

KARNATAKA STATE OPEN UNIVERSITY

DIPLOMA IN MECHANICAL ENGINEERING

SEMESTER SYSTEM

SYLLABUS

I YEAR SYLLBUS
(Basic Engineering)
(Common to all Branches)

Subject Code	Subject Title	Max Marks	Max Credits
Semester-I			
BE101	Communication English	100	4
BE102	Applied Mathematics-1	100	4
BE103	Engineering Physics-I	100	4
BE104	Engineering Chemistry-I	100	4
BE105	Computer Application Lab	100	2
BE106	Workshop Practice Lab	100	2
Semester -II			
BE201	Applied Mathematics-1I	100	4
BE202	Engineering Physics-II	100	4
BE203	Engineering Chemistry-II	100	4
BE204	Engineering Graphics	100	4
BE205	Physics Lab	100	2
BE206	Chemistry Lab	100	2

**Mechanical Engineering
III Semester**

Subject Code	Subject Title	Max Marks	Max Credits
ME 301	Engineering Mechanics	100	4
ME 302	Manufacturing Technology-I	100	4
ME 303	Fluid Mechanics	100	4
ME 304	Machine Drawing	100	4
ME 305	Engineering Mechanics Lab	100	2
ME 306	Workshop-I	100	2

IV Semester

Subject Code	Subject Title	Max Marks	Max Credits
ME 401	Thermodynamics	100	4
ME 402	Manufacturing Technology-II	100	4
ME 403	Electrical and Electronics Engineering	100	4
ME 404	Refrigeration and Air Conditioning	100	4
ME 405	Thermodynamics Lab	100	2
ME 406	Workshop-II	100	2

V Semester

Subject Code	Subject Title	Max Marks	Max Credits
ME 501	Design of Machine Elements	100	4
ME 502	Thermal Engineering	100	4
ME 503	Metrology	100	4
ME 504	Mechatronics	100	4
ME 505	Metrology Lab	100	2
ME 506	Workshop-III	100	2

VI Semester

Subject Code	Subject Title	Max Marks	Max Credits
ME 601	Industrial Engineering and Management	100	4
ME 602	CAD/CAM	100	4
ME 603	Automobile Technology	100	4
ME 604	CAD/CAM Lab	100	2
ME 605	Project	400	8

Total Marks = 3800

Total Credits = 122

SEMESTER : I

Subject Code : BE 101

Subject Title : Communication English

Structure of the Course Content

BLOCK 1 Grammar (Non-Textual)

- Unit 1: Functional Analysis
- Unit 2: Voice and parts of speech
- Unit 3: Direct and indirect speech
- Unit 4: Preposition

BLOCK 2 Grammar

- Unit 1: One word substitute
- Unit 2: Articles and question tags
- Unit 3: Prefixes and suffixes
- Unit 4: Tenses

BLOCK 3 Composition

- Unit 1: Comprehension
- Unit 2: Simple passage
- Unit 3: Moral story
- Unit 4: Science and technology

BLOCK 4 Letter and dialogue Writing

- Unit 1: Letter writing - personal
- Unit 2: Letter writing - official
- Unit 3: Dialogue writing
- Unit 4: Hints development

BLOCK 5 Prose

- Unit 1: An Astrloger's day – R.K. Narayanan
- Unit 2: The sun, The planets and the stars – C.Jones
- Unit 3: The continuing spell of Ramanujam
- Unit 4: On saying 'please' – A.G.Gardiner

Books :

1.A.S.Hornby, 'The advanced learners Dictionary of current English', Oxford university press.

SEMESTER : I

Subject Code : BE 102

Subject Title : Applied Mathematics - I

Structure of the Course Content

BLOCK 1 Algebra

Unit 1: Determinants

Unit 2: Matrices

Unit 3: Permutation and combination

Unit 4: Binomial Theorem

BLOCK 2 Complex numbers

Unit 1: Real and imaginary parts

Unit 2: De Moivre's Theorem

Unit 3: Finding the n^{th} roots of unity

Unit 4: Solving equations

BLOCK 3 Analytical geometry

Unit 1: Pair of straight lines

Unit 2: Circles

Unit 3: Family of circles

Unit 4: Concentric circles

BLOCK 4 Trigonometry

Unit 1: Compound angles

Unit 2: Multiple angles

Unit 3: Sub multiple angles

Unit 4: Sum and product formulae

BLOCK 5 Differential calculus

Unit 1: Limits

Unit 2: Differentiation

Unit 3: Differentiation methods

Unit 4: Successive differentiation

Books :

1. Engineering Mathematics – Dr M.K.Venkatraman, National Publishing Co.

SEMESTER : I

Subject Code : BE 103

Subject Title : Engineering Physics - I

Structure of the Course Content

BLOCK 1 S I units and Statics

- Unit 1: Fundamental quantities
- Unit 2: Derived quantities
- Unit 3: Concurrent forces
- Unit 4: parallelogram Law of forces

BLOCK 2 Properties of matter

- Unit 1: Stress and strain
- Unit 2: Young's modulus
- Unit 3: Viscosity
- Unit 4: Surface Tension

BLOCK 3 Dynamics

- Unit 1: Projectile Motion
- Unit 2: Angle of projection
- Unit 3: Circular Motion
- Unit 4: Application of circular motion

BLOCK 4 Rotational motion of rigidity bodies

- Unit 1: Moment of Inertia
- Unit 2: Kinetic energy
- Unit 3: Angular Momentum
- Unit 4: Kepler's Law

BLOCK 5 Remote sensing and sound

- Unit 1: Active and Passive remote sensing
- Unit 2: Microwave remote sensing
- Unit 3: Types of sound waves
- Unit 4: Acoustics

Books :

- 1.Narayana Kurup – Mechanics – S.Chand publishers

SEMESTER : I

Subject Code : BE 104

Subject Title : Applied Chemistry - I

Structure of the Course Content

BLOCK 1 Acids – Bases, Catalysis

Unit 1: Theories of Acids and Bases

Unit 2: Industrial application

Unit 3: Positive and Negative catalyst

Unit 4: Characteristics of Catalyst

BLOCK 2 Pollution

Unit 1: Air Pollution

Unit 2: Global warming

Unit 3: Water Pollution

Unit 4: Green Chemistry

BLOCK 3 Electro chemistry and corrosion

Unit 1: Types of conductors

Unit 2: Industrial applications of Electrochemistry

Unit 3: Electrochemical theory

Unit 4: Electroplating

BLOCK 4 Orgonic coatings

Unit 1: Paint

Unit 2: Varnish

Unit 3: Adhesives

Unit 4: Lubricants

BLOCK 5 Colloids and Ceramics

Unit 1: Colloidal solution

Unit 2: Brownian Movement

Unit 3: Water purification

Unit 4: Ceramics

Books :

1. Jain & Jain – Engineering chemistry – Dhanpatrai & Co

SEMESTER : I

Subject Code : BE 105

Subject Title : Computer Application Lab

**Practicals
Windows**

- 1.a. Starting a program, running a program.
- b. Starting the Windows in safe mode
- c. Running multiple Programs and switching between windows.
- d. Moving the windows, and the task bar.
- e. Startup to MS-DOS prompt.
- 2.a. Creating and removing a folder.
- b. Making the taskbar wider, arranging icons on the Desktop.
- c. Displaying and hiding the taskbar clock.
- d. Controlling the size of start menu options.
- e. Creating shortcuts.
- 3.a. Installing a screen saver.
- b. Assigning Wallpaper to Desktop.
- c. Adding a program to the start menu.
- d. Recovering files and folders from Recycle bin.
- e. Customizing the mouse settings.
- 4 a. Expanding and collapsing a folder.
- b. Recognizing file types using icons.
- c. Running a program from explorer.
- d. Renaming a file or folder.
- e. Selecting two or more files for an operation.
- 5.a. Displaying the properties for a file or folder.
- b. Using cut and paste operations to copy a file.
- c. Using copy and paste operations to copy a file.

- d. Moving and copying files with mouse.
- e. Sorting a folder.
- 6.a. Finding a file or folder, by name.
- b. Defragmenting the disk using disk defragmenter.
- c. Compressing a file using WinZip.
- d. Controlling the speaker volume.
- e. Recording and saving an audio file.

MS Word

- a. Prepare a newsletter with borders, two columns text, header and footer and a graphic image and spell check the document.
- b. Create a table to show the paradigm of the verb “eat” in all 12 tenses

Tense		Present	Past	Future
Simple	He	Eats	Ate	Will eat
	I	Eat	Ate	Will eat
	You/They	Eat	Ate	Will eat
Continuous	He	Is eating	Was eating	Will be eating
	I	Am eating	Was eating	Will be eating
	You/They	Are eating	Was eating	Will be eating
Perfect	He	Has eaten	Had eaten	Will have eaten
	I	Have eaten	Had eaten	Will have eaten
	You/They	Have eaten	Had eaten	Will have eaten
Perfect continuous	He	Has been eating	Had been eating	Will have been eating
	I	Have been eating	Had been eating	Will have been eating
	You/They	Have been eating	Had been eating	Will have been eating

- c. Prepare your Bio-data/Resume
- d. Do the mail merge operation for sending applications to many companies with your resume

MS EXCEL

- 1.Create a worksheet in Excel for a company:
 - a. Copy, Move and Merge the cells
 - b. Adding Comments
 - c.Adding, Deleting the cells, Rows and Columns
 - d. Hiding and Unhiding the columns, Rows and gridlines.

2. Using formula and functions prepare worksheet for storing subject marks of ten students and perform the following:

- a. Calculate the student wise total and average
- b. Calculate the subject wise total and average
- c. Calculate the overall percentage and also individual percentage of the student.

3. Create Bar Graph and Pie Chart for various data

MS Power Point

- a. Create a simple presentation with atleast 5 slides to introduce your friend and include sounds in slides.
- b. Create a presentation with 5 slides for the essay Astrologer's Day by R.K Narayanan

Internet

- a. Creating an E-Mail account.
- b. Sending an E-Mail to a known Address
- c. Viewing an E-Mail received from your friend/relative.
- d. Printing an E-Mail received
- e. Use of Attachment Facility
- f. Use of Address Book Facility
- g. Use of Sent Folder
- h. Use of Save Draft Folder
- i. Use of Trash Folder
- j. Browse a given web-site address.
- k. Search a Particular topic through a Search engine.

SEMESTER : I

Subject Code : BE 106

Subject Title : Workshop Practice

Fitting

1. Fittion
2. V - Joint
3. L - Joint
4. T - Joint
5. Half round joint
6. Dovetail Joint
7. U – Joint
8. Hexagonal – Joint
9. Step - Joint
10. Drilling and Tapping M8
11. Drilling and Tapping M10

Wiring

1. Single lamp controlled by single switch.
2. Two Lamps controlled by two independent switches.
3. Stair case Wiring
4. Fluorescent lamp circuit.
5. Circuit diagram of a fan
6. Circuit diagram of an iron box
7. Circuit diagram of a mixie
8. Soldering practice

Sheet Metal

1. Hemming
2. Seaming
3. Tray
4. Cylinder
5. Cone
6. Hopper
7. Dust Pan
8. Funnel

SEMESTER : II

Subject Code : BE 201

Subject Title : Applied Mathematics - II

Structure of the Course Content

BLOCK 1 Vector Algebra

Unit 1: Introduction

Unit 2: Vector Properties

Unit 3: Product of Vectors

Unit 4: Application of Vectors

BLOCK 2 Integral Calculus

Unit 1: Integration

Unit 2: Standard Integrals

Unit 3: Integration by parts

Unit 4: Bernoulli's Theorem and Applications

BLOCK 3 Differentiation

Unit 1: Velocity and Acceleration

Unit 2: Tangents and Normals

Unit 3: Maxima and Minima

Unit 4: Partial differentiation

BLOCK 4 Application of Integration

Unit 1: Definite Integral.

