

PRACTICALS FOR III SEM. B.E. (CIVIL) EXAMINATION

STRENGTH OF MATERIALS (3CE-02)

Minimum Any Ten Experiments.

1. Study of strain measuring instruments mechanical, electrical types.
2. Tension test on metals.
3. Hardness test on metals.
4. Torsion test on metals.
5. Impact test on metals.
6. Transverse test on beams including deflections.
7. Compression Test on Bricks & Stores.
8. Measurement of static strains using electrical resistance gauges.
9. Verification of S.T. in beams.
10. Shear center.
11. Deflection of springs.
12. Bricks: Absorption Test, Dimension Test, Crushing strength, Efflorescence.
13. Tiles: flooring-Transverse strength, water absorption, and Abrasion test.
14. Timber: Moisture content, strength parallel and to grain-transverse strength
15. Notch Bar Test for toughness of metals.

FLUID MECHANICS-I (3CE-03)

A minimum of ten practicals form the list given below shall be performed.

1. Determination of Metacentric height.
2. Verification of Bernoulli's Theorem.
3. Impact of jets.
4. Determination of loss coefficients for pipe expansion contractions bends elbows etc
5. Velocity measurement by Pitot tube, Pitot-static tube current meter.
6. Discharge measurement by Venturimeter-Determination of meter coefficient.
7. Discharge measurement by pipe orifice Determination of C_d .
8. Determination of Hydraulic coefficients of sharp-edged circular orifices.
9. Determination of C_d of an external cylindrical mouthpiece.
10. Flow over a rectangular notch-Determination of C_d
11. Flow over a rectangular notch-Determination of K & in $Q-KH$.
12. Study of status of flow using Reynolds apparatus.

GEOTECHNICAL ENGG. – I (3CE-04)

These shall comprise of ten experiments and terms work to be presented in the form of journal for assessment of sessional and practical examination.

A. List of Experiments:

1. Moisture content.
2. Specific gravity of soil
3. Grain size Analysis - (Sieve Analysis)
4. Atterberg Limits
5. Permeability by constant head of falling head
6. Proctors compaction Test.
7. Field Density determinations sand replacement method.
8. Field Density determination core cutter method.
9. Unconfined compression test.
10. Direct shear Test.
11. Triaxial Compression test (Demonstration)
12. Strength test on Blend soil.
13. To find F.S.W. And D.F.S. Of soil. Identification of swelling Soil.

B. One Field visit & its Report to be included in journal

PRACTICALS FOR IV SEM. B.E. (CIVIL) EXAMINATION

ENVIRONMENTAL ENGINEERING – I (4CE-03)

A) PRACTICAL ANY TEN

1. Determination of pH
2. Determination of Conductivity
3. Determination of Chlorides
4. Determination of Solid's
5. Determination of Turbidity
6. Determination of Alkalinity - Acidity
7. Determination of Dissolved Oxygen
8. Determination of Hardness
9. Determination of Available Chlorine
10. Determination of Residual Chlorine
11. Jar Test
12. Bacteriological Plate count and MPN tests

B) Only demonstration of COD, BOD .

ENGINEERING GEOLOGY (3CE05)

Laboratory Work:

1. Megascopic study of the following minerals :Quartz and its varieties, Opal, Orthoclase, Microcline Plagioclase nepheline olivine, augite, hornblende muscovite
Biotite, serpentine, asbestos, chlorite, talc, zeolite, gypsum, calcite, dolomite, fluorite, apatite, topaz, corundum, beryl, tourmaline, garnet, kyanite, epidote, barite, ianite, clay, coal, magnetite, hematite, limonite, ochre, galena, sphalerite, chalcocite, pyrite, Malachite, azurite, pyrolusite, siderite.
2. Megascopic study of the following rocks :
 - (a) Igneous Rocks + Granite, granodiorite, diorite, syenite, gabbro, anorthosite, peridotite, dunite, pyroxenite, aplite, rhyolite, andesite, basalt, pyroclastic rocks.
 - (b) Sedimentary Rocks : Conglomerate, breccia, arkose, sandstone, greywackes, shales, Limestone.
 - (c) Metamorphic Rocks : slate, phyllite, Schist, Gneiss, Garnetite, eclogite, hornblende schist, Amphibolite, marble, quartzite.
3. Geological map reading : strike, dip, outcrop, Construction or cross sections of simple geological maps depicting structures like Unconformity, intrusives, folds, faults etc. and some maps with engineering problems -About 10 maps.

Field Work :

1. Use of clinometer - compass in geological mapping.
2. Local geological field work to identify and interpret Geomorphic and geological features.
3. Visits to site of engineering structures to study the bearing of geological features in them.

Excursions be conducted under the guidance and supervision of the teaching staff and preliminary report on geological excursion shall be submitted by the students. The report shall be valuable and the marks shall be included in the sessional marks for practicals.

CONCRETE TECHNOLOGY (4CE-04)

Any Ten experiments to be Performed.

Test on Cement :

1. Normal Consistency, setting time, soundness.
2. Compressive strength, briquette for tension test .Aggregate.
3. Particle shape, Texture and Elongated/ Flakiness of aggregates-demonstration. Flakiness index, Sieve analysis, particle size distribution curve.
4. Crushing value test, impact value Abrasion test.
5. Bulk density , specific Gravity, Absorption & Moisture content. Bulking & % slit in sand Test on Concrete.
6. Workability - Slump test, compaction factor, flow test, Vee bee test.
7. Concrete Mix design Road note 4 method ACI method.
8. Cube strength of concrete, Acceletated test, Flexural strength, Split tension test.

NDT:

9. Rebound hammer test, ultrasonic pulse velocity test.
10. Field Permeability test.
11. Test for pH of concrete or for carbonation.
12. Test of Structure by cover meter.

SURVEYING - I (4CE-05)

PRACTICAL :

Ten practicals based on above syllabus and with intensive field work to collect data and preparation of Drawing for any one of the Civil Engg. Projects.

COMPUTER AIDED DRAFTING (4CE-07)

Minimum 4 drawing for submission be prepared, based on building plans or civil engineering work.

1. Specifying distances and coordinates, Polar coordinates, relative Cartesian coordinates. Interpreting cursor modes and understanding prompts, choosing command options, selecting objects, editing with grips. Setting up work area, measurement system, scale factor modes as drafting tools.
Symbol, Blocks Layers. Templates, Copying Objects, editing lines, changing length of objects. Geometric constructions-Lines and points parallel lines perpendicular lines, breaking lines, dividing lines, fillets, chamfers, circles, tangent, arcs, curves through points, breaking polylines, similar shapes, arrays of lines or circles, Polygons, solid shape ellipse.
2. Hatch patterns boundary. Adding text. Text formatting style size of text & scale of drawing Dimension style, Unit height, location, arrow style.
3. Polylines, editing, creating spline curve, dividing in segments. Filling in solid area.
4. Printing & Plotting drawings output devices paper size - orientation, control on scale and location.

PRACTICALS FOR V Sem. B.E. (CIVIL) EXAMINATION

STEEL STRUCTURES (5CE-01)

Minimum two Design assignments based on syllabus along with the detailed structural drawing on A2 size sheets.

SURVEYING –II (5CE-03)

A) Practicals : Any five Practicals out of the following

1. Determination of constant of Tacheometer.
2. Determination of elevation of points by Tacheometric surveying.
3. Determination of elevation of points & horizontal distance between them by Tacheometric surveying.
4. Determination of given length of road by Tacheometric surveying
5. Setting out of Simple circular curve by offset from chord produced method.
6. Setting out of Simple circular curve by Rankine's method of tangential angle.
7. Setting out of Simple Transition curve by tangential angle method.
8. Study of Stereoscope.

B) Survey camp: On Any of the following topics for minimum Three Days.

- 1) Road Project
- 2) Irrigation Project
- 3) Water supply Projects

TRANSPORTATION ENGINEERING-I (3CE-04)

(A) Every student must carry out minimum of 10 (Ten) experiments from the following:

- (a) Subgrade Soil: Classification, group index and rating CBR test. (Vide IS:2720)
- (b) Aggregates: Specific Gravity & water absorption, flakiness index, Impact, crushing and Abrasion, Photographic Identification (Vide IS:2386)
- (c) Bitumen: Penetration, softening Point, flash point, ductility, stripping, Viscosity of Tar and Cutback.
- (d) Students should be familiar with relevant BIS, MOST specifications of various materials for different constructions.

(B) At least one field visit & its report in journal.

BUILDING DESIGN AND DRAWING (5CE-05)

A) Following assignments of working drawing on A1 Size shall be submitted.

