| 2 | Introduction of PIC Micro controllers |
| 3 | Features of PIC 16C84 |
| 4 | Architecture of PIC 16C84 |
|  | 5 | Revision and class test |
| 15th |  1 | Applications of microcontrollers | 15th | Development of Electrical, Instrumentation applications using 8051 microcontroller |
| 2 | Radio control system |
| 3 | Revision of complete syllabus |
| 4 | Revision and class test |
| 5 | Discussion of previous year HSBTE questionpapers |

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| Gyan Ganga Polytechnic Heengakheri(Kurukshetra) Electrical Engineering Department **Lesson Plan** |
| **Name of Faculty** |  Er. Krishan Popli |
| **Discipline**  | Electrical Engineering |
| **Semester** | 5th |
| **Subject** | Instrumentation |
| **Duration** | (From Sep2022 to Jan 2023) Theory : 04, Practical : 02 |
| **Week** | **Theory** | **Practical** |
|  | **Lecture****Day** | **Topic (Including Assignment/ Test)** | **Practical****Day** | **Topic** |
| 1st | Day 1 | **1 Measurements** | Day 1 | To measure the level of a liquid using a transducer |
| Day 2 | Importance of measurement, Basicmeasuring systems |
| Day 3 | Advantages and limitations of eachmeasuring systems |
| Day 4 | Generalized measurement system, signalconditioning |
| 2nd | Day 1 | Display devices | Day 1 | To measure temperature using a thermo-couple |
| Day 2 | Revision |
| Day 3 | **2 Transducers** |
| Day 4 | Theory, construction and use of varioustransducers |
| 3rd | Day 1 | Resistance | Day 1 | Practice /Checking |
| Day 2 | Inductance |
| Day 3 | Capacitance |
| Day 4 | Electromagnetic |
| 4th | Day 1 | piezo electric type | Day 1 | Study and use of digital temperature controller |
| Day 2 | Revision |
| Day 3 | **3 Measurement of Displacement and****Strain** |
| Day 4 | Displacement Measuring Devices: |
| 5th | Day 1 | wire wound potentiometer | Day 1 | Use of themistor in ON/OFF transducer |
| Day 2 | LVDT, strain gauges |
| Day 3 | and their different types such as inductancetype, |
| Day 4 | resistive type |
| 6th | Day 1 | Wire and foil type etc. | Day 1 | Practice /Checking |
| Day 2 | Gauge factor, gauge materials |
| Day 3 | And their selections, sources of errorsand its compensations. |
| Day 4 | Use of electrical strain gauges |
| 7th | Day 1 | Strain gauge bridges and amplifiers. | Day 1 | Study of variable capacitive transducer |
| Day 2 | Revision |
| Day 3 | **4Force and Torque Measurement:** |
| Day 4 | Different types of force measuring devicesand their principles, |
| 8th | Day 1 | Load measurements by using elasticTransducers | Day 1 | Draw the characteristics of a potentiometer |
| Day 2 | and electrical strain gauges |
| Day 3 | Load cells |
| Day 4 | Proving rings |
| 9th | Day 1 | Measurements of torque by brake | Day 1 | Practice /Checking |
| Day 2 | Dynamometer |
|  | Day 3 | Electrical strain gauges, |  |  |
| Day 4 | Speed measurements; |
| 10th | Day 1 | different methods, devices | Day 1 | To measure linear displacement using LVDT |
| Day 2 | Revision |
| Day 3 | **5Pressure Measurement** |
| Day 4 | Bourdon pressure gauges |
| 11th | Day 1 | Electrical pressure pickups and theirprinciple, | Day 1 | To study the use of electrical strain gauge |
| Day 2 | Construction and applications |
| Day 3 | Use of pressure cells. |
| Day 4 | Revision |
| 12th | Day 1 | **6Flow Measurement:** |
| Day 2 | Basic principles of magnetic | Day 1 | Practice /Checking |
| Day 3 | Ultrasonic flow meters |
| Day 4 | Revision |
| 13th | Day 1 | **7Measurement of Temperature:** | Day 1 | To study weighing machine using load cell |
| Day 2 | Bimetallic thermometer |
| Day 3 | Pressure thermometers |
| Day 4 | Thermoelectric thermometers,resistance thermometers, |
| 14th | Day 1 | Thermocouple, | Day 1 | To study pH meter |
| Day 2 | Thermisters |
| Day 3 | Pyrometer, errors in temperaturemeasurements in rapidly moving fluids |
| Day 4 | Temperature recorders |
| 15th | Day 1 | Revision | Day 1 | Practice /Checking |
| Day 2 | **8 Measurement of other non- electrical quantities** |
| Day 3 | such as humidity |
| Day 4 | pH level and |
| 16th | Day 1 | Vibrations | Day 1 | Internal practical |
| Day 2 | Revision of Hsbte old Paper |
| Day 3 | Revision of Hsbte old Paper |
| Day 4 | Revision of Hsbte old Paper |