Unit 2: Area and Volume

Unit 3: Solution of differential equations

Unit 4: Second order differential equation with constant coefficients

BLOCK 5 Probability Distributions

Unit 1: Continuous random variable

Unit 2: Discrete random variable

Unit 3: Discrete Distributions (Binomial, Poisson)

Unit 4: Continuous Distribution

Books :

1. Engineering Mathematics – Dr. M. K.Venkatraman, National Publishing Co
2. Engineering Mathematics – Dr. P.Kandasamy & Others, Schand & Co

SEMESTER : II

Subject Code : BE 202

Subject Title : Engineering Physics - II

Structure of the Course Content

BLOCK 1 Heat

Unit 1: Heat - Kinetic Theory of Gases:

Unit 2: Specific Heat

Unit 3: Isothermal Changes

Unit 4: Adiabatic Changes

BLOCK 2 Gases & Non Conversional Energy

Unit 1: Liquefaction of Gases

Unit 2: Joule Thomson Effect & Linde's process

Unit 3: Renewable and Non-renewable sources

Unit 4: Alternate sources of Energy-

BLOCK 3 Light & Magnetism

Unit 1: Optical Instruments

Unit 2: Lasers

Unit 3: Basic definitions of Magnetism

Unit 4: Hysteresis Loop

BLOCK 4 Electricity

Unit 1: Basic laws

Unit 2: Force on a moving charge

Unit 3: Measuring Instruments

Unit 4: Heating Effect of Electric Current

BLOCK 5 Dielectric effect & Electronics

Unit 1: Chemical Effect of Electric Current

Unit 2: Capacitor

Unit 3: Semiconductors , PN Junction & Transistors

Unit 4: Logic Gates

Books :

1. Electricity and Magnetism by Srivastava, S. Chand Publishers
2. Conventional Energy Sources by G. D. Rai, Khanna Publishers

SEMESTER : II

Subject Code : BE 203

Subject Title : Applied Chemistry - II

Structure of the Course Content

BLOCK 1 Nuclear Chemistry

- Unit 1: Radio activity and definitions
- Unit 2: Half life period & Nuclear fission & fusion
- Unit 3: Applications of radio active isotopes
- Unit 4: Abrasives

BLOCK 2 Fuels and Refractories

- Unit 1: Fuels - classification
- Unit 2: Solid and Liquid Fuels
- Unit 3: Gas Fuels
- Unit 4: Refractories

BLOCK 3 Water Treatment

- Unit 1: Water Treatment Methods
- Unit 2: EDTA Method
- Unit 3: Water -purification
- Unit 4: Lime and manufacturing process

BLOCK 4 Plastics and Rubber

- Unit 1: Thermoplastics,
- Unit 2: Thermo set plastics
- Unit 3: Natural rubber-
- Unit 4: Synthetic rubber

BLOCK 5 Metallurgy

- Unit 1: Tungsten & Titanium
- Unit 2: Powder metallurgy
- Unit 3: Purpose of alloying
- Unit 4: Non ferrous alloys

Books :

1. Jain & Jain – Engineering chemistry – Dhanpatrai & Co
2. Uppal– Engineering Chemistry– Khanna publishers

SEMESTER : II

Subject Code : BE 204

Subject Title : Engineering Graphics

Structure of the Course Content

BLOCK 1 Drawing Office Practice

Unit 1: Basics of Engg Drawing

Unit 2: Dimensioning

Unit 3: Scales

Unit 4: Geometrical Constructions, conics and geometrical curves

BLOCK 2 Projection

Unit 1: Orthographic Projection

Unit 2: Projection of simple solids

Unit 3: Section of Solids

Unit 4: Half & Full Sectioning

BLOCK 3 Pictorial drawings

Unit 1: Introduction

Unit 2: Isometric Drawings

Unit 3: Conversion of orthographic views

BLOCK 4 Development of Surfaces:

Unit 1: Cube, Cylinder

Unit 2: Prism

Unit 3: Pyramids

Unit 4: Tee and Elbow

BLOCK 5 AutoCAD

Unit 1: Introduction

Unit 2: AutoCAD commands

Unit 3: Drawing -line, circle, arc, polygon,

Unit 4: Drawing - ellipse, rectangle

Books :

- 1."Engineering Drawing" By KR Gopalakrishnan, Dhanalakshmi publishers
2. A Book on AutoCad Release 2007

Drawing Pratices

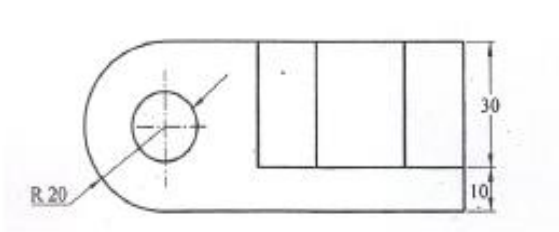


Fig – 1

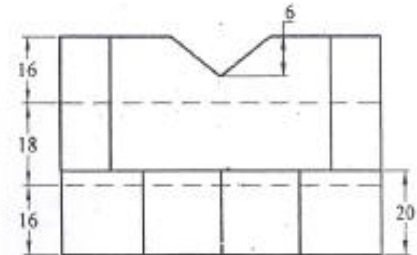


Fig- 2

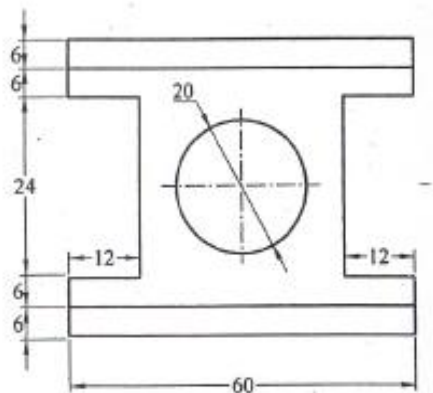


Fig. 3

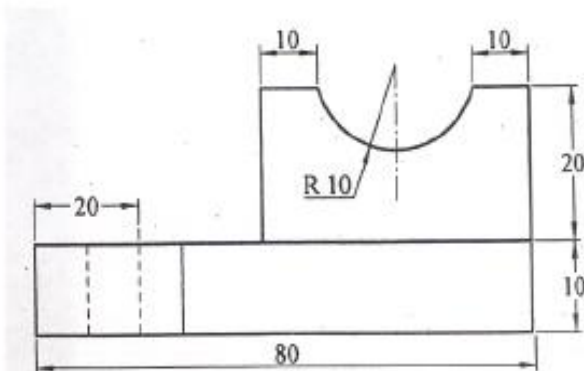


Fig. 4

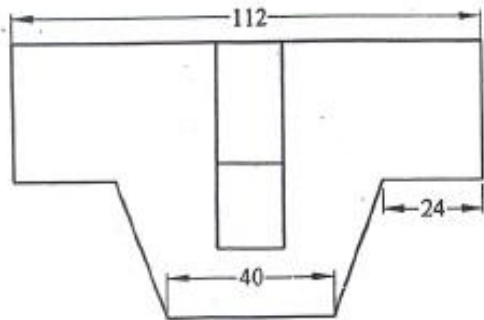


Fig. 5

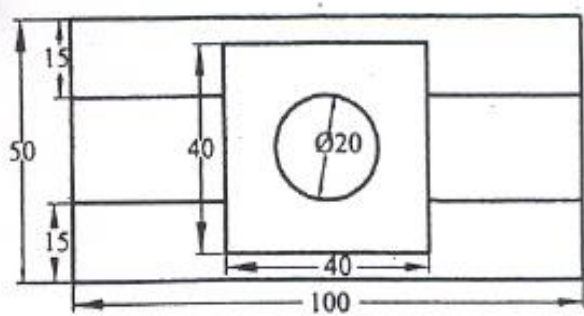


Fig. 6

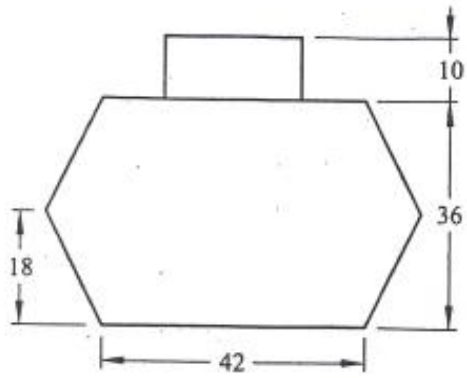


Fig. 7

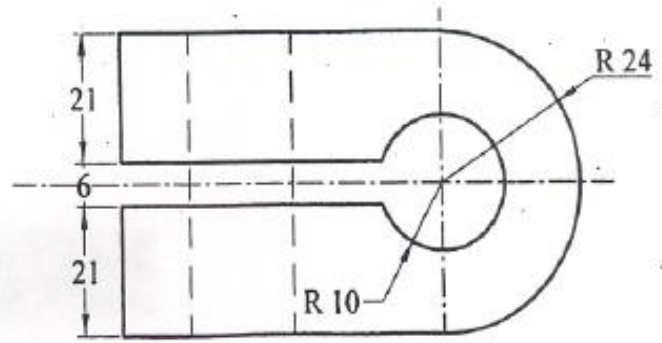


Fig. 8

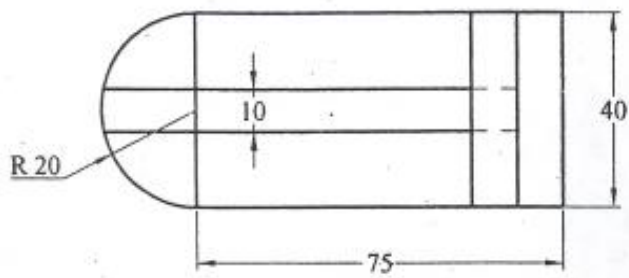


Fig. 9

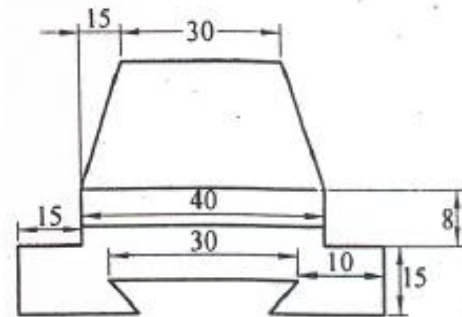


Fig. 10

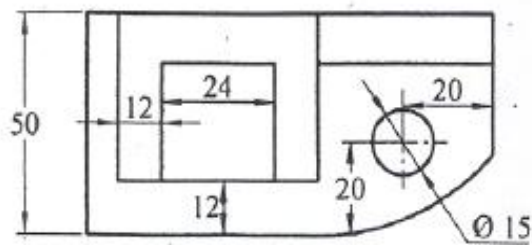


Fig. 11

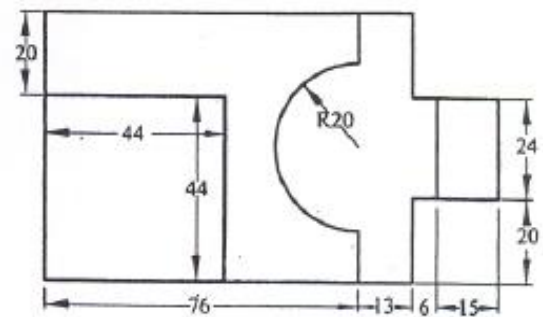


Fig. 12

SEMESTER : II

Subject Code : BE 205

Subject Title : Engineering Physics Lab

List of Experiments

1 VERNIER CALIPERS - To find the volumes of the solid cylinder and hollow cylinder using vernier callipers.

2 SCREW GAUGE – To find the thickness of (a) glass plate (b) given sphere using screw gauge. Hence calculate the volume of the glass plate and the sphere.