1. Working drawing of residential single storied building of terrace and pitched roofs with foundation plan of Load bearing structure.(Two assignments)
 2. Submission drawing of single storied residential building (framed structure) with access to terrace including all details and statements as per the local bye-laws.(One assignment A1 sheet).
 3. Working drawing of multistoried public buildings such as Educational, Health, Community and Industrial building including structural details& layout of services. (ONE assignment).
 4. Two point perspective of single storied residential building neglecting small building elements (ONE assignment).
 5. Minimum 30 free hand self-explanatory dimensioned sketches of various building elements in sketchbook.
 6. Line plans of various types of buildings (Residential, Public) in sketchbook.(Four assignments)
 7. Submission drawing of two storied residential building (framed structure) including all details and statements as per the local bye-laws.(One assignment A1 sheet).
 8. Compulsory field Exercise.
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PRACTICALS FOR VI Sem. B.E. (CIVIL) EXAMINATION

STRUCTURAL ANALYSIS II (6CE-01)

1. To find the slope & deflection of continuous beams.
2. To find the value of flexural rigidity (EI) for a given beam & compare it with theoretical value.
3. To determine the moment required to produce given solution at one end of the beam when the other end is (1) pinned (2) fixed
4. To study the behavior of different types of struts and to calculate the Euler's Buckling Load for each case.
5. To verify the Maxwell's Reciprocal Theorem for beam.
6. To measure the strain in the cantilever beam with the help of acoustic strain gauges.
7. Study of various types of strain gauges.
8. Plotting the qualitative influence lines by making use of Muller-Bresler principle.
9. Determination of deflection of trusses by Willot-Mohrs diagram.
10. Determination of material fringe value.
11. Determination of stress in fixed beam by photoelastic method.
12. To find horizontal thrust & to draw the influence line for horizontal thrust for two hinged arch.
13. To calculate horizontal deflection at roller end in two hinged arch.
14. To measure the strain in the Cantilever beam with the help of Electrical resistance Strain gausge.
15. To determine horizontal deflection at roller end in two hinged Arch.
16. Study of Poloriscope.

RCC STRUCTURES(6CE-02)

Practical shall consists of minimum four design assignments with detailed drawing on A-2 size sheets and detailed calculation in Journal.

1. Circular Water Tank with Roof Slab /Dome resting on ground
2. Rectangular Water Tank with one way Roof Slab resting on ground.
3. Single span Pre-stressed concrete Rectangular Beam, slab.
4. One Way Slab, Continuous Slab.
5. Rectangular pad / Sloped footing.

At Least one field visit & its report included in journal.

FLUID MECHANICS-II (6CE-04)

A minimum of ten practicals, from the list given below shall be performed.

1. Study of flow around immersed bodies.
2. Determination of Darcy-Weisbach friction co-efficient.
3. Determination of Manning's "A" or Chezy's "C" for an open channel.
4. Developing specific energy diagram for a rectangular channel.
5. Study of GVF profiles.
6. Study of Hydraulic Jump in a rectangular channel..
7. Study and performance of Francis Turbine.
8. Study and performance of pelton wheel
9. Study and performance of Centrifugal pump
10. Study and performance of reciprocating pump.
11. Design problem on Pipe network analysis

COMPUTER APPLICATIONS IN CIVIL ENGINEERING (6CE-05)

Minimum sixteen computer programme development, minimum one from each of the following field using Fortran-95/ C language. At least two Programmes on mixed language using both Fortran-95& C and four programme in any one language. It is recommended to have at least four programmes based on numerical methods in either Fortran or C and Two assignments i application software's such as spread sheets. Data base management programmes etc.

1. Engineering Mechanics
2. Strength of Materials
3. Transportation Engineering
4. Geotechnical Engineering
5. Hydraulic engineering
6. Irrigation & water resource engineering
7. Surveying
8. Estimating & costing
9. Structural Analysis
10. Structural Design
11. Environmental Engineering
12. Matrix algebra, solution techniques
13. Numerical integration
14. Table generation from IS :456
15. Earthquake force calculation on structures as per IS: 1893

PRACTICALS FOR VII SEM. B.E. (CIVIL) EXAMINATION

STRUCTURAL ANALYSIS-III (7CE-01)

Minimum eight practicals, hand calculations, computer programme development. Use of readymade software etc based on syllabus.

Solution is restricted upto 3 DOF problems and assembly restricted upto 6 DOF problems.

ADVANCE CONCRETE STRUCTURES (7CE-02)

Practical work Shall consist of

1. Design assignment with detailed drawings on A2 size sheets & detailed calculation in journal.

- i) Two way slabs with various end conditions.
- ii) Cantilever/Counterfort Retaining wall.
- iii) Combined footing
- iv) Portal frames

2. One field visit and its report in journal.

IRRIGATION ENGINEERING (7CE-03)

Following design & drawing should be included (Minimum FIVE).

1. Reservoir planning -Storage Capacity of Reservoir
2. Useful life of a Reservoir
3. Gravity Dam- Checking of various modes.
4. Earthen Dam- Phreatic line, Checking of foundation against shear.
5. Design of Canal (Lined and Unlined)
6. Design of a lift irrigation scheme.
7. Drawing of various canal structures.
8. Site visit to Irrigation project-Detailed report should be submitted.

INDUSTRIAL CASE STUDY (7CE-06)

The student is expected to study minimum three construction/Rehabilitation works & submit detailed report on them.

PROJECT AND SEMINAR (7CE-07)

This includes preparation of preliminaries for the project work to be undertaken in eighth semester.

1. Finalizing the title of the project
2. Literature survey
3. Collection of datas
4. Scope of the projects.

Each group shall deliver seminar on the work done during the semester. In addition student will deliver one more seminar on the topic finalized by him with the consent of his guide.

PRACTICALS FOR VIII SEM. B.E. (CIVIL) EXAMINATION
ESTIMATING AND COSTING (8CE-01)

Term-work

The candidates shall submit 12 experiments in the following:

1. A complete set of contract document (including specifications along with a building estimate).
2. Detailed estimate of the following (Minimum three)
Load bearing structure, R.C.C. framed structure, hydraulic structure, steel structures, culverts, Water supply & sanitary work, Road works, Water tank.
3. Rate analysis of 10 major items of buildings and 3 items of road works.
4. Specification of 10 major items of buildings and 3 items of road works.
5. Site visit to a study of schedule of rates and comparison with market rates & report by the students.
6. Valuation & rent fixation
7. Earth work of road for 1km. Length
8. Detailed estimate woodwork of doors & windows.
9. Calculation of reinforcement in RCC with bar bending schedule.
10. Study of IS:1200
11. Expert lecture by legal advisor on various legal aspects of contracts & report by the students.
12. Expert lecture by accountant of construction department (preferably government) on various accounting methods, material management etc. & report by the students.
Practical examination shall consist of written test & viva-voce based on the syllabus & sessional work.

WATER AND WASTE WATER TREATMENT (8CE-04)

A) Minimum five experiments:

1. Determination of sulphates
2. Determination of Chlorides
3. Residual available chlorination & chlorine demand.
4. Determination of BOD
5. Determination of COD
6. Jar test
7. Effective size and uniformity coefficient of filter sand.
8. Bacteriological test (MPN test)
9. Design of individual unit of water or waste water treatment

B) Design of individual unit of water or waste water treatment

Department of Mechanical Engineering
Practical List
Semester:- III SEM
Subject:- Computer Application –I

1. Introduction to algorithm.
2. Draw flowchart, algorithm and write a program for if-else statement.
3. Draw flowchart, algorithm and write a program using menu driven programming of switch statement.
4. Write a program and algorithm for the addition of two matrices and display result in another matrix.
5. Write a program and algorithm for the multiplication of two matrices.
6. Introduction to stack.
7. Introduction to queue.
8. Write a program and algorithm for bubble sort of an array.
9. Find the element in an array of A[10] using linear search.
10. Write a program for binary search.
11. Introduction to linked-list.

LAB :- ENGINEERING METALLURGY

1. To Study Metallurgy Microscope
2. Preparation of Specimen for Metallographic Examinations.
3. Preparation of Mounted sample with the help of mounting press / cold setting resins
4. To study of phase diagrams.
5. To Study the Iron – Iron carbide Equilibrium Diagram
6. To Observe & Draw Microstructures of Steel
7. To Observe & Draw Microstructures of Iron
8. To Observe & Draw Microstructures of Non – Ferrous Alloys.
9. To study of T.T.T. curve.
10. To study Al-Si Phase diagram.
11. Determination of Hardenability of Steels by Jominy End Quench Test.
12. To Perform Tension Test on given Specimen of Mild Steel
13. To Perform Quenching of En-8 Components
14. Study the effect of Annealing & Normalizing on properties of steels
15. Study of pack Carbonizing of steel samples
16. Study of Effect of Alloying Elements on properties of Steel

SUBJECT: HEAT TRANSFER

- 1) Study of different methods of temperature measurement with special emphasis on thermocouple.
- 2) To determine thermal conductivity of insulating powder
- 3) To plot radial temperature distribution and to determine thermal conductivity of pipe insulation
- 4) To determine Stephan Boltzman constant of radiation heat transfer
- 5) To measure Emissivity of Test plate Surface
- 6) To determine surface heat transfer coefficient for Heated Vertical cylinder in Natural convection
- 7) To determine the efficiency of pin fin in natural and forced convection
- 8) Study of heat pipe
- 9) To find Critical Radius of Insulating Material
- 10) To study and compare Temperature Distribution heat transfer rate, overall heat transfer coefficient in parallel flow and counter flow heat exchanger.

LIST OF PRACTICALS
B.E. (Mechanical)
V Sem
SUBJECT : Production Technology

List of Experiments

- 01 Measurement of Linear dimensions.
- 02 Measurement of Angular dimensions.
- 03 Measurement of Straightness.
- 04 Measurement of Flatness.
- 05 Measurement of parameters of threaded part by using Profile Projector.
- 06 Measurement of parameters of threaded part by using Tool Maker Microscope.
- 07 Calibration of Micrometer.
- 08 Calibration of Dial Indicator.
- 09 Measurement of parameters of threaded part by using Floating Carriage Diameter Measuring Machine. (Two wire method)
- 10 Case studies on Process Control Charts. (Three case studies)
- 11 Design of Acceptance Sampling Plan.
- 12 Problems on tolerance analysis (Limits and Fits)
- 13 Design of Limit Gauges.
- 14 Preparation of Process Planning Sheet and Longitudinal tolerance chart.