3 SIMPLE PENDULUM – To find the acceleration due to gravity in the laboratory, using simple pendulum. Calculate the acceleration due to gravity, by $L-T^2$ graph.

4 CONCURRENT FORCES -To verify the parallelogram law of forces and Lami's theorem.

5 COPLANAR – PARALLEL FORCES – To verify the conditions of the Co-planar parallel forces.

6 TORSION PENDULUM – To find the rigidity modulus of the thin wire and moment of inertia of the disc by using symmetric masses.

7 COMPARISON OF VISCOSITIES – To compare the coefficient of viscosities of two liquids by capillary flow method.

8 VISCOSITY OF A HIGHLY VISCOUS LIQUID – To find the coefficient of viscosity of a highly viscous liquid.

9 SURFACE TENSION:To find the surface tension of the given liquid by capillary rise

method

10 YOUNG'S MODULUS – To find the young's modulus of the material of the given metre scale.

11 SPECTROMETER – 1. To find the angle of the prism.

12 SPECTROMETER – 2. To find the refractive index of the material of the prism.

13 DEFLECTION MAGNETOMETER – To compare the magnetic moments of two given magnets by (a) Equal distance method and (b) Null method.

14 SONO METER – To find the frequency of the given tuning fork.

15 JOULE'S CALORIMETER – To determine the specific heat capacity of the given liquid.

16 COPPER VOLTAMETER – To determine electro – chemical – equivalent of copper.

17 OHM'S LAW – To determine the resistance of two given coils of wire using Ohm's law. Also verify the laws of resistances.

18 POTENTIO METER – To compare the e.m.fs of two given cells.

19 PN JUNCTION DIODE – For the given semiconductor diode draw (a) Forward bias (b) Reverse bias characteristic curves.

20 SOLAR CELLS – V. I. Characteristics.

SEMESTER : II

Subject Code : BE 206

Subject Title : Applied Chemistry Lab

List of Experiments

1. Qualitative Analysis

Acid radicals : Chloride, Carbonate, Sulphate, Nitrate

Basic radicals: Lead, Cadmium, Copper, Aluminium, Zinc, Calcium, Magnesium, Ammonium

Identification of acid and basic radicals in

1. Lime Stone (Calcium Carbonate)
2. Pollutant (Lead nitrate or Cadmium Carbonate)
3. Fertilizer (Ammonium sulphate)
4. Electrolyte (Ammonium Chloride)
5. Fungicide (Copper sulphate)
6. Coagulant (Aluminium Sulphate)
7. Mordant (Zinc Sulphate)
8. Gypsum (Calcium Sulphate)
9. Epsom (Magnesium Sulphate)

10. Analysis of an Effluent (containing pollutants like Lead, Cadmium, Zinc, Copper). Students may be given above four pollutants, in four separate test tubes in solution form and asked to report metallic pollutants with procedure (Basic Radical Analysis Procedure) and their harmful effects.

2. VOLUMETRIC ANALYSIS (DOUBLE TITRATIONS)

ACIDIMETRY AND ALKALIMETRY

1. Estimation of Hydrochloric acid
2. Estimation of Sodium Hydroxide
3. Estimation of Sodium Carbonate
4. Comparison of Strengths of two bases

PERMANGANIMETRY

5. Estimation of Ferrous Ammonium Sulphate
6. Estimation of Ferrous Sulphate
7. Comparison of Potassium Permanganate.

WATER ANALYSIS

8. Estimation of Total Hardness by EDTA method.
9. Calculation of pH of four sample solutions and calculation of H^+ Ion concentration for a particular sample solution.

SEMESTER : III

Subject Code : ME 301

Subject Title : Engineering Mechanics

Structure of the Course Content

BLOCK 1 Mechanical Properties of Materials

- Unit 1: Basic Definitions
- Unit 2: Stress
- Unit 3: Strain
- Unit 4: Stress-Strain Calculations

BLOCK 2 Geometrical Properties of Sections

- Unit 1: Basic Definitions
- Unit 2: Moment of Inertia
- Unit 3: Thin cylinders
- Unit 4: Thin Spherical Shells

BLOCK 3 Theory of Simple Bending

- Unit 1: Shear Force
- Unit 2: Bending Moment
- Unit 3: Cantilever
- Unit 4: Simple Bending

BLOCK 4 Torsion and Springs

- Unit 1: Theory of Torsion
- Unit 2: Torsional Rigidity
- Unit 3: Hollow Shaft
- Unit 4: Springs

BLOCK 5 Deflection

- Unit 1: Beams
- Unit 2: Friction
- Unit 3: Gear Drives
- Unit 4: Belt Drives

Books :

1. Applied Mechanics by A.K. Upadhyay, Charotar Publishers
2. Strength of Materials by R.S. Khurmi, S. Chand & Co

SEMESTER : III

Subject Code : ME 302

Subject Title : Manufacturing Technology - I

Structure of the Course Content

BLOCK 1 Foundry

- Unit 1: Patterns
- Unit 2: Moulding
- Unit 3: Casting
- Unit 4: Furnace

BLOCK 2 Forging and Welding

- Unit 1: Hot Working operation
- Unit 2: Welding
- Unit 3: Types of Welding
- Unit 4: Types of Testing

BLOCK 3 Powder Metallurgy and Heat Treatment

- Unit 1: Methods of Manufacturing
- Unit 2: Metallurgy
- Unit 3: Heat Treatment
- Unit 4: Hardening

BLOCK 4 Lathe

- Unit 1: Simple Lathe
- Unit 2: Semi Automatic Lathe
- Unit 3: Fully Automatic Lathe
- Unit 4: Multi Spindle Automatic Lathe

BLOCK 5 Metrology

- Unit 1: Measuring Instruments
- Unit 2: Marking Instruments
- Unit 3: Comparators
- Unit 4: Gauges

Books :

1. R.S. Khurmi & J.K. Gupta, A Text Book of workshop Technology, Edn.2, S.Chand & Co., New Delhi
2. Begeman, Manufacturing Process, Edn.-5, TMC, New Delhi.

SEMESTER : III

Subject Code : ME 303

Subject Title : Fluid Mechanics

Structure of the Course Content

BLOCK 1 Properties of Fluids

- Unit 1: Basic Definition
- Unit 2: Pressure measurement
- Unit 3: Mechanical Gauges
- Unit 4: Diaphragm Pressure gauge

BLOCK 2 Flow of Fluids

- Unit 1: Type of Fluids
- Unit 2: Bernoulli's Theorem
- Unit 3: Orifice Meter
- Unit 4: Venturi Meter

BLOCK 3 Jets and Pumps

- Unit 1: Impact of Jets
- Unit 2: Turbine
- Unit 3: Types Turbines
- Unit 4: Pumps

BLOCK 4 Pneumatic Systems

- Unit 1: Basics of Pneumatic systems
- Unit 2: Flow Control Valve
- Unit 3: FRL Unit
- Unit 4: Application of Pneumatic Systems

BLOCK 5 Hydraulic Systems

- Unit 1: Basics of Hydraulic Systems
- Unit 2: Accumulator
- Unit 3: Fluid Power Pump
- Unit 4: Application of Hydraulic Systems

Books :

1. .S. Khurmi, A Text Book of Hydraulics, Fluid Mechanics, S.Chand & Co, New Delhi
2. R.K.Rajput, A Text Book of Hydraulics

SEMESTER : III

Subject Code : ME 304

Subject Title : Machine Drawing

Structure of the Course Content

BLOCK 1 Section Views

- Unit 1: Need Sectioning
- Unit 2: Hatching
- Unit 3: Half Sectioning and full sectioning
- Unit 4: Removed and offset sections

BLOCK 2 Limits, Fits and Tolerances

- Unit 1: Basic Definitions
- Unit 2: Limits
- Unit 3: Fits
- Unit 4: Tolerances

BLOCK 3 Keys and Surface finish

- Unit 1: Basic Definitions
- Unit 2: Types of Keys
- Unit 3: Design of shaft and keys
- Unit 4: Indication of surface roughness

BLOCK 4 Threads and Fasteners

- Unit 1: Basic Definition
- Unit 2: Types of Threads
- Unit 3: Types of Bolts and nuts
- Unit 4: Types of Rivets

BLOCK 5 CAD Drawings

- Unit 1: AutoCAD Theory
- Unit 2: Sleeve and Cotter Joint
- Unit 3: Machine Vice
- Unit 4: Screw Jack

Books :

1. N.D.Bhatt, Machine Drawing, Edn.37, Charotar Publishing House
2. R.C.Parkinson, Engineering Drawing Published by English University Press, London

SEMESTER : III

Subject Code : ME 305

Subject Title : Engineering Mechanics Lab

Laboratory Experiments :

1. Test on Ductile Materials
2. Hardness Test
3. Torsion test
4. Bending and deflection tests
5. Impact test
6. Tests on springs of circular section
7. Shear test
8. Verifying the Bernoulli's Theorem
9. Determination of Coefficient of discharge of a Venturimeter
10. Determination of Coefficient of discharge of a Orificemeter
11. Performance test on a reciprocating pump
12. Performance test on a centrifugal pump
13. Performance test on an impulse turbine
14. Performance test on a reaction turbine

SEMESTER : III

Subject Code : ME 306

Subject Title : Workshop –I

Structure of the Course Content

Smithy :

Exercises:

1. Round rod to hexagonal rod
2. Round rod to square rod
3. Round rod to square headed bolt
4. Round rod to 'S' Shape
5. Round rod to flat with 25mm

Foundry :

Exercises:

Preparation of sand mould:

6. Solid pattern
 - a. Stepped Pulley
 - b. Bearing top
 - c. Gear Wheel
 - d. T-pipe
7. Split pattern
 - a. Bent Pipe
 - b. Dumbles
8. Loose Piece Pattern- Dowtail
9. Cylindrical core making
10. Melting and casting

Welding :

Exercises:

11. Arc welding
 - a. Lap joint (Material: 25mm x 3mm Ms Flat)
 - b. Butt joint (Material: 25mm x 6mm Ms Flat)
 - c. T-joint (Material: 25mm x 3mm Ms Flat)
 - d. Corner joint (Material: 25mm x 3mm Ms Flat)
12. Gas Welding
 - a. Lap joint (Material: 25mm x 3mm Ms Flat)
 - b. Butt Joint (Material: 25mm x 6mm Ms Flat)
13. Gas cutting: Profile cutting.