VII Sem

SUBJECT : ENERGY CONVERSION -II

- 1) Performance of two stage reciprocating air compressor
- 2) Study of different components of IC engine
- 3) Study of Carburettor
- 4) Study of different ignition system
- 5) Study of fuel ignition system
- 6) Study of lubrication system and cooling system in IC engine
- 7) Performance analysis of blower test rig
- 8) Performance of single cylinder diesel engine
- 9) Performance of single cylinder 4 stroke petrol engine
- 10) Performance analysis of morse test
- 11) Visit to koradi thermal power station

SUBJECT :- MACHINE DESIGN – III

Numericals on

1. Design of Flywheel
2. a) Design of Rigid Flange Coupling , b) Design of Flexible Coupling
3. Design of sliding contact bearing
4. Design of Rolling element bearing
5. a) Design of flat belt drive, b) Design of V- belt drive
6. Design of chain drive
7. a) Design of spur gear drive, b) Design of Helical gear drive
8. Design of Bevel gear drive
9. Design of Worm gear drive
10. Design of Wire rope
11. Design of two machine having at least four above components with assembly drawing

SUBJECT :- REFRIGERATION & AIR CONDITIONING

1. Study of Vapour compression refrigeration cycle
2. Study of Vapour absorption refrigeration cycle
3. Study of various types of refrigerant compressor
4. Study of various types of evaporators used in refrigerators
5. Study of various expansion devices used in refrigeration & Air Conditioning
6. Study of various controls (devices) used in refrigeration & Air Conditioning
7. Study of air refrigeration system.
8. Performance on VCRS
9. Study of Psychometry
10. Study of different Air Conditioning Systems
11. Study of Ice Plant

IV SEM.

**B. E. (MECHANICAL)
LAB :- FLUID POWER- II**

1. To determine Metacentric height of ship model.
2. To verify Bernoulli's Theorem.
3. To find Coefficient of Discharge of a given Venturimeter.
4. To find Coefficient of Discharge of a given Orifice
5. To study the status of flow using Reynold's apparatus
6. To determine performance characteristics of Pelton wheel
7. To determine performance characteristics of Variable speed centrifugal Pump.
8. To determine performance characteristics of Francis Turbine.
9. To determine performance characteristics of Reciprocating Pump.
10. To determine performance characteristics of constant speed centrifugal pump.

Semester:- VI SEM
Subject:- Computer Application –II

1. Learning the concept of DBMS and RDBMS
2. To use the Data Definition Language for creating, altering and dropping the table object in a database
3. To implement Domain and Entity Integrity Constraints on a Database
4. To implement Referential integrity constraint on a database
5. To use the Database Manipulation language for inserting, selecting, updating and deleting the data in the table in a database.
6. To create the table from an existing table and to populate a table with the contents of an existing table.
7. To use the Transaction control language and Data control language in a Database.
8. To use arithmetic, comparison and logical operator in database.
9. To use comparison operator in ORACLE for range searching and pattern matching of table data.
10. To use SQL character function in a Database.
11. To use SQL Numeric function in a Database.
12. To use the Data function in a Database.
13. To use the Data conversion in Oracle using the various data type conversion function in SQL.
14. To use group function in a database.
15. To use Order By, Group By, and Having clause in a Database.
16. To use Set Operator in a Database.
17. To relate data through join concept in a Database.
18. Usage of sub-queries in a Database.
19. To use locks in a Database.

LAB : MACHINE DRAWING

1. Pencil drawing of Standard components. 02 Sheets.
2. Pencil drawing of Standard assemblies with components 02 Sheets.
3. Pencil drawing of a large assembly with component drawing. 01 Sheet
4. Computer printout of small assembly with Components
5. Computer printout of Production drawing for one component.
6. Computer printout of Process Sheet for one component.

B.E. (Mechanical) VIII-Sem
SUBJECT :- ENERGY CONVERSION - III

1. Performance on Vapour compression refrigeration systems
2. Experiment on Desert Cooler
3. Study of Vapour absorption refrigeration systems
4. Study & Demonstration on Household refrigerator
5. Study & Demonstration on Solar application
6. Study & Demonstration on Hydraulic pumps & valves
7. Study & Demonstration of various Industrial hydraulic circuits
8. Study of Air preparatory unit
9. Study & Demonstration of various Industrial pneumatic circuits
10. Study on Energy conservation opportunities preferably in industries
11. Report on visit to Ice plant OR any refrigeration installation air conditions plant
12. Study of instruments / equipments required for conducting energy audit

SUBJECT : COMPUTER AIDED DESIGN

1. Introduction to CAD, DDA Line Bresenham's line
2. Program on Bresenham's circle algorithms
3. Program on Bresenham's Ellipse algorithms
4. Simple example of two-dimensional transformation
5. Simple example of three-dimensional transformation
6. Generation of at least two simple solid models showing geometric properties using any cad software
7. One Dimensional Problem on Finite Element Analysis
8. Finite element method problem on truss
9. Finite element method using two dimensional analysis
10. Problem on optimization method

SUBJECT :- AUTOMATION IN PRODUCTION

1. Study of NC System
2. Manual Part Programming (Manuscript)
3. Computer Assisted Part Programming (APT Language)
4. Performance, Simulation on CNC Lathe (Simple Geometry)
5. Performance, Simulation on CNC Lathe (Complex Geometry)
6. Performance, Simulation on CNC Lathe (Threaded Geometry)
7. Simulation on CNC Milling (Simple Geometry)
8. Simulation on CNC Milling (Complex Geometry)
9. Demonstration and Study of Pneumatic Robot Arm
10. Study of Group Technology and Part Coding
11. Case study on Automated System

I-Year: WORKSHOP PRACTICE

A. Carpentry Shop:

1. Study of Carpentry Tools and Materials.
2. Study of Carpentry Joints.
3. Preparation of Carpentry Joints (Atleast Two Joints)

B. Fitting Shop:

1. Study of Fitting Tools, Equipments and Measuring Instruments.
2. Study of Various Fitting Operations.
3. Preparation of Assembly Jobs (One Job)(Male-Female Job)

C. Welding Shop:

1. Introduction to Welding Processes.
2. Study of Various Welding Equipments, Tools.
3. Study of Welding Joints.
4. Preparation of any Types of Welding Joint (One Job)

D. Smithy Shop:

1. Introduction to Forging process and Hand Tools.
2. Study of Various Tools and Equipments.
3. Preparation of Job with the help of Smith's Health

III-Sem SUBJECT: MANUFACTURING PROCESS-I

- 01) Study of Single Point Cutting Tool.
- 02) To Study the Tool for Left & Right hand Turning.
- 03) To Study the Tool for External and Internal Turning.
- 04) To Study the Mechanism in Lathe.
- 05) To Study the Mechanism in Drilling.
- 06) To Study the Mechanism in Shaper
- 07) To Study the Mechanism in Milling
- 08) Practical on Milling Machine -Gear Milling.
- 09) Practical on Turning involving facing step turning taper
turning boring with internal steps & taper drilling (in Lathe)
internal & External Threading.
- 10) Practical on use of Drilling Machines.

V-Sem : SUBJECT: MECHANICAL MEASUREMENT

1. 1. To Study Static Characteristics of LVDT. (Measurement of Displacement)
2. To Study Static Characteristics of Strain Guage. (Measurement of Load)
3. To Study Static Characteristics of Capacitive Pick-up. (Measurement of Angular Displacement)
4. To Study Static Characteristics of Inductive Pick-up. (Measurement of Linear Displacement)
5. To Study Static Characteristics of LDR. (Measurement i. of Linear Displacement)
6. Calibration of Pressure Guage using dead weight Pressure Guage Tester.
7. Measurement of Speed using Non-Contact Pick-upa (Magnetic and Photoelectric pick-ups).
8. Measurement of High Temperature using radiation Pyrometer.
9. Measurement of Vibration using Piezo-electric Pick-up.
10. Measurement of Pressure using Strain Guages.

IV-Sem SUBJECT: MANUFACTURING PROCESS-I

01) Study of Various Foundry Tools.

Introduction

Foundry Tools.

Furnaces used in Foundry.

Machines used in Foundry.

02) Study of Patterns and Pattern-Making.

Introduction

Materials used in Pattern.

Allowances on Patterns.

Patterns -Making and Colour Coding

03) Study of Moulding and Casting.

Introduction

Moulding processes (Bench, Floor, Pit, Machine Moulding)

Materials used in Moulding.

Characterised of Moulding Materials.

Properties of Moulding Sand.

Green Sand Moulding Preparations and Casting.

04) Study of Gating System. I

Introduction

Elements of Gating System

Risers Details

Types of Gates & Gate Design Considerations.

05) Study of General Purpose Machine Tool.

Introduction

Study of Parts & Accessories & Various Operations Performed on Lathe, Shaper & Planner.

06) Study of Single Point Cutting Tool.

Introduction

Theory of Chip Formation, Types of Chips.

Various Parts Cutting Tool, Tool Angles.

Tool Nomenclature.

Cutting Tool Materials & Its Properties.

07) Analysis of Joining Process

Introduction

Type of Joining Process.

Classification Joining Process.

Advantage & Disadvantage of Welding Process. Different types of Flames.

Various Symbols used in Welding Process.

Analysis of Forging Processes.