- 14. Spot welding-Lap joint(18/20swg)
- 15. Demonstration of Soldering and brazing

SEMESTER : IV

Subject Code : ME 401

Subject Title : Thermodynamics

Structure of the Course Content

BLOCK 1 Thermodynamics and Expansion of Gases

- Unit 1: Basic Definitions
- Unit 2: Steam Properties
- Unit 3: Gas Properties
- Unit 4: Law of Perfect Gases

BLOCK 2 Steady flow energy equation and Air Cycles

- Unit 1: Steady flow system
- Unit 2: Steam Boilers
- Unit 3: Air Cycles
- Unit 4: P-V Diagram

BLOCK 3 Internal Combustion engines

- Unit 1: Diesel Engines
- Unit 2: Petrol Engines
- Unit 3: Ignition Systems
- Unit 4: Lubrication Systems

BLOCK 4 Fuels & Performance of I.C.Engines

- Unit 1: Classification of fuels
- Unit 2: Performance of IC Engines
- Unit 3: Break power calculation
- Unit 4: Morse test

BLOCK 5 Air Compressors

- Unit 1: Basic Definition
- Unit 2: Types of Compressor
- Unit 3: Working Principle of Compressor
- Unit 4: Problems

Books :

1. R.S.Khurmi and J.K. Gupta, Thermal Engineering, Edn. 18, published by S.Chand & Co
2. P.K.Nag, Applied Thermodynamics, Edn.24, TMC, New Delhi.

SEMESTER : IV

Subject Code : ME 402

Subject Title : Manufacturing Technology

Structure of the Course Content

BLOCK 1 Planer, Shaper and Slotter

- Unit 1: Planer
- Unit 2: Shaper
- Unit 3: Slotter
- Unit 4: Jig and fixtures

BLOCK 2 Drilling Machines and Milling Machines

- Unit 1: Types of Drilling Machines
- Unit 2: Types of Drilling Operations
- Unit 3: Types of Milling Machines
- Unit 4: Types of Milling Operations

BLOCK 3 Grinding, Broaching & Boring

- Unit 1: Types of Grinding Machines
- Unit 2: Principle and Operation of Grinding Machines
- Unit 3: Broaching
- Unit 4: Boring

BLOCK 4 Gear Manufacturing

- Unit 1: Gear Manufacturing in Milling operation
- Unit 2: Gear Manufacturing in Shaping operation
- Unit 3: Milling Procedure for Spur Gear
- Unit 4: Milling Procedure for Helical & bevel gears

BLOCK 5 Jigs and Fixtures and Press works

- Unit 1: Jigs
- Unit 2: Fixtures
- Unit 3: Mechanical Press
- Unit 4: Hydraulic Press

Books :

1. Hajra Choudry & Battacharya, Elements of Workshop Technology-Vol-I & II, Edn. 11, Mumbai.
2. Jain & Gupta, Production Technology, Khanna Publishers, New Delhi.

SEMESTER : IV

Subject Code : ME 403

Subject Title : Electrical & Electronics Engineering

Structure of the Course Content

BLOCK 1 DC Circuits and Batteries

Unit 1: Basic Laws

Unit 2: Series, Parallel connections

Unit 3: Batteries

Unit 4: Types of Batteries

BLOCK 2 DC Machines

Unit 1: DC Generator

Unit 2: DC Motors

Unit 3: Types of Starters

Unit 4: Applications of DC Machines

BLOCK 3 AC Machines

Unit 1: Transformers

Unit 2: AC Motors

Unit 3: Types of Starters

Unit 4: Applications of AC Motors

BLOCK 4 Electronic Devices

Unit 1: Semi Conductor Theory

Unit 2: Diode

Unit 3: Transistor

Unit 4: Thyristors

BLOCK 5 Electrical Safety

Unit 1: Earthing

Unit 2: Types of Earthing

Unit 3: Electric Shock

Unit 4: Safety precautions

Books :

1. B.L.Theraja, Fundaments of Electrical and Electronics Engineering, S.Chand & Co.
2. T.Thiyagarajan, Fundamentals of Electrical and Electronics Engineering, Scitech

Publications.

SEMESTER : IV

Subject Code : ME 404

Subject Title : Refrigeration and Air Conditioning

Structure of the Course Content

BLOCK 1 Refrigeration System & refrigeration equipments

- Unit 1: Basic Definition
- Unit 2: Refrigeration Systems
- Unit 3: Refrigeration Equipments
- Unit 4: Problems

BLOCK 2 Vapour Compression and Absorption Systems

- Unit 1: Vapour Compression Systems
- Unit 2: Heat Exchangers
- Unit 3: Vapour Absorption Refrigeration System
- Unit 4: Electrolux System

BLOCK 3 Refrigeration Flow Controls & Refrigerants

- Unit 1: Refrigeration flow control
- Unit 2: Refrigerants
- Unit 3: Lubricants
- Unit 4: Applications of Refrigeration

BLOCK 4 Psychrometry and Comfort Air conditioning

- Unit 1: Basic Definitions
- Unit 2: Psychometric Processes
- Unit 3: Enthalpy calculation
- Unit 4: Problems

BLOCK 5 Air Conditioning Systems and Cooling load calculations

- Unit 1: Air Conditioning Systems
- Unit 2: Fan and Blowers
- Unit 3: Insulating Materials
- Unit 4: Cooling load calculations

Books :

- 1 P.L.Ballaney, Refrigeration and Air Conditioning, Khanna Publishers, New Delhi.
3. V.K.Jain, Refrigeration and air conditioning.

SEMESTER : IV

Subject Code : ME 405

Subject Title : Thermodynamics Lab

Laboratory Experiments :

1. Determining flash and fire points of the given oil using open cup apparatus.
2. Determining flash and fire points of the given oil using close cup apparatus.
3. Determining the absolute viscosity of the given lubricating oil using Redwood viscometer.
4. Determining the absolute viscosity of the given lubricating oil using Saybolt viscometer.
5. Valve timing diagram of four-stroke cycle petrol engine.
6. Valve timing diagram of four-stroke cycle diesel engine.
7. Port timing diagram of two-stroke cycle petrol engine.
- 8 Load test (Performance Test) on petrol engine.
- 9 Load test (Performance Test) on diesel engine.
10. Morse test on multicylinder petrol engine.
11. Heat balance sheet on I.C engine.
12. Emission test for petrol / diesel engine.
13. Volumetric efficiency of air compressor.

SEMESTER : IV

Subject Code : ME 406

Subject Title : Workshop –II

Structure of the Course Content

Syllabus:

1. Introduction of safety in operating machines.
2. Introduction to lathe, drilling machine & shaping machine and its parts.
3. Introduction to work holding devices and tool holding devices.
4. Types of tools used in lathe work, drilling & shaping.
5. Types of measuring instruments and their uses.
6. Setting of work and tools.
7. Operation of lathe, drilling & shaping.
8. Practice on a lathe, drilling and shaping machine

Note: The dimensions may be modified according to the materials specified.

Enclosure: Sketches of Lathe, drilling & shaping Exercises.

LATHE

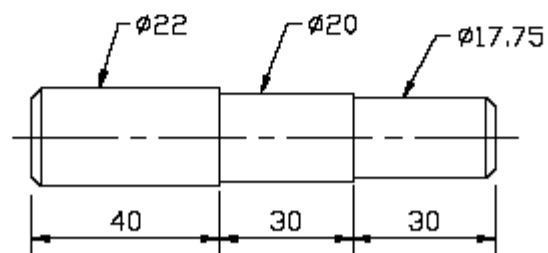
1.0 LATHE

EX.NO.1 PLAIN TURNING

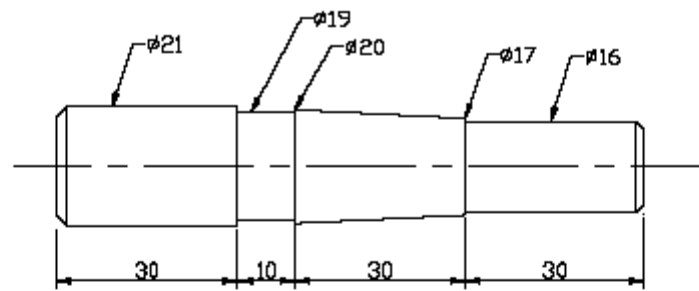


MATERIAL:M.S. OF SIZE DIA
25X105mm.

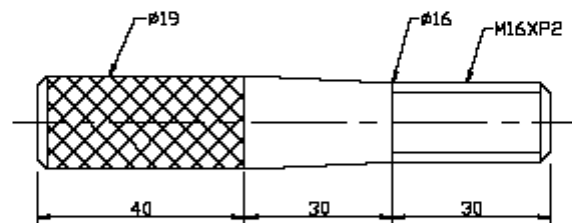
EX.NO.2 STEP TURNING



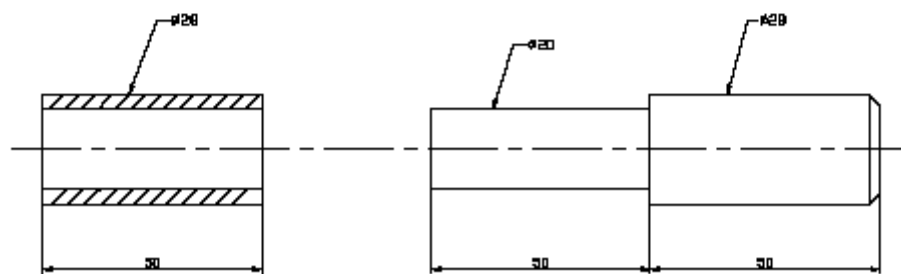
EX.NO.3 TAPER TURNING



EX.NO.4 THREAD CUTTING AND KNURLING



EX.NO.5 BUSHING

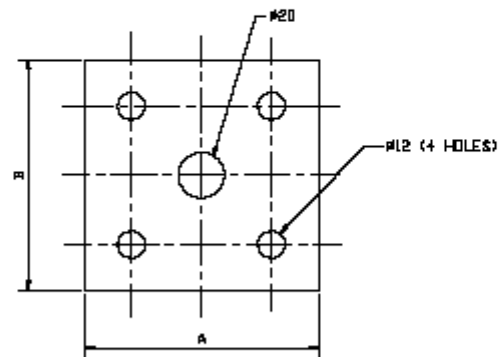


DRILLING

2.0 DRILLING

EX.NO.1

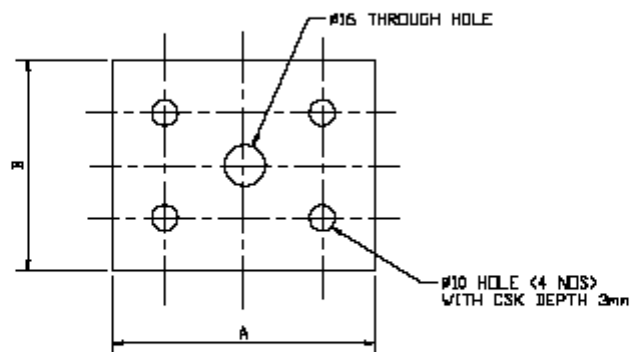
THROUGH HOLE DRILLING



MATERIAL:M.S. OF SIZE 75X50X6mm.

EX.NO.2

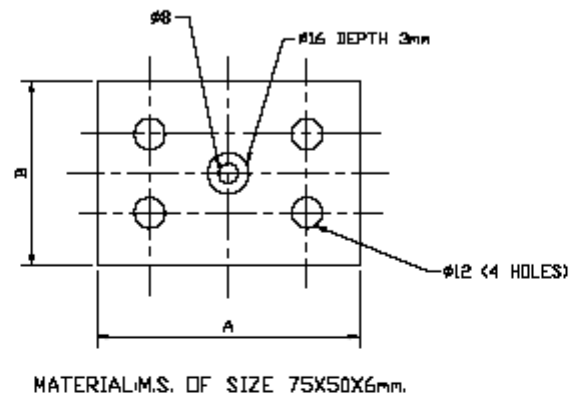
THROUGH HOLE DRILLING WITH COUNTER SUNK



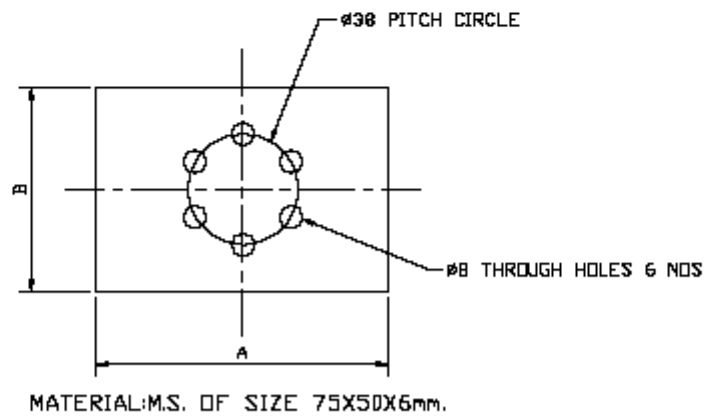
MATERIAL:M.S. OF SIZE 75X50X6mm.

EX.NO.3

PART DRILLING



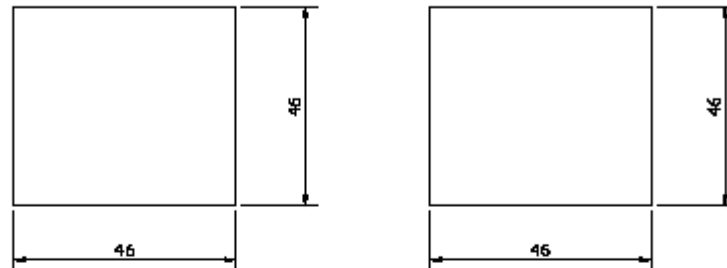
EX.NO.4 THROUGH HOLE DRILLING (ON PITCH CIRCLE)



SHAPING

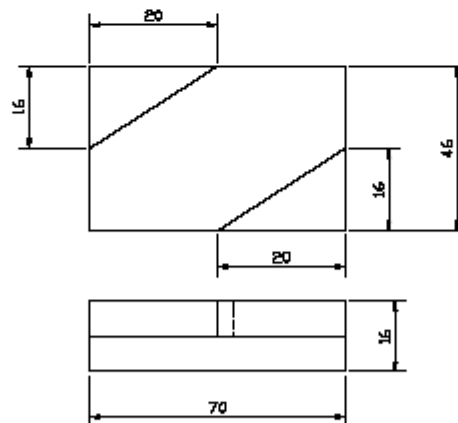
3.0 SHAPING

EX.NO.1 MACHINING FLAT SURFACE USING A SHAPER



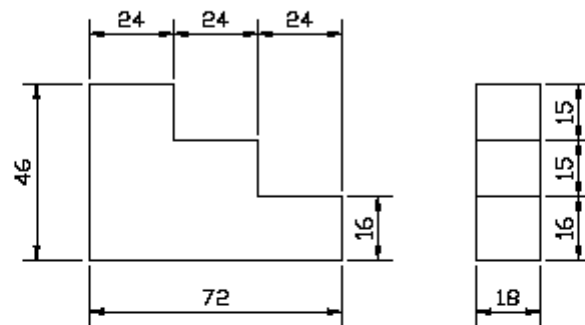
MATERIAL: C.I. OF SIZE 50X50X50mm.

EX.NO.2 CROSS CUT MACHINING USING SHAPER



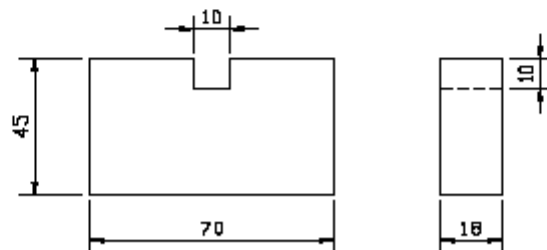
MATERIAL: C.I. OF SIZE 75X50X20mm.

EX.NO.3 MACHINIG A STEPPED BLOCK



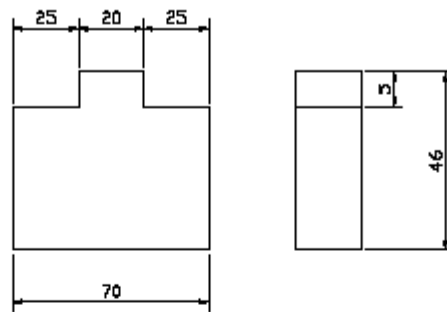
MATERIAL: C.I. OF SIZE 75X50X20mm.

EX.NO.4 SLOTTING USING A SHAPER



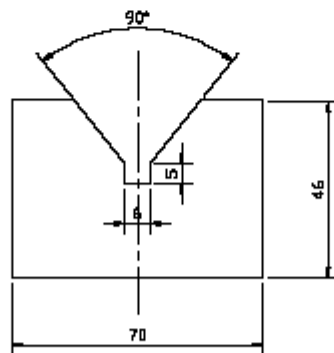
MATERIAL: C.I. OF SIZE 75X50X20mm.

EX.NO.5 SHAPING INVERTED 'T' BLOCK



MATERIAL: C.I. OF SIZE 75X50X20mm.

EX.NO.6 SHAPING A 'V' BLOCK



MATERIAL: C.I. OF SIZE 75X50X20mm.

SEMESTER : V

Subject Code : ME 501

Subject Title : Design of Machine Elements

Structure of the Course Content

BLOCK 1 Design of shafts

Unit 1: Selection of Materials

Unit 2: Design of shaft

Unit 3: Maximum bending movement

Unit 4: Twisting movement

BLOCK 2 Design of Bolt

Unit 1: Selection of Materials

Unit 2: Design of Bolt

Unit 3: Design of pin and key

Unit 4: Design of cotter joint and couplings

BLOCK 3 Design of Belts

Unit 1: Selection of Materials

Unit 2: Design of flat belts

Unit 3: Design of V belts

Unit 4: Power Design of V-belt drives

BLOCK 4 Design of Bearings

Unit 1: Selection of Materials

Unit 2: Design of ball and radial bearing

Unit 3: Design of roller bearing

Unit 4: Design of Cylindrical bearing

BLOCK 5 Design of Levers and gears

Unit 1: Selection of Materials

Unit 2: Design of Levers

Unit 3: Design of gears

Unit 4: Design of spur gears

Books :

1. Pandya & Shah, Machine Design, Edn. 1995 Charotar Publishing House.
2. R.S.Khurmi & J K Gupta, A text book of machine design, Edn. 18, New Delhi.

SEMESTER : V

Subject Code : ME 502

Subject Title : Thermal Engineering

Structure of the Course Content

BLOCK 1 Steam and Expansions of steam

- Unit 1: Basic definitions
- Unit 2: Enthalpy and Entrophy
- Unit 3: Types of Steam
- Unit 4: Problems using mollier chart

BLOCK 2 Steam Boilers and Performance of Boilers

- Unit 1: Classification of Boilers
- Unit 2: Boilers mounting and accessories
- Unit 3: Performance of Boilers
- Unit 4: Problems

BLOCK 3 Thermal Power Plant

- Unit 1: Layout of thermal power plant
- Unit 2: Pollution effects in thermal power plant
- Unit 3: Stream turbine
- Unit 4: Problems

BLOCK 4 Nuclear Power Plant

- Unit 1: Layout of Nuclear power plant
- Unit 2: Nuclear fuels
- Unit 3: Moderator
- Unit 4: Safety precautions in Nuclear Power Plant

BLOCK 5 Energy Engineering and Management

- Unit 1: Basic Definitions
- Unit 2: Energy Engineering
- Unit 3: Conventional sources
- Unit 4: Non-conventional sources

Books :

1. R.K.Rajput, Thermal Engineering
2. R.S.Khurmi & J K Gupta, Thermal Engineering, Edn. 18, New Delhi.

SEMESTER : V

Subject Code : ME 503

Subject Title : Metrology

Structure of the Course Content

BLOCK 1 Standards of measurements

- Unit 1: Introduction to Metrology
- Unit 2: Objectives of Metrology
- Unit 3: Classification of standards
- Unit 4: Classification of measuring instruments

BLOCK 2 Linear and Angular Measurements

- Unit 1: Vernier Calipers and gauges
- Unit 2: Bevel Protectors
- Unit 3: Sine bar
- Unit 4: Taper measurement

BLOCK 3 Measurement of threads and gears

- Unit 1: Screw thread gauges
- Unit 2: Gear tooth vernier
- Unit 3: Measurement of tooth profile
- Unit 4: Alignment of gears

BLOCK 4 Measurement of Surface finish

- Unit 1: BIS Methods of Measuring surface finish
- Unit 2: Comparison methods of surface finish
- Unit 3: Inspection
- Unit 4: Surface Photographs

BLOCK 5 Comparators

- Unit 1: Types Comparators
- Unit 2: Mechanical Comparators
- Unit 3: Electrical Comparators
- Unit 4: Electronics Comparators

Books :

1. R.K.Rajput, Engineering Metrology & Instrumentation, 4th Edition 2004, S.K. Kataria & Sons, New Delhi.
2. M.Mahajan, Engineering Metrology, 2005, Dhanpatrai & Co, New Delhi.

SEMESTER : V

Subject Code : ME 504

Subject Title : Mechatronics

Structure of the Course Content

BLOCK 1 Introduction, sensors & transducers

Unit 1: Introduction to Mechatronics

Unit 2: Control Systems

Unit 3: Displacement, position & Proximity Sensors

Unit 4: Velocity and Motion Sensors

BLOCK 2 Actuation Systems

Unit 1: Mechanical Actuation Systems

Unit 2: Electrical Actuation Systems

Unit 3: Pneumatic Actuation Systems

Unit 4: Hydraulic Actuation Systems

BLOCK 3 Basic System Models, I/O systems

Unit 1: Mathematical Model

Unit 2: Mechanical and Electrical systems building blocks

Unit 3: Hydro and pneumatic Systems building blocks

Unit 4: Interfacing I/O ports

BLOCK 4 Programmable Logic Controller

Unit 1: Basic Block diagram and Structure of PLC

Unit 2: I/O processing

Unit 3: Ladder diagram

Unit 4: Selection PLC

BLOCK 5 Design Examples

Unit 1: Design Process stages

Unit 2: Traditional Vs Mechatronics designs

Unit 3: Case studies of Car Park barrier

Unit 4: Case studies of Automatic washing machine

Books :

1. R.K.Rajput, A Text Book of Mechatronics, 1st Edn. 2007, S.Chand & co
2. HMT, Mechatronics, 1st Edition 1998, TMC, New Delhi.

SEMESTER : V

Subject Code : ME 505

Subject Title : Metrology Lab

Exercises:

I. Linear Measurements:

1. Determination of the thickness of ground MS flat to an accuracy of 0.02mm using vernier caliper.
2. Determination of the diameter and length of a turned cylindrical (turned in lab exercise) to an accuracy of 0.02mm using vernier caliper.
3. Determination of the inside diameter of a bush component to an accuracy of 0.02 using vernier caliper.
4. Determination of diameter of a cylindrical component to an accuracy of 0.01mm using micrometer and check the result with digital micrometer
5. Determination of inside diameter of the bore of a bush cylindrical component to an accuracy of 0.01mm using inside micrometer.
6. Determine the heights of gauge blocks or parallel bars to accuracy of 0.02mm using vernier height gauge and check the result with digital vernier height gauge.
7. Determine the depth of a blind bore component to an accuracy of 0.02mm using vernier depth gauge.
8. Determine the thickness of ground MS plates using slip gauges

I. Angular Measurements:

9. Determination of angle of v-blocks, dovetails in mechanical components using universal bevel protractor.
10. Determination of angle of machined surfaces of components using sine bar with slip gauges.
11. Measurement of V-Thread dimensions.
12. Measurement of spur gear tooth dimensions.

SEMESTER : V

Subject Code : ME 506

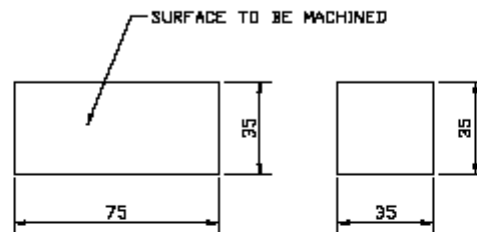
Subject Title : Workshop- III

Syllabus:

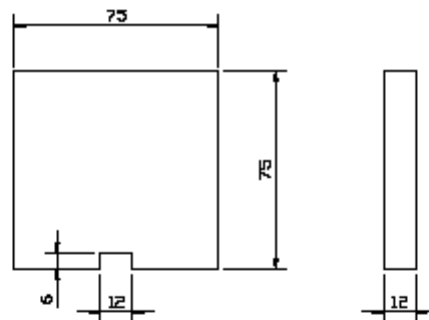
1. Introduction to planing machine and its parts.
2. Introduction to slotting machine and its parts.
3. Introduction to milling machine and its parts.
4. Introduction to grinding machine and its parts.
5. Introduction to turret and capstan lathe.
6. Introduction to work holding devices.
7. Types of tools used in planing and slotting machines.
8. Types of cutter used in milling machine.
9. Types of grinding wheels used in grinding machines.
10. Types of tools used in turret and capstan lathes.
11. Setting of work, tools and cutters in planing, slotting, milling and grinding machines.
12. Operation performed in planing, slotting, milling and grinding machines.
13. Operation of planing, slotting, milling, grinding, capstan and turret machines.

Enclosure : Sketches for Exercises

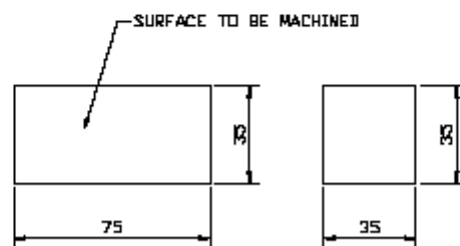
1. STUDY OF PLANNING MACHINE AND MACHINE A FLAT SURFACE



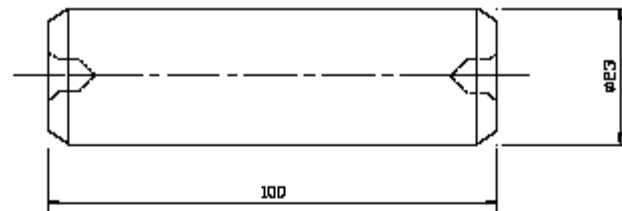
2. STUDY OF SLOTTING MACHINE AND MACHINE A SIMPLE SLOT



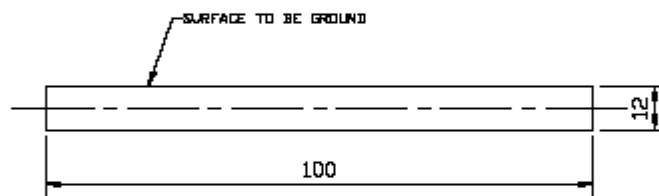
3. STUDY OF MILLING MACHINE AND MACHINE A PLANE SURFACE USING PLAIN MILLING CUTTER



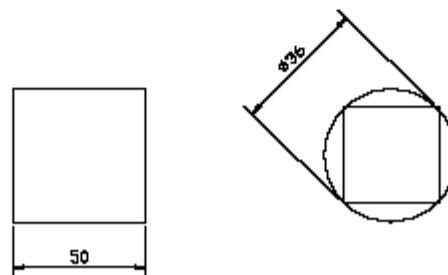
4. STUDY OF CYLINDRICAL GRINDER AND GRIND A CYLINDER



5. STUDY OF SURFACE GRINDER AND GRIND A PLANE SURFACE



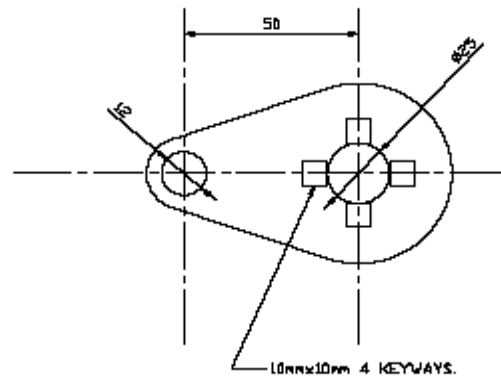
6. PLANNING A SQUARE - CAST IRON 50mmX50mm



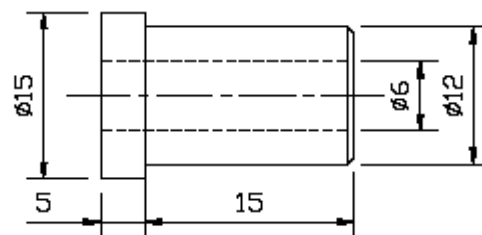
MATERIAL: $\phi 36$ mmX50mm M.S. ROUND ROD

7. SLOTTING:

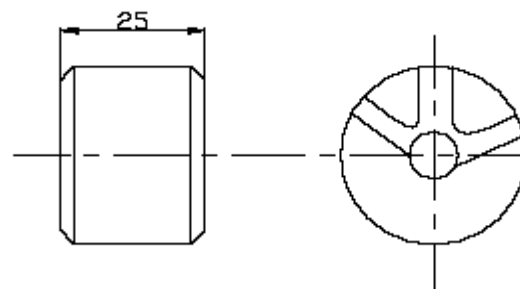
DRILLING HOLES IN RADIAL DRILLING MACHINE. MAKING INTERNAL KEYWAY AND MACHINING AN EXTERNAL PROFILE.



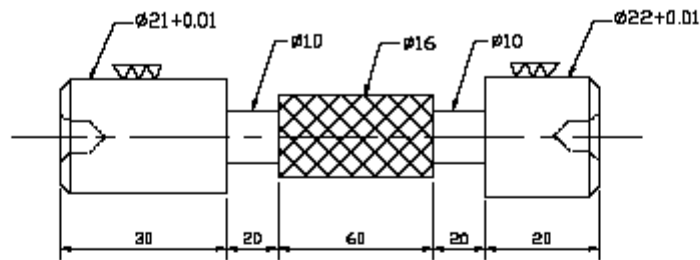
7.b. BUSH TURNING



8. GEAR CUTTING IN MILLING MACHINE

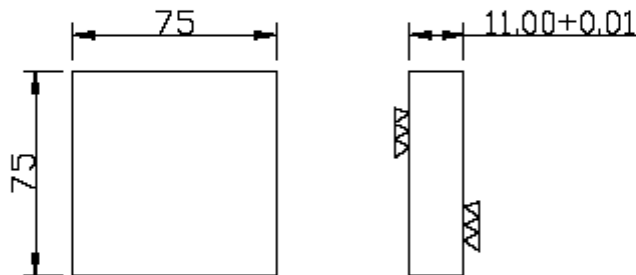


9. GRINDING A CYLINDER IN CYLINDRICAL GRINDING MACHINE



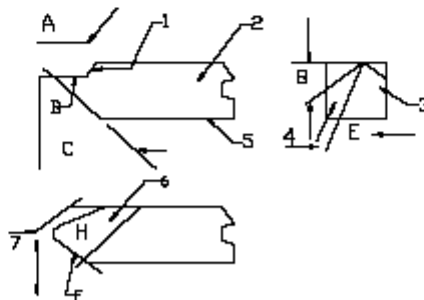
MATERIAL: $\phi 25 \times 100$ mm M.S ROUND ROD

10. GRINDING A FLAT SURFACE IN SURFACE GRINDER



MATERIAL: 75X75X12mm

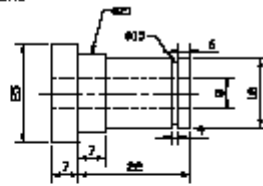
11. GRINDING A SINGLE POINT CUTTING TOOL IN TOOL AND CUTTER GRINDER



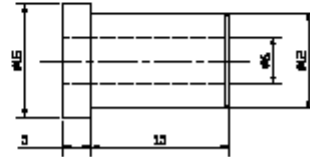
A - TOP RAKE ANGLE
B - LIP ANGLE
C - FRONT CLEARANCE ANGLE
D - SIDE RAKE ANGLE
E - END CLEARANCE ANGLE
F - SIDE CUTTING EDGE ANGLE
G - END CUTTING EDGE ANGLE
H - NOSE ANGLE

1&6 - FACE
2 - SHANK
3 - SIDE FLANK
4 - END FLANK
5 - BASE
6 - END CUTTING EDGE
7 - NOSE
8 - SIDE CUTTING EDGE
9 - NOSE RADIUS

12. STEP TURNING AND DRILLING



13. BUSH TURNING



SEMESTER : VI

Subject Code : ME 601

Subject Title : Industrial Engineering and Management

Structure of the Course Content

BLOCK 1 Plant Engineering and Plant Safety

- Unit 1: Plant Layout
- Unit 2: Plant Maintenance
- Unit 3: Plant Safety
- Unit 4: Plant Safety rules

BLOCK 2 Work study, Method study and work Measurement

- Unit 1: Work study
- Unit 2: Method study
- Unit 3: String and flow diagram
- Unit 4: Work Measurement

BLOCK 3 Production Planning and Quality Control

- Unit 1: Production Planning
- Unit 2: Critical Path Method
- Unit 3: Quality Control
- Unit 4: Types of measurements

BLOCK 4 Principles of Management and Personnel Management

- Unit 1: Administration and Organisation
- Unit 2: Leadership and Motivation
- Unit 3: Total Quality Management
- Unit 4: Personnel Management

BLOCK 5 Financial Management and Material Management

- Unit 1: Fixed and Working capital
- Unit 2: Equity shares
- Unit 3: Depreciation
- Unit 4: Material Management

Books :

1. O.P.Khanna, Industrial Engineering and Management, Rev. Edition-2004, Dhanpat Rai Publications (P)Ltd, New Delhi.
2. Joseph L.Masse, Essentials of Management, 4th Edition, Prentice Hall of India, New Delhi.