IV –Sem : SUBJECT: THEORY OF MACHINES -II

1. Demonstrate Gyroscopic Effect and Verify Relation $T = I\omega\dot{\omega}$.
2. To Determine Jump Speed of Eccentric Cam
3. Static and Dynamic Balancing of Rotating Masses.
4. To Determine Natural frequency of Vibration of Longitudinal Free Vibration of Helical Spring -Mass System.
5. To Determine Natural Frequency of Undamped Free Vibration of equivalent spring mass system.
6. To Determine Frequency of Damped Torsional Oscillation of system and to Determine the Damping Co-efficient C_d .
7. To Study the Forced Lateral Vibration of the beam for different Damping.
8. To Determine Natural Frequency of Undamped Torsion. 11 Vibrating system of Single Rotar Shaft System.
9. To Determine Natural Frequency of Undamped Torsion. 11 Vibrating system of Two Rotar Shaft System & Determine Node.
10. To Determine Critical Speed of Shaft & Verify Dunkerley's Rule.
11. To Determine the Sensitiveness of Governor.

VI sem. :Subject: Industrial Electronics

1. Verification of Demorgan's Law & Boolean Laws,
Study of R-S, D & T Flip flop Characteristics.
2. Study of 8085 Micro-Processor.
3. Programming using 8085 Micro-Processor,
 - a). Transfer 10 bytes of data from 4200 to 4300.
 - b). Add 8 bit data of reg. A and reg. B and store in reg C.
4. Study of 8051 Micro-Controller.
5. Programming using 8051 controller,
 - a). Program to multiply 2 nos.
 - b). Program to divide the no. by 8.
 - c). Program to reset d7, d4, d1 bits & set d6, d5 bits & rest are unchanged at reg. RO.
6. Speed control of D.C. Shunt. motor.
7. Speed control of 3 squirrel gauge Induction motor.
8. To perform load test on D.C. Shunt Motor.
9. Study of Servomotor.

1. ELCTRICAL ENGINEERING LABORATORY

Laboratory Incharge: *Ms. P. Somkuwar*

Area: 116.29 Sq. m

Total Investment: Rs. 2,63,357/-

Practicals are conducted for ALL Students of I Year B.E.

Facilities are available to conduct the following experiments:

1. To verify Kirchhoff's current law for a D.C. network.
2. To verify Kirchhoff's voltage law for a D.C. network.
3. To plot a B-H curve for a given magnetic material.
4. To study R-L-C series circuit.
5. To study R-L-C parallel circuit.
6. To verify the transformation ratio of a single phase transformer.
7. To determine regulation and efficiency of a single phase transformer by direct loading.
8. To perform open circuit and short circuit tests on a single phase transformer.
9. To study a balanced three phase star connected load and verify V-I relationships of phase & line values.
10. To study a balanced three phase delta connected load and verify V-I relationships of phase & line values.
11. Verification of superposition theorem.
12. To plot the magnetization characteristics of a D.C. shunt Generator.
13. To study speed control of a D.C. shunt motor.
14. To observe A.C. voltage and phase shift on a C.R.O.
15. To study connections and starting of a three phase Induction motor using direct on-line starter.
16. To study connections and starting of a three phase Induction motor using Star-delta starter.
17. To measure power in three phase circuit using two wattmeter method.
18. To plot fusing time characteristics of incandescent lamp.
19. To plot voltage- current characteristics of a fuse wire.
20. Measurement of armature and field resistance of a D.C. motor.

2. ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

Laboratory Incharge: *Ms. P. Somkuwar*

Area: 116.9 Sq. m

Total Investment: Rs. 3,77,416/-

Practicals are conducted for: i) III Semester B.E.(Electrical Engg.)
ii) III Semester B.E.(Electronics Engg.)
iii) IV Semester B.E.(Computer Technology)

Facilities are available to conduct the following experiments:

1. Measurement of unknown value of medium resistance using Wheatstone's Bridge.
2. Measurement of unknown value of low 'Q' coils using Maxwell's Inductance- Capacitance Bridge.
3. Measurement of unknown value of Capacitance using Schering's Bridge.
4. Measurement of low resistance using Kelvin's Double Bridge.
5. Extension of the range of Ammeters using Shunt.
6. Extension of the range of Voltmeters using Series Resistance.
7. Study of Megger.
8. Measurement of High resistance by loss of charge method.
9. Calibration of Single phase Energymeter.
10. Measurement of three phase power by one Wattmeter method.
11. Measurement of three phase power by two Wattmeter method.
12. Measurement of three phase power by three Wattmeter method.
13. Polarity testing of a Current transformer.
14. Calculation of ratio error of Current Transformer.
15. Calculation of phase angle error of a current transformer.
16. Study of a Cathode Ray Oscilloscope.
17. Study of Lissajous patterns by Cathode Ray Oscilloscope.
18. Study of analog instruments.
19. Measurement of reactive power by one wattmeter method.
20. To study loading effect of shunt connected instruments.
21. To study loading effect of series connected instruments.

3. ELECTRICAL MACHINES

Laboratory Incharge: Mr. S.K. Mude

Area: 262.08 Sq. m

Total Investment: Rs. 8,73,377/-

Practicals are conducted for :

- i) IV Semester B.E.(Electrical Engg.)
- ii) IV Semester B.E.(Electronics Engg.)
- iii) IV Semester B.E.(Computer Technology)
- iv) V Semester B.E. (Electrical Engg.)
- v) VIII Semester B.E.(Electrical Engg.)
- vi) First Year B.E.

Facilities are available to conduct the following experiments:

1. To find the magnetization characteristic of a D.C. Shunt generator.
2. To study the Build up of a D.C. shunt generator.
3. To determine losses in a D.C. machine in case of -
 - a) Single machine
 - b) Coupled machine
4. To perform load test on a D.C. shunt generator.
5. To perform load test on a D.C. compound generator.
6. To perform speed control of a D.C. shunt motor by –
 - a) Varying field current with armature voltage kept constant.
 - b) Varying armature voltage with field current kept constant.
7. To perform load test on a D.C. shunt motor.
8. To perform load test on a D.C. series motor.
9. To perform load test on a D.C. compound motor.
10. To perform open circuit and short circuit tests on a three phase transformer.
11. To study three phase to two phase i.e. Scott connection.
12. To perform No load and block rotor tests on an Induction motor.
13. To perform Load test on an Induction motor.
14. To perform speed control of a slip ring Induction motor by rotor resistance method.
15. To study the three point starter of a D.C. motor.

16. Determination of regulation of a three phase alternator by direct loading.
17. Determination of regulation of a three phase alternator by open circuit and short circuit tests.
18. Determination of Potier Reactance by zero power factor saturation curve.
19. Determination of zero sequence reactance of a synchronous generator.
20. Determination of negative sequence reactance of a synchronous generator.
21. Determination of negative sequence reactance of a synchronous generator.
22. To determine sub-transient direct axis (x_d'') and quadrature axis (x_q'') of a synchronous machine.
23. To find x_d and x_q of a salient pole synchronous machine by slip test.
24. To study the starting and reversal of synchronous motor.
25. To plot 'v' and 'inverted v' curves of a synchronous motor.
26. To study the synchronization of an alternator with infinite bus by –
 - a) Dark lamp method.
 - b) Bright lamp method.
27. To perform load test on Schrage motor.
28. To study the single phase repulsion motor.
29. To study the single phase universal motor.
30. Identification of different windings of a D.C. compound machine.

C) 4. POWER SYSTEMS

D) 4-(a) SWITCHGEAR & PROTECTION

Laboratory Incharge: *Mrs. Sudha Srikanth*

Area: 116.9 Sq. m

Total Investment: Rs. 4,28,049/-

Practicals are conducted for : i) VIII Semester B.E.(Electrical Engg.)

Facilities are available to conduct the following experiments:

1. To study Generalized Protection systems and it's various components.
2. To study and plot the Magnetization characteristics of a Protective C.T.
3. To study and plot the Time Current Characteristics of a Re-wirable Fuse.
4. To study and plot the Time Current Characteristics of a Miniature Circuit Breaker.
5. To study the Sensitivity of an Earth Leakage Circuit Breaker.
6. To study and plot the Time Current Characteristics of a Reverse Power Relay.
7. To study and plot the Time Current Characteristics of an Under Voltage Relay.
8. To study and plot the Time Current Characteristics of an IDMT Relay.
9. To study and plot the Time Current Characteristics of an Instantaneous Earth Fault Relay.
10. To study and plot the Time Current Characteristics of an Over Voltage Relay.
11. To study and plot the Time Current Characteristics of an Inverse Relay.
12. To study and plot the Time Current Characteristics of a Percentage Biased Differential Relay.
13. Demonstration of Differential Protection Scheme for the Protection of a Transformer.
14. Demonstration of Cross Differential Protection Scheme for the Protection of an Alternator.
15. To study and plot time-current characteristics of Over Current, Definite time, Inverse time, Very inverse, extremely inverse Microprocessor based Relay.
16. Demonstration of Distance Protection scheme for a transmission line.
17. Demonstration of combined Over current and Earth fault scheme for a transmission line.
18. Study of various Circuit Breakers.

4(b) HIGH VOLTAGE ENGINEERING

Laboratory Incharge: *Mr. D. M. Holey*

Area: 114.6 Sq. m

Total Investment: Rs. 2,94,959/-

Practicals are conducted for : i) VII Semester B.E.(Electrical Engg.)

Facilities are available to conduct the following experiments:

1. To study the operation and Design aspects of the High Voltage test setup 0-150 KV.
2. To find out the Breakdown voltage of given insulation paper.
3. To find the Breakdown strength of the Dielectric liquid.
4. To study arc in Horn Gap arrangement.
5. To find out Corona inception voltage and study the Corona.
6. To conduct visible discharge test on the bushing.
7. To calibrate voltmeter by standard Sphere Gap arrangement.
8. Measurement of High voltage by horizontal sphere gap.
9. To perform following tests on pin type insulator:
 - a) Dry flashover test
 - b) Wet flashover test
10. To study various types of insulators.