SEMESTER : VI

Subject Code : ME 602

Subject Title : CAD/CAM

Structure of the Course Content

BLOCK 1 Computer Aided Design

Unit 1: CAD Definition

Unit 2: I/O Devices

Unit 3: Memory

Unit 4: Types of CAD systems

BLOCK 2 Computer Aided Manufacturing

Unit 1: CAM Definition

Unit 2: Integrated CAD/CAM Organisation

Unit 3: Master Production schedule

Unit 4: Product Development cycle

BLOCK 3 CNC Machines

Unit 1: Numerical Control

Unit 2: NC, CNC and adaptive control systems

Unit 3: Types of CNC Machines

Unit 4: CNC EDA Machines

BLOCK 4 CNC components and Part programming

Unit 1: Drives

Unit 2: Actuating systems

Unit 3: CNC programming procedures

Unit 4: CAD Models

BLOCK 5 GT – FMS – CIM –AGV and Robotic

Unit 1: FMS

Unit 2: CIM

Unit 3: AGV

Unit 4: Robotic

Books :

1. CAD/CAM/CIM, R.Radhakrishnan, S.Subramanian, V.Raju, 2nd, 2003, New Age International Pvt Ltd..
2. CAD/CAM, Mikell P.Groover, Emory Zimmers Jr. Indian Reprint Oct 1993, Prantice Hall of India

SEMESTER : VI

Subject Code : ME 603

Subject Title : Automobile Technology

Structure of the Course Content

BLOCK 1 Automotive Engines

- Unit 1: Basics Engine Component
- Unit 2: Construction of Automotive Engines
- Unit 3: Stages of Combustion
- Unit 4: Cooling and Lubrication systems

BLOCK 2 Fuel and Fuel Feed Systems

- Unit 1: Ideal Petrol
- Unit 2: Natural Gas and Bio Gas
- Unit 3: Layout of fuel feed system in petrol engine
- Unit 4: Layout of fuel feed system in Diesel Engine

BLOCK 3 Transmission

- Unit 1: Power Transmission Systems
- Unit 2: Gear Box Construction
- Unit 3: Shaft Construction
- Unit 4: Differential Construction

BLOCK 4 Automotive Chassis

- Unit 1: Front Axle
- Unit 2: Steering System
- Unit 3: Suspension System
- Unit 4: Brake Systems

BLOCK 5 Automobile Electrical Equipment

- Unit 1: Lead acid Battery
- Unit 2: Starter Motor
- Unit 3: Drive Mechanism
- Unit 4: Ignition Systems

Books :

1. Automobile Transmission and Power Systems, William.H.Grouse.
2. Narang. G.B.S., "Automobile Engineering", Khanna Publishers, New Delhi.

SEMESTER : VI
Subject Code : ME 604
Subject Title : CAD/CAM lab

PART-1 CAD Practical

3D CAD Drawing – Solid Modeling & Lisp Programming

1. Predefined 3D objects – converting 2D plan into a 3D model – 3Dmesh – 3Dface - 3Dpoly -creating surfaces – Rulsurf – Revsurf – Tabsurf – Edgesurf – isolines -3DView – viewports –Vpoint – hide – dview – modelspace - paper space.
2. 3D solid primitives - creating region – pedit – extrude – revolve - combining object – union –subtract – intersect – Align – Fillet – chamfer - Advanced 3D editing techniques – align - 3D array–Mirror 3D - Rotate3D.
3. Working with UCS – 3D coordinate system – DDUCS – Plan – UCS icon
4. Solid Rendering – material attaching and detaching – shade with color – slice and sectioning –script – 3D orbit – calculating mass properties
5. Developing LISP program – constructing a list – input/output functions – control structures -arithmetic operations – trigonometric functions – special functions.

3D solid modeling and LISP programming practice

- i) Geneva Mechanism
- ii) Cast Iron Block
- iii) Bearing Block
- iv) Bushed Bearing
- v) Gib and Cotter joint
- vi) Screw Jack
- vii) Universal Coupling

Part-2 CAM Practical

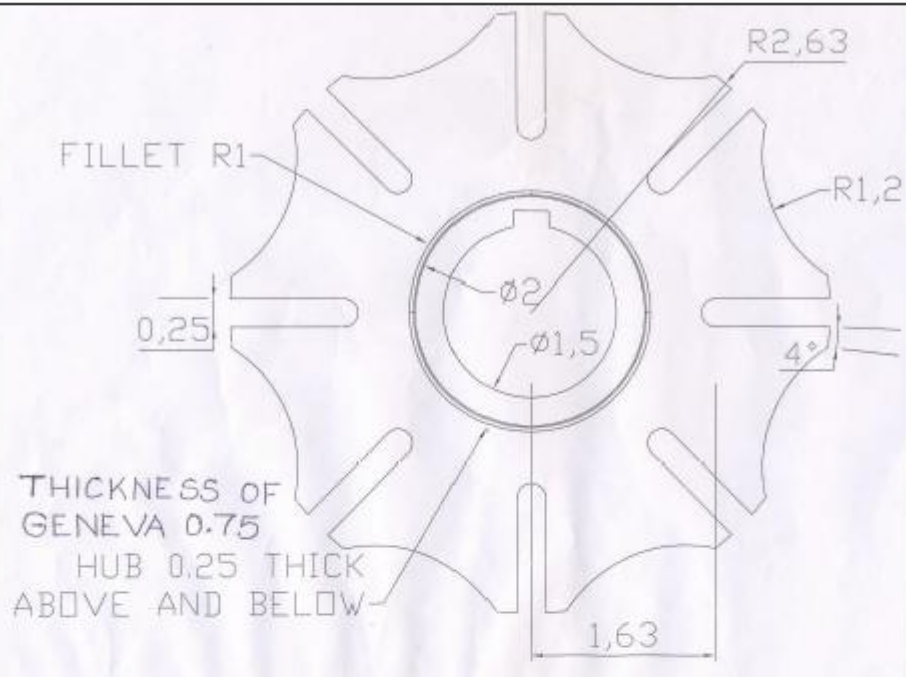
Exercise practice

CNC Lathe

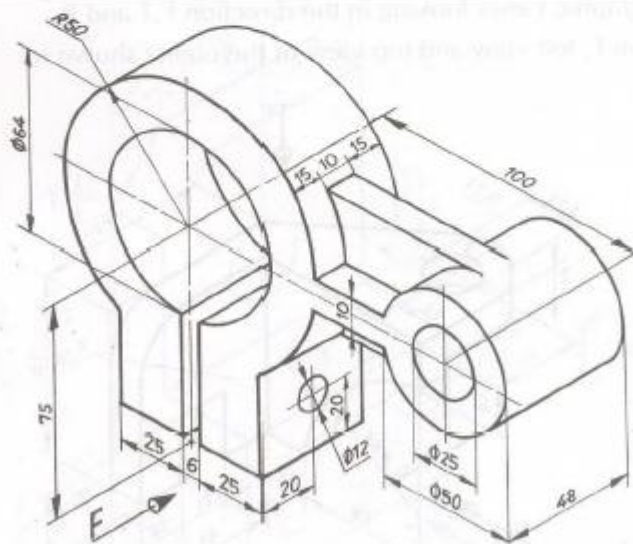
1. Develop a part program for step turning and simulate
2. Develop a part program for taper turning and simulate
3. Develop a part program for circular interpolation and simulate
4. Develop a part program for multiple turning operation and simulate
5. Develop a part program for thread cutting, grooving and simulate
6. Develop a part program for internal drills, boring and simulate

CNC Milling

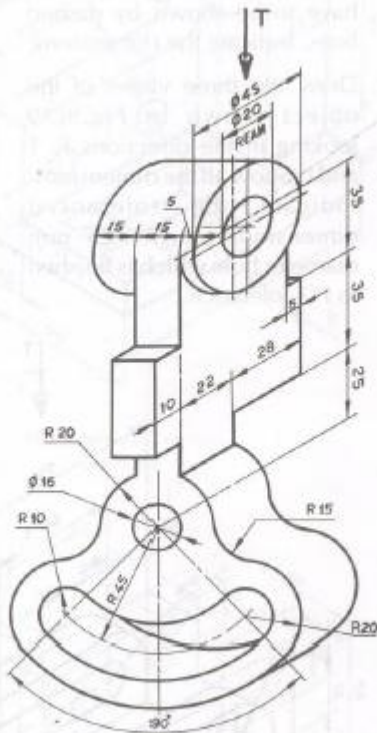
- 7 Develop a part program for grooving and simulate
8. Develop a part program for drilling (canned cycle) and simulate
9. Develop a part program for mirroring with subroutines and simulate
10. Develop a part program for rectangular and circular pocketing and simulate



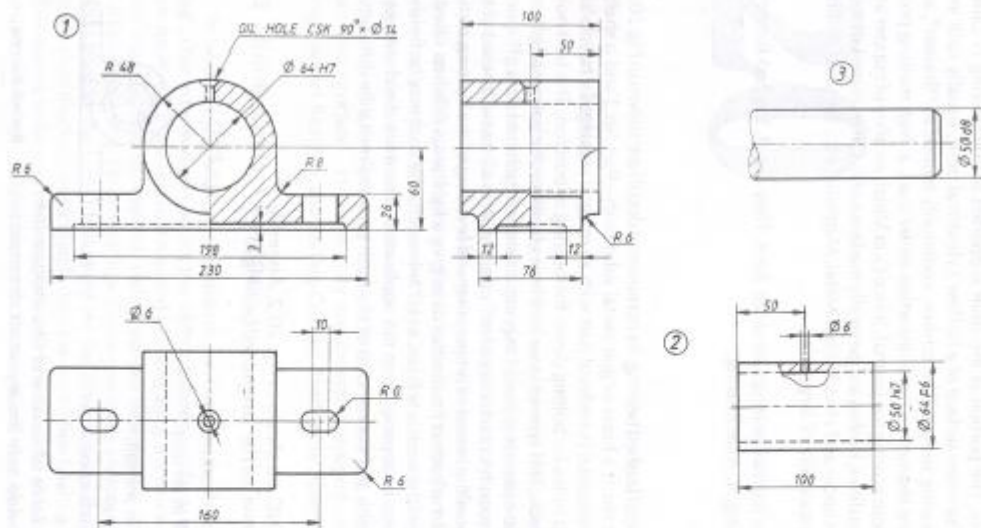
Geneva Mechanism



Cast iron Block

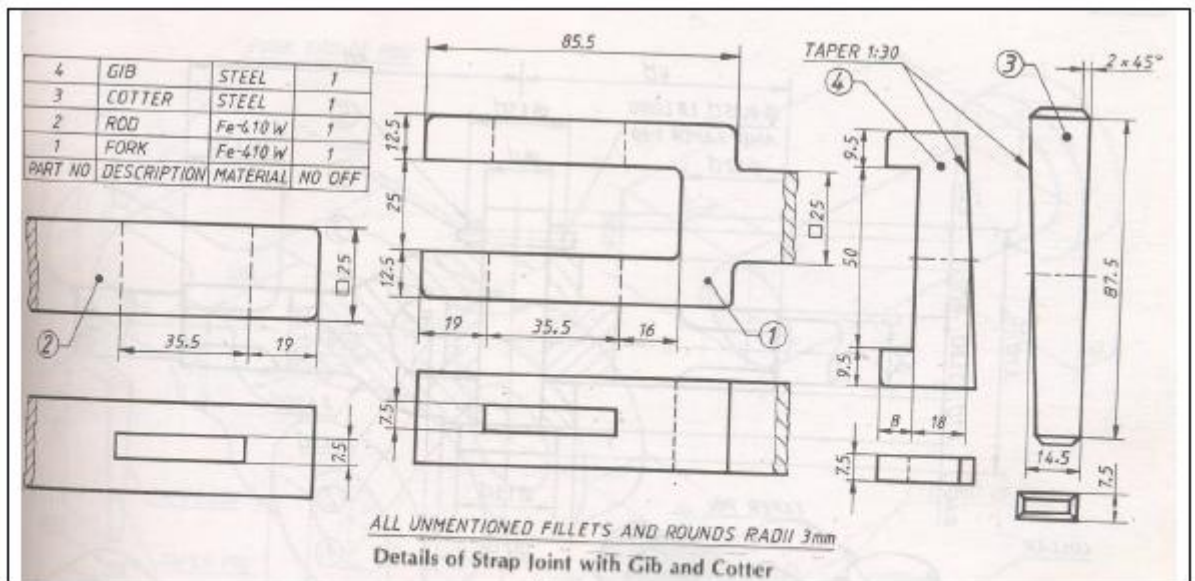


Bearing Block

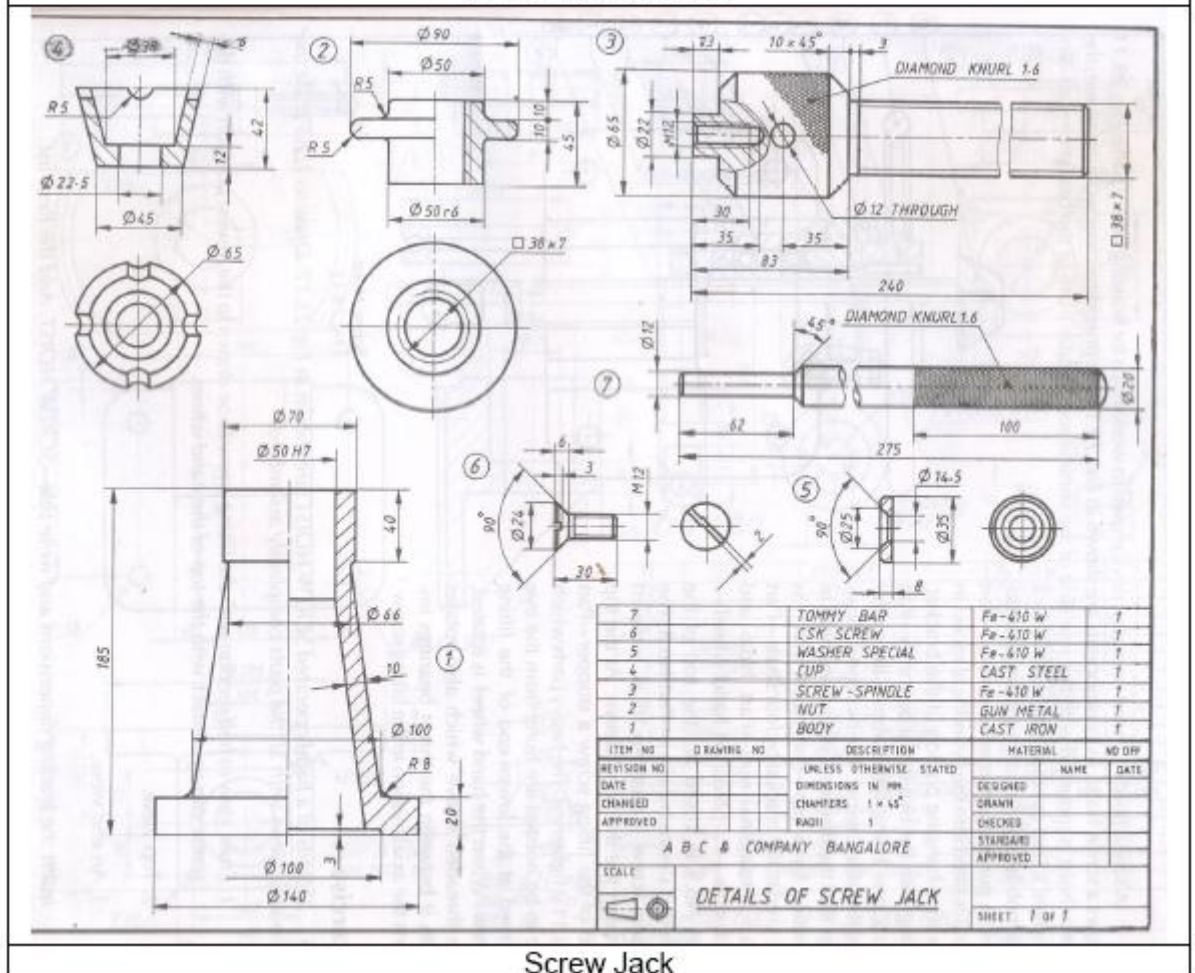


3		SHAFT	Fe 410 W	1
2		BUSH	BRASS	1
1		BLOCK	CAST IRON	1
ITEM NO.	DRAWING NO.	DESCRIPTION	MATERIAL	MS. DFT.
REVISION NO.		UNLESS OTHERWISE STATED		NAME
DATE		DIMENSIONS IN MM		DATE
CHANGED		CHAMFERS 1:4:1		
APPROVED		MATERIAL		
ABC & COMPANY BANGALORE			STANDARD	
SCALE			APPROVED	
DETAILS OF BUSHED BEARING				
			SHEET	1 OF 1

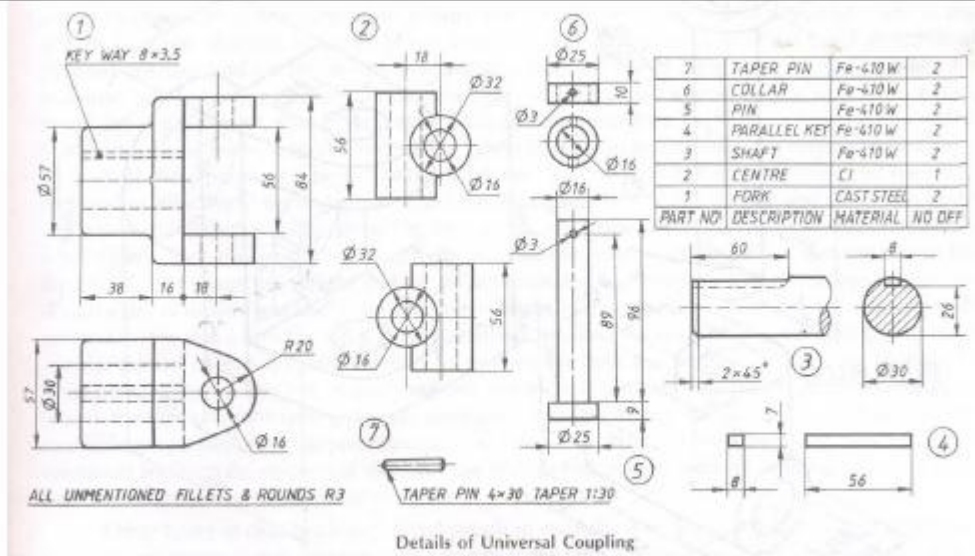
Bushed Bearing



Gib and Cotter Joint



Screw Jack

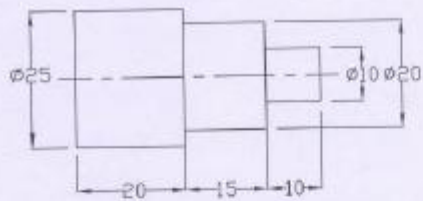


Details of Universal Coupling

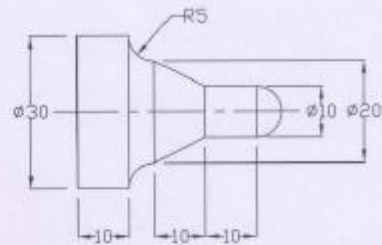
Universal Coupling

CAM Practicals – Lathe

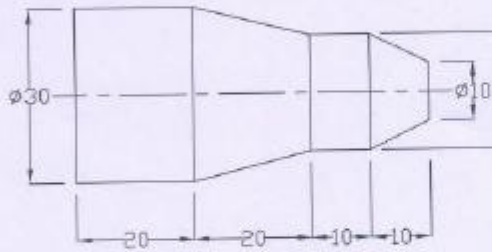
STEP TURNING



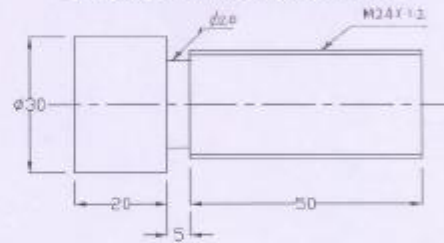
MULTIPLE TURNING CYCLE



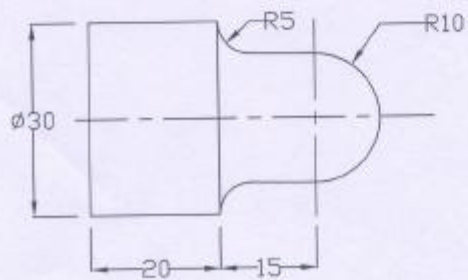
TAPER TURNING



THREADCUTTING & GROOVING



CIRCULAR INTERPOLATION

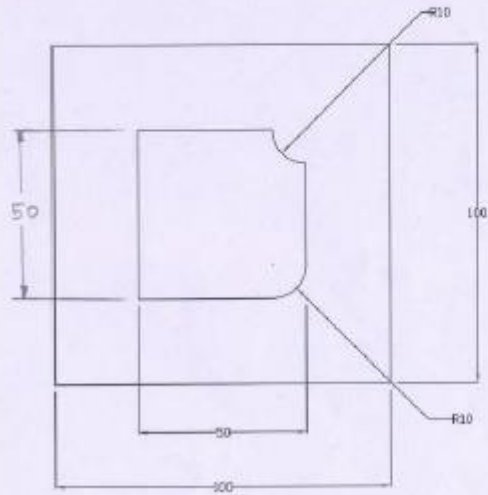


INTERNAL DRILLS & BORES

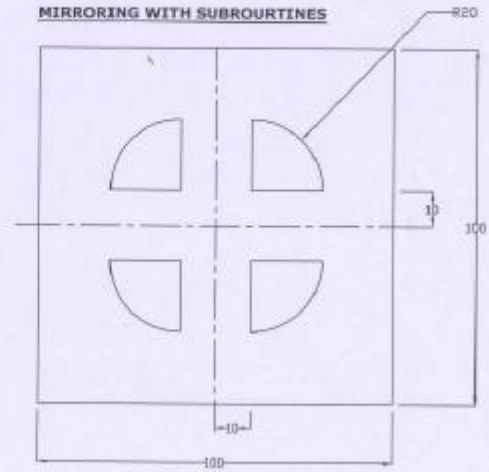


CAM Practical - Milling