E)

F)

G) 5. CONTROL ENGINEERING

H) 5(a) CONTROL SYSTEMS

Laboratory Incharge: *Mr. D. M. Holey*

Area: 116.9 Sq. m

Total Investment: Rs. 3,08,853/-

Practicals are conducted for : i) VI Semester B.E.(Electrical Engg.)
ii) VI Semester B.E.(Electronics Engg.)

Facilities are available to conduct the following experiments:

1. To study Synchro transmitter and receiver.
2. To plot speed verses torque and speed vs. back emf characteristic of AC servomotor.
3. To study AC position control system.
4. To study DC position control system.
5. To study potentiometer as an error detector.
6. To measure basic step angle of a stepper motor.
7. Simulation and analysis of Time response of a First order system using PSCAD.
8. Simulation and analysis of Time response of a second order system using PSCAD.
9. Simulation and analysis of frequency response of a second order system using PSCAD.
10. To study AC series voltage stabilizer circuit.
11. To study series regulator circuit.
12. To study PID controller in different modes.
13. To study performance of various types of controllers used to control the temperature of the oven.
14. To demonstrate the use of PLC for various Industrial applications.
15. To study synchro as an error detector.
16. To study Lag-Lead Compensator.

D) 5(b) POWER ELECTRONICS

Laboratory Incharge: *Mr. G. H. Agrawal*

Area: 143.24 Sq. m

Total Investment: Rs. 2,43,356/-

Practicals are conducted for : i) VII Semester B.E.(Electrical Engg.)
ii) V Semester B.E.(Electronics Engg.)

Facilities are available to conduct the following experiments:

1. To study the Lamp dimmer using DIAC and TRIAC.
2. To study the Lamp Flasher using SCR.
3. To study & observe the waveforms for the SCR turn on methods:
 - 3.1 DC gate triggering method.
 - 3.2 Resistive AC gate triggering method.
 - 3.3 R-C AC gate triggering method.
 - 3.4 UJT Relaxation oscillator pulse- gate triggering method.
4. To study & observe the waveforms for the Speed control of a Universal motor.
5. To study the Commutation Circuits
 - 5.1 Class A Resonant Commutation
 - 5.2 Class B Self Commutation
 - 5.3 Class C Complementary Commutation
 - 5.4 Class D Auxiliary Commutation
 - 5.5 Class E External Pulse Commutation
6. To study and plot the waveforms of the Three phase full wave uncontrolled converter.
7. To study and plot the waveforms of the Single phase half wave controlled converter with resistive and inductive load.
8. To study and plot the waveforms of the Single phase half controlled converter with resistive and inductive load.
9. To study and plot the waveforms of the AC power controller.
 - 9.1 UJT triggered AC phase control with single SCR and diode bridge rectifier.
 - 9.2 AC phase control using DIAC and TRIAC.

9.3 AC phase control using anti-parallel SCR.

10. To study and plot the waveforms of the Three phase half wave-controlled converter.
11. To study and plot the waveforms of the Single phase fully controlled converter with R-L load with and without free wheeling diode.
12. To study the Series Inverter.
13. To study the Parallel Inverter.
14. To study the DC circuit breaker.
15. To study & observe the waveforms of Jone's Chopper and Speed control of motor using Jone's chopper.
16. To study and plot the waveforms of the Single phase fully controlled converter in inverting mode.
17. To study and plot the waveforms of the Three phase half controlled converter.
18. To study and plot the waveforms of the SCR power supply.
19. To study and plot the waveforms of the Three phase half wave uncontrolled converter.
20. To study and plot the TRIAC characteristics.
21. To study and plot the DIAC characteristics.
22. Measurement of turn off time of SCR using Class D Commutation technique.
23. To study and plot the waveforms of three phase fully controlled converter.
24. To study and plot the waveforms of single- phase cycloconverter.

J)

K) 6. NETWORK ANALYSIS

Laboratory Incharge: *Mr. G. H. Agrawal*

Area: 116.9 Sq. m

Total Investment: Rs. 2,02,645/-

Practicals are conducted for : i) III Semester B.E.(Electrical Engg.)

Facilities are available to conduct the following experiments:

1. To study and verify Superposition Theorem.
2. To study and verify Thevenin's Theorem.
3. To study and verify Norton's Theorem.
4. To study and verify Reciprocity Theorem.
5. To study and verify Maximum Power Transfer Theorem.
6. To study and verify Compensation Theorem.
7. To determine z-parameters for a given network.
8. To determine y-parameters for a given network.
9. Measurement of Three phase power by Two Wattmeter Method.
10. Measurement of Power and Power Factor of a series R-L network.
11. Measurement of Q-factor for both series and parallel resonance.
12. To determine the Fourier Component of a square wave.
13. To determine the Fourier Component of a clipped sine wave.
14. To study different types of passive filters and to determine different constants & cut off frequencies.

L)

M)

N) 7. ELECTRICAL WORKSHOP

Laboratory Incharge: *Mrs. Sudha Srikanth*

Area: 116.9 Sq. m

Total Investment: Rs. 28,437/-

Practicals are conducted for : i) V Semester B.E.(Electrical Engg.)

Facilities are available to conduct the following experiments:

1. To study various symbols used in Electrical Engineering.
2. To study different materials and accessories used in Electrical Installations.
3. To study wiring diagram details and types of wiring systems.
4. To perform load survey and to determine the ratings of distribution transformer and other substation equipments.
5. To study the electrical installation of –
 - a) Residential building/colony/complex.
 - b) Small industry.
6. To study windings of a D.C. machine and identification of windings of a D.C. Compound motor.
7. To perform polarity test on single phase transformer.
8. To design and fabricate single phase transformer of given specifications.
9. To design suitable illumination scheme for a given project and to design the wiring diagram for above designed scheme.
10. To study internal construction and working of a three phase a.c. contactor and to construct the starting circuit for a three phase induction motor.
11. To design forwarding and reversing circuit for three phase induction motor.
12. To perform testing of insulation resistance of different cables using megger.
13. To perform estimation and costing of a given project.
14. To study substation layout, various design and installation aspects along with substation equipment.
15. To design and fabricate winding arrangements of a three phase Induction motor.
16. To study various types of earthing.

8. PROJECT

Laboratory Incharge: *Mr.G. H. Agrawal*

Area: 116.9 Sq. m

Total Investment:

Projects : VIII Semester B.E.(Electrical Engg.)

Following facilities are available:

O)

P) 9. ELECTRONICS

Practicals are conducted for the following three subjects:

1. Electronic Devices & Circuits

2. Digital Circuits

3. Linear Integrated Circuits

Laboratory Incharge: *Mr. V.V. Chakole*

Area: 175.26Sq. m

Total Investment: Rs. 5,60,627/-

Practicals are conducted for :

- i) III Semester B.E.(Electrical Engg.)
- ii) III Semester B.E.(Electronics Engg.)
- iii) IV Semester B.E.(Electrical Engg.)
- iv) V Semester B.E. (Electrical Engg.)
- v) IV Semester B.E. (Mechanical Engg.)

Facilities are available to conduct the following experiments:

1. To obtain the V-I characteristics of a P-N Junction Diode in forward and reverse bias.
2. To obtain the V-I characteristics of a Zener Diode.
3. To study the working of a Half wave, Full wave and Full wave Bridge Rectifier without filter.
4. To study the working of a Half wave, Full wave and Full wave Bridge Rectifier with filter.
5. To study the transistor characteristics of for Common Emitter configuration.
6. To study the transistor characteristics of for Common Base configuration.
7. To study the characteristics of Field Effect Transistor (FET).
8. To study the characteristics of MOS-FET.
9. To study the Negative Feedback Amplifier.
10. To study the Colpitt's Oscillator.
11. To study the Hartley's Oscillator.

12. To verify the basic logic gates using diodes and transistors.
13. To construct and verify the Truth Table for :
 - i) Half adder and Half subtractor using AND & EX-OR gates
 - ii) Full adder and Full Subtractor.
14. To demonstrate the operation of a 4-bit arithmetic logic unit and to verify its Truth table for all 16 logic and arithmetic functions.
15. To verify De-Morgan's theorems by using Combinational gates with switches as inputs and LEDs as outputs.
16. To construct a Divide by N Counter from 0-9 using IC 7490 to work as Modulo-N Counter.
17. To demonstrate the operation and application of digital multiplexers and to verify the use of this multiplexer for conversion of a parallel data input to a serial data output device.
18. To constitute and verify a 7-segment decoder/ driver.
19. Implementation of EX-OR gate and EX-NOR gate (2 inputs and 3 inputs) using NAND gate only.
20. Implementation of EX-OR gate and EX-NOR gate using NOR gate only.
21. To construct RS flip-flop using NAND gates and verify its Truth Table for D-FF and T-FF with switches as inputs and LEDs as outputs.
22. To study the inverting and non-inverting Operation Amplifiers.
23. To study OP-AMP as an Adder and a Subtractor.
24. To plot the frequency response of a non-inverting Opamp.
25. To study generation of a square wave and a triangular wave.
26. To study Integrator and Differentiator circuit using Opamp.
27. To study conversion of current of the proportional voltage in inverting and non-inverting modes.
28. To study the conversion of the input voltage into proportional current irrespective of load for inverting and non-inverting mode.
29. To study the Precision Half-wave and Full-wave Rectifier.
30. To study the Schmitt Trigger circuit using Opamp.
31. To study the IC-555 Timer.
32. To study the IC-723 as a Voltage Regulator.

Q) 10. MICROPROCESSOR & INTERFACING

Laboratory Incharge: *Mr. S. A. Bagal*

Area: 87.63 Sq. m

Total Investment: Rs. 2,62,697/-

Practicals are conducted for : i) V Semester B.E.(Electrical Engg.)
ii) V Semester B.E.(Electronics Engg.)

Facilities are available to conduct the following experiments:

1. Various software programs using Microprocessor 8085 e.g.
 - i) Programs on addition.
 - ii) Programs on block transfer of data.
 - iii) Programs on code conversion.
 - iv) General programs.
 - v) Delay Programs.
2. Interfacing a Memory kit with the microprocessor.
3. To study the PPI IC-8255 and to interface it with the microprocessor.
4. To study the control operations of Traffic light using the 8255 PPI.
5. To study and plot the generation of a square wave on SOD pin.

Branch – Computer Technology

SUBJECT : INTRODUCTION TO PROGRAMMING

SEMESTER : III – SEMESTER

1. Write a program to exchange data of two variables.
2. Write a program to convert temperature in degree Celsius to degree. Fahrenheit
3. Write a program to generate the following pattern.

```
*  
**  
***  
****  
*****
```

4. Write a program to find the root of a quadratic equation using function.
5. Write a program to generate Fibonacci series using recursion.
6. Write a program to sort the element of an array in ascending /descending order.
7. Write a menu driven program for addition, subtraction, multiplication, and transpose of matrix.
8. Write a program to check whether the string is palindrome or not.
9. Write a program to check input the data of a student using structure and display the contained using the pointer (using structure & indirect operator)
10. Write a program to copy the content of one file to the other file.

SUBJECT : COMPUTER WORKSHOP – I

1. Introduction to Computer.
2. Introduction to all the internal parts of the CPU.
3. Introduction to all peripheral devices of Computers.
4. Study of all Internal DOS Commands.
5. Study of all External DOS Commands
6. Create a batch File.
7. Introduction to Microsoft Office.
8. Introduction to Internet.
9. Introduction to Computer Networking.
10. Study of Windows O.S.

SUBJECT : DATA STRUCTURE

SEMESTER : IV – SEMESTER

1. Write a Program for Bubble Sort.
2. Write a Program for Binary Search.
3. Write a Program to evaluate the Postfix Expression.
4. Write a Program to implement Queue using array.
5. Write a Menu Driven Program to implement Stack using Linked List.
6. Write a Program to implement Circular link list.
7. Write a Program to traverse Binary Search Tree.
8. Write a Program to implement Threaded Binary Tree.
9. Write a Program to implement Breadth first search algorithm on graph.
10. Write a Program to implement Depth First Search algorithm on graph.

SUBJECT : COMPUTER WORKSHOP – II

SEMESTER : IV– SEMESTER

1. Introduction to MS –WORD
2. Make a documentary file by using MS-WORD
3. Introduction to MS –EXCEL
4. Make Mark List of Student Using MS- EXCEL
5. Introduction to Power Point
6. Introduction to Internet & WWW
7. Introduction to FOXPRO
8. Commands of FOXPRO
9. Mini Project

SUBJECT : OOM

SEMESTER : V – SEMESTER

1. Implementation of link list using C.
2. Program for maintaining the employee information using classes & objects
3. Program using constructor and destructor.
4. Program using operator overloading.
5. Program using function overloading.
6. Program using inheritance.
7. Program using friend function.
8. Program using virtual function.
9. Program using templates.
10. Program for concatenation of 2 strings.
11. Program using dynamic allocation of memory.

SUB : DPFO
SEMESTER : VI SEM

1. Write a program to find area of circle.
2. Write a program to find perimeter of rectangle.
3. Write a program to calculate a factorial of a given no.
4. Write a program using array (multiplication of two matrices).
5. Write a program using function to print prime numbers between 1 to 100.
6. Write a program to read the data from sequential file.
7. Write a program to read and write the data into the indexed file.
8. Write a program to read and write the data into relative file.
9. Write a program to create a master file and a transaction file .
10. Write a program to sort two files in ascending order.
11. Write a program to merge two files.

SUBJECT : Software Engineering
SEMESTER : VI - Semester

1. Introduction to Software Engineering
2. Study of various Software Process Model
3. Study Of Software Measurements
4. Study Of Software Project Planning
5. Seminar Report (Topic 1)
6. Seminar Report (Topic 2)
7. Seminar Report (Topic 3)
8. Synopsis of mini project according to the phases of Software Engineering Process

SUBJECT : Computer Network and Internet

SEMESTER : VII - Semester

- 1 Introduction to computer N/W
- 2 Study of ISO/OSI reference Model
- 3 Study Of Computer Labs of KDK College Of Engineering
- 4 Write a Program to implement Cyclic Redundancy Code(CRC)
- 5 Write a Program to implement Encryption & Decryption using ASCII Method
- 6 Write a Program to implement Encryption & Decryption using Substitution Cipher Method
- 7 Write a Program to implement Encryption & Decryption using Substitution Transposition Method
- 8 Study Of Internet

SUBJECT : DBMS

SEMESTER : VII – SEMESTER

1. 1.Study of various SQL commands.
2. 2.Execution of different SQL commands.
3. 3.Execution of various SQL commands.
4. 4.To execute different SQL commands on the table given.
5. 5.Write a PL/SQL block for finding total percentage and grade of a student with marks of any 3 subject entered through keyboard.
6. Write a PL/SQL block to perform transaction and simultaneously update stock.
7. 7.Write a PL/SQL block to perform sales transaction /purchase transaction and update the master block.
8. Write a PL/SQL block to perform either deposit or withdrawal transaction and update the account table. Perform validation.

SUB : COMPLIERS

SEMESTER : VIII

1. Study experiment: Phases of Compilers.
2. Write a program to check validity of token and acceptance of token (using NFA & DFA concept).
3. Design Lexical Analyzer.
4. Design a program to evaluate FIRST () set of non –terminals of C.F grammar.
5. Design a program to evaluate FOLLW () set.
6. Design predictive parser to check validity of string.
7. Study experiment: YACC.
8. Design a program to evaluate IN & OUT set (reaching Definitions)

SUBJECT : COMPUTER GRAPHICS

SEMESTER : VIII SEMESTER

- 1 Write a Program To generate a line using DDA & Bresenham's Algorithm.
- 2 Write a Program To generate Dotted, Dash & Thick line using Bresenham's Algorithm.
- 3 Write a Program To generate Circle using Bresenham's Algorithm.
- 4 Write a Program for Edge Fill & Seed Fill Algorithm.
- 5 Write a Program for 2-D Transformation.
- 6 Write a Program for Parallel & Perspective Projection.
- 7 Write a Program for Implementing Bezier Curve.
- 8 Write a Program To generate for Sutherland & Cohen line Clipping Algorithm.
- 9 Write a Program To generate for Cyrus Beck line Clipping Algorithm.
- 10 Write a Program for Animation.

Branch – Information Technology

PROGRAMMING LANGUAGE IN - C

SEMESTER : III – SEMESTER

1. Write a program to exchange data of two variables.
2. Write a program to convert temperature in degree Celsius to degree. Fahrenheit
3. Write a program to generate the following pattern.
 1. *
 2. **
 3. ***
 4. ****
 5. *****
4. Write a program to find the root of a quadratic equation using function.
5. Write a program to generate Fibonacci series using recursion.
6. Write a program to sort the element of an array in ascending /descending order.
7. Write a menu driven program for addition, subtraction, multiplication, and transpose of matrix.
8. Write a program to check whether the string is palindrome or not.
9. Write a program to check input the data of a student using structure and display the contained using the pointer (using structure & indirect operator)
10. Write a program to copy the content of one file to the other file.

SUBJECT : COMPUTER WORKSHOP – I

SEMESTER : III SEMESTER

1. Introduction to Computer.
2. Introduction to all the internal parts of the CPU.
3. Introduction to all peripheral devices of Computers.
4. Study of all Internal DOS Commands.
5. Study of all External DOS Commands
6. Create a batch File.
7. Introduction to Microsoft Office.
8. Introduction to Internet.
9. Introduction to Computer Networking.
10. Study of Windows O.S.

SUBJECT : COMPUTER WORKSHOP – II

SEMESTER : IV– SEMESTER

1. Introduction to MS –WORD
2. Make a documentary file by using MS-WORD
3. Introduction to MS –EXCEL
4. Make Mark List of Student Using MS- EXCEL
5. Introduction to Power Point
6. Introduction to Internet & WWW
7. Introduction to FOXPRO
8. Commands of FOXPRO
9. Mini Project

SUBJECT : ADS

SEMESTER : IV – SEMESTER

1. Write a Program for Bubble Sort.
2. Write a Program for Binary Search.
3. Write a Program to evaluate the Postfix Expression.
4. Write a Program to implement Queue using array.
5. Write a Menu Driven Program to implement Stack using Linked List.
6. Write a Program to implement Circular link list.
7. Write a Program to traverse Binary Search Tree.
8. Write a Program to implement Threaded Binary Tree.
9. Write a Program to implement Breadth first search algorithm on graph.
10. Write a Program to implement Depth First Search algorithm on graph.

SUB :- DPFO

SEMESTER :- VI SEM

1. Write a program to find area of circle.
2. Write a program to find perimeter of rectangle.
3. Write a program to calculate a factorial of a given no.
4. Write a program using array (multiplication of two matrices).
5. Write a program using function to print prime numbers between 1 to 100.
6. Write a program to read the data from sequential file.
7. Write a program to read and write the data into the indexed file.
8. Write a program to read and write the data into relative file.
9. Write a program to create a master file and a transaction file .
10. Write a program to sort two files in ascending order.
11. Write a program to merge two files.

SUBJECT : COMPUTER GRAPHICS

SEMESTER : V SEMESTER

1. Write a Program To generate a line using DDA & Bresenham's Algorithm.
2. Write a Program To generate Dotted, Dash & Thick line using Bresenham's Algorithm.
3. Write a Program To generate Circle using Bresenham's Algorithm.
4. Write a Program for Edge Fill & Seed Fill Algorithm.
5. Write a Program for 2-D Transformation.
6. Write a Program for Parallel & Perspective Projection.
7. Write a Program for Implementing Bezier Curve.
8. Write a Program To generate for Sutherland & Cohen line Clipping Algorithm.
9. Write a Program To generate for Cyrus Beck line Clipping Algorithm.
10. Write a Program for Animation.

SUBJECT : OOM

SEMESTER : V – SEMESTER

1. Implementation of link list using C.
2. Program for maintaining the employee information using classes & objects
3. Program using constructor and destructor.
4. Program using operator overloading.
5. Program using function overloading.
6. Program using inheritance.
7. Program using friend function.
8. Program using virtual function.
9. Program using templates.
10. Program for concatenation of 2 strings.
11. Program using dynamic allocation of memory.

SUBJECT : DBMS

SEMESTER : VI – SEMESTER

1. Study of various SQL commands.
2. Execution of different SQL commands.
3. Execution of various SQL commands.
4. To execute different SQL commands on the table given.
5. Write a PL/SQL block for finding total percentage and grade of a student with marks of any 3 subject entered through keyboard.
6. Write a PL/SQL block to perform transaction and simultaneously update stock.
7. Write a PL/SQL block to perform sales transaction /purchase transaction and update the master block.
8. Write a PL/SQL block to perform either deposit or withdrawal transaction and update the account table. Perform validation.

SUBJECT : JAVA PROGRAMMING

SEMESTER : VI – SEMESTER

1. WAP using for-each to display & sum the values of 10 nos.
2. WAP using do-while to process a menu selection.
3. WAP to print the pyramid:
0 1
0 2 4
0 3 6 9
4. Write interface solid having 2 methods volume & area. Define classes 1)sphere 2) cylinder 3)Box which implements interface.
5. WAP to calculate area & perimeter of circle.
6. WAP based on Exception handling.
7. WAP to create multiple threads
8. WAP based on Applet.
9. WAP to sort strings using bubble sort.
10. WAP to convert names in uppercase & store them into another file.

SUBJECT : VT

SEMESTER : VI – SEMESTER

1. Study of Visual Basic
2. Designing a Simple Calculator Application
3. Design an Application to calculate a factorial of a no. and a user interface for password checking
4. Designing an Application using Menus.
5. Designing an application using Multiple Document Interface.
6. Program using List box, Combo box, Text Box & Label Box.
7. Program to transfer data from one list box to other.
8. Program for maintaining records of employees using MS-ACCESS
9. Program using ADODC.
10. Program to Develop a Notepad Application.

SUBJECT : Computer Network and Internet

SEMESTER : VII - Semester

- 1 Introduction to computer N/W
- 2 Study of ISO/OSI reference Model
- 3 Study Of Computer Labs of KDK College Of Engineering
- 4 Write a Program to implement Cyclic Redundancy Code(CRC)
- 5 Write a Program to implement Encryption & Decryption using ASCII Method
- 6 Write a Program to implement Encryption & Decryption using Substitution Cipher Method
- 7 Write a Program to implement Encryption & Decryption using Substitution Transposition Method
- 8 Study Of Internet

SUBJECT : *WEB TECHNOLOGY*

SEMESTER : VIII SEM

1. Write a program to design a feedback form which contains firstname,lastname,email,password,age,gender,address,state.
2. Create a page about your hobbies and interests.On the page include links to interesting sites that coincide with your description
3. Create a formthat allows the user to subscribe to a different magazine. Include different segments for name,address,demographic information, and credit card no.
Also use layout and HTML emphasis to make it clear to the user what informationis required & what is optional.
4. Create a table of thumbnail images with a small image, a description of image & image filename in each row.Make each image clickable so that a larger image appear on new page when the user clicks the thumbnail.
5. Write an XML document featuring a list of your favorite books. Include links to author bios to an online bookstore from which others can order these titles.
6. Write an XML document that defines a root element with five child elements.The 1st child element is optional, the 2nd & 3rd must be entered atleast once, & the 4th & 5th can occure any number of times or not at all.
7. Write a HTML page to create Time Table of college using tables.
8. Write A HTML form for student registration with the the following information name,address,phone no.date of registration,course,media.

SUBJECT : DOOD

SEMESTER : VIII – SEMESTER

1. Study of different Database management system (RDBMS Object-Oriented
2. Distributed).
3. Study of distributed DBMS reference architecture.
4. Study of different types of fragmentation of Distributed DBMS.
5. Study of Transact SQL.
6. Study of Object Oriented DBMS architecture.
7. Study of different types of replication.
8. Project on relational DBMS :- Data Collection.

Department of Electronics

Subject:- Electronics Device & Circuits

Semester:-III Sem(Etrx/Elect/I.T./C.T.)

1. To obtain the V-I characteristics of a P-N Junction Diode in forward and reverse bias.
2. To obtain the V-I characteristics of a Zener Diode.
3. To study the working of a Half wave, Full wave and Full wave Bridge Rectifier without filter.
4. To study the working of a Half wave, Full wave and Full wave Bridge Rectifier with filter.
5. To study the transistor characteristics of for Common Emitter configuration.
6. To study the transistor characteristics of for Common Base configuration.
7. To study the characteristics of Field Effect Transistor (FET).
8. To study the characteristics of MOS-FET.
9. To study the Negative Feedback Amplifier.
10. To study the Colpitt's Oscillator.
11. To study the Hartley's Oscillator.
12. To study the Phase Shift Oscillator.

Subject:- Digital Circuits/Electronics **Semester:-**III Sem(I.T./C.T)/IVsem(Etrx/Elect)

- 1) To verify the basic logic gates using diodes and transistors.
- 2) To construct and verify the Truth Table for :
 - i) Half adder and Half subtractor using AND & EX-OR gates
 - ii) Full adder and Full Subtractor.
- 3) To demonstrate the operation of a 4-bit arithmetic logic unit and to verify its Truth table for all 16 logic and arithmetic functions.
- 4) To verify De-Morgan's theorems by using Combinational gates with switches as inputs and LEDs as outputs.
- 5) To construct a Divide by N Counter from 0-9 using IC 7490 to work as Modulo-N Counter.
- 6) To demonstrate the operation and application of digital multiplexers and to verify the use of this multiplexer for conversion of a parallel data input to a serial data output device.
- 7) To constitute and verify a 7-segment decoder/ driver.
- 8) Implementation of EX-OR gate and EX-NOR gate (2 inputs and 3 inputs) using NAND gate only.
- 9) Implementation of EX-OR gate and EX-NOR gate using NOR gate only.
- 10) To construct RS flip-flop using NAND gates and verify its Truth Table for D-FF and T-FF with switches as inputs and LEDs as outputs.
- 11) To study J-K Flip-Flop.
- 12) To study the interfacing of CMOS & TTL integrated circuits.

Subject:- Linear Electronics Circuit/ Discrete & Integrated Circuit

Semester:- V sem(Etrx)/VI Sem(Elect)/VI Sem(I.T.)

- 1) To study the inverting and non-inverting Operation Amplifiers.
- 2) To study OP-AMP as an Adder and a Subtractor.
- 3) To plot the frequency response of a non-inverting Opamp.
- 4) To study generation of a square wave and a triangular wave.
- 5) To study Integrator and Differentiator circuit using Opamp.
- 6) To study conversion of current to the proportional voltage in inverting and non-inverting modes.
- 7) To study the conversion of the input voltage into proportional current irrespective of load for inverting and non-inverting mode.
- 8) To study the Precision Half-wave and Full-wave Rectifier.
- 9) To study the Schmitt Trigger circuit using Opamp.
- 10) To study the IC-555 Timer.
- 11) To study the IC-723 as a Voltage Regulator.

Semester :- V IT : List of the Experiments

1. To study the Amplitude Shift Keying Modulator.
2. To study the Amplitude Shift Keying De-Modulator.
3. To study the Phase Shift Keying Modulator.
4. To study the Phase Shift Keying De-Modulator.
5. To study the Frequency Shift Keying Modulator.
6. To study the Frequency Shift Keying De-Modulator.
7. To study the Quadrature Amplitude Modulator.
8. To study the Data Communication System.
9. To study the Pulse Code Modulation.
10. To study the Time Division Multiplexing

Subject: Industrial Electronics

Branch/ Year: Mechanical! VI sean.

1. Verification of Demorgan's Law & Boolean Laws, Study of R-S, D & T Flip flop Characteristics.
2. Study of 8085 Micro-Processor.
3. Programming using 8085 Micro-Processor,
 - a). Transfer 10 bytes of data from 4200 to 4300.
 - b). Add 8 bit data of reg. A and reg. B and store in reg C.
4. Study of 8051 Micro -Controller.
5. Programming using 8051 controller,
 - a). Program to multiply 2 nos.
 - b). Program to divide the no. by 8.
- 0). Program to reset d7,d4,d1 bits & set d6,d5 bits & rest are unchanged at reg. RO.
6. Speed control of D.C. Shunt. motor.
7. Speed control at 3 squirrel gauge Induction motor.
8. To perform load test on D.C. Shunt Motor.
9. Study of Servomotor.

Subject:- Advanced Microprocessor

Semester:-VII(Etrx)/V(C.T.)

1. To study the Architecture of 8086 and component layout of 8086 MPU kit.
2. Write a program in 8086 assembly language to add the contents of two reg(CX,AX) and store the result in reg DX.
3. Find out the arith. Mean of 2, 16 bit nos. product in AX and CX. Store 16 bit result in AX and DX respectively.
4. Perform the multiplication of 2 numbers and store the result in SI.
5. Perform the addition of 2 BCD numbers and then store the result in memory.
6. To perform BCD to ASCII conversion.
7. To perform ASCII addition and Subtraction.
8. To convert the Hexadecimal number to decimal number.
9. To addition using microcontroller.
10. To perform multiplication using Microcontroller.

List of Experiments

Subject:-DSP

Semester:-VII(Etrx)/

1. Write a program for convolution of two sequences using mat lab.
2. Write a program for Auto correlation of two sequences using mat lab.
3. Write a program for cross correlation of two sequences using mat lab.
4. Write a program for finding the Z-transform of a sequence using mat lab.
5. Write a program for Circular convolution of two sequences using mat lab.
6. To compute DFT of the sequence and plot magnitude and phase response.
7. To compute IDFT of the sequence using mat lab.
8. To design a Butter worth low pass filter using mat lab.
9. To design a Chebyshev low pass filter using mat lab.
10. To design a FIR low pass filter using Hamming and Blackman windows using mat lab.
11. Study of DSP chip trainer kit TMS320C25 & TMS320C50.

Subject: Communication System

SEM:4IT/5CT/6EN

List of Experiments:

1. To study the amplitude modulation and demodulation, calculation of modulation index.
2. To study the frequency modulation and demodulation, calculation of modulation index.
3. To study the phase modulation, calculation of modulation index.
4. To study the pulse position and pulse width modulation.
5. To study the Bridge balance modulation.
6. To study the pulse position and pulse width modulation.
7. To study the pulse amplitude modulation, demodulation
8. To study the T.D.M. circuit and observe the waveform.
9. To study the F.M. Transmitter.
10. To study the A.M. Transmitter.

R) Department of Electronics Engineering

Subject:- UHF & Microwave

Semester:-VII Sem(ETRX)

- 1) To study the Microwave components.
- 2) To study the characteristic of reflex Klystron.
- 3) To determine the Standing Wave Ratio & Reflex Coefficient.
- 4) To study the Magic Tee & to determine coupling coefficient of V.S.W.R & Isolation.
- 5) To determine the frequency & wavelength in rectangular waveguide on TE₁₀ mode.
- 6) To Measure an unknown Impedance of load with smith chart.
- 7) To study the Isolator & Circulator.
- 8) To study the function of multihole directional coupler by measuring the following parameter
 - a) To measure main line & auxiliary line V.S.W.R.
 - b) To measure the coupling factor & directivity of the coupler.
- 9) To study the Attenuator(Fixed & Variable) & to determine V.S.W.R., Insertion loss &Attenuation
- 10) To study the phase shifter & to determine phase shift.
- 11) To measure the polar pattern & gain of wave guide Antenna.

Subject:-Microprocessor & Interfacing

Semester:-V(Etrx/Elect)/IV(C.T./I.T.)

1. To study the pin configuration and architecture of IC 8085 and the component layout of 8085 MPU kit.
2. To study an interface 8255 with 8085.
3. Programming using frequently used instructions.
4. Programming using advanced instructions.
5. Programming using sub program.
6. Write a program to produce delay time.
7. Generation of symmetric and asymmetric square waveform using SOD pin of 8085.
8. To study memory mapping, IO, devices using memory mapping.
9. To study an interface 8253 with up 8085.
10. Application of programming skill for project oriented applications.
11. *To study the pin configuration and architecture of IC 8086 and the component layout of 8086 MPU kit.
12. To study an interface 8253 with 8085.
13. To study an interface 8259with 8085.
14. To study an interface 8279 with 8085.
15. To study an interface AD/DA with 8085.

***Applicable to IV Sem C.T.**

DEPARTMENT OF ELECTRONICS ENGINEERING

SUBJECT : LINEAR ELECTRONICS CIRCUIT

(V-SEMESTER ELECTRONICS & VI- SEMESTER ELECTRICAL)

Experiment List :

1. To study the inverting and Non-Inverting OP-AMP.
2. To study OP-AMP as an adder and Subtractor.
3. To plot the frequency response of Non-Inverting OP-AMP.
4. To Study generation of square wave and triangular wave generator.
5. To study integrator and differentiator circuits using OP-AMP.
6. To plot the frequency of low pass and high pass Filter.
7. To study conversion of current to the proportional voltage in Inverting and Non-Inverting mode.
8. To study conversion of voltage to the proportional current irrespective of load for Inverting and Non-Inverting mode.
9. To study precision Rectifier using OP-AMP (Half wave and full wave Rectifier.)
10. To study Schmitt Trigger circuit using OP-AMP
11. To study IC-555 Timer
12. To study IC-723 as a Voltage regulator

SUBJECT : ELECTRONICS SYSTEM DESIGN.

(VII-SEMESTER ELECTRONICS)

Experiment List :

1. Design of wein – Bridge Oscillator.
2. Design of phase – shift Oscillator.
3. Design & plot the frequency response of first order & second order Low pass filter.
4. Design & plot the frequency response of first order & second order High pass filter.
5. Design of Emitter follower Voltage regulator.
6. Design of audio power amplifier.
7. Design of series voltage Regulator. (SVR)
8. Design of switch Mode Power supply. (SMPS)
9. Design of Colpitts & Hartely Oscillator using Transistor.
10. Design of Infinite Gain Multiple Feedback (IGMF) band pass Filter.

SUBJECT : ELECTRONICS WORKSHOP

(VI-SEMESTER ELECTRONICS)

Experiment List :

1. Introduction of the tools used in the electronics workshop.
2. General information about Resistors, Capacitors, Inductors, Graphical symbols & other electronics components .and its identification.
3. Why & Where PCB's are used.
4. To design PCB layout for a given circuit.
5. To Study the soldering practice
6. To Study the soldering techniques.
7. To Study the PCB fabrication
8. To Study the preparation of negative of the circuit artwork.
9. To study the transfer of negative on copper clad laminate.
10. To study the etching process.
11. Mini Project

SUBJECT : DISCRETE INTEGRATED CIRCUIT

(V-SEMESTER I.T)

Experiment List :

1. To Study Inverting & Non-Inverting amplifier
2. To Study adder & Subtractor circuit.
3. To Study Integrator & Differentiator
4. To plot the frequency response of non inverting amplifier.
5. To Study high pass & low pass RC circuit.
6. To Study Bistable Multivibrator .
7. To Study clipper & clamper circuit.
8. To Study Monostable Multivibrator
9. To Study IC-555 Timer.
10. To Study IC-723.

SUBJECT : DIGITAL SYSTEM DESIGN

(VIII-SEMESTER ETRX)

Experiment List :

- 1) Write a V.H.D.L. program for basic logic gates.
- 2) Write a V.H.D.L. program for 16:1 MUX using 4:1 MUX
- 3) Write a V.H.D.L. program for Full Adder.
- 4) Write a V.H.D.L. program for Full Subtractor.
- 5) Write a V.H.D.L. program for 2:4Decoder.
- 6) Write a V.H.D.L. program for 4:2Encoder.
- 7) Write a V.H.D.L. program for ALU.
- 8) Study of FPGA & CPLD.
- 9) Write a V.H.D.L. program for Universal Shift Register.

DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

PHYSICS LABORATORY

LIST OF EXPERIMENTS:-

GROUP-A

- 1) A study of the static characteristics of a PN- junction diodes.
- 2) A study of the VOLT- AMPERE characteristics of a Zener diode.
- 3) A study of the static characteristics of a PNP (or NPN) Transistor in Common – Base configuration.
- 4) A study of the static characteristics of a PNP (or NPN) Transistor in Common –Emitter configuration.
- 5) Determination of Bandgap in semiconductor using a reversed biased PN- junction.
- 6) Determination of the Principal refractive indices of a birefringent crystal.

GROUP-B

- 1) Determination of e/m of an electron bar magnet method.
- 2) A study of Cathode Ray Oscilloscope.
- 3) Determination of Radius of curvature of plano convex lens using Newton's rings.
- 4) Determination of wavelength of spectral lines using a plane diffraction grating.
- 5) A study of Hall- Effect in semiconductor.

CHEMISTRY LABORATORY

LIST OF EXPERIMENTS :-

GROUP :- I

- 1) To estimate the amount of ferrous and ferric ions present in the given solution or from ore .
- 2) Determination of hardness of water by complexometry method.
- 3) Determination of copper by Iodometry.
- 4) To estimate the amount of Ni^{+2} ions in a given solution by complexometric method.
- 5) Estimation of free chlorine in water by iodometry.
- 6) Type and extent of alkalinity by Warder's method.

GROUP :- II

- 1) Determination of viscosity of lubricating oil at different temp. by Redwood Viscometer No. 1 or No. 2
- 2) Determination of flash point of lubricating oil by two different flash point apparatus close cup or open cap.
- 3) Proximate analysis of coal.
- 4) Determination of Al_2O_3 & Fe_2O_3 ratio of cement.
- 5) Determination of Neutralization value of lubricating oil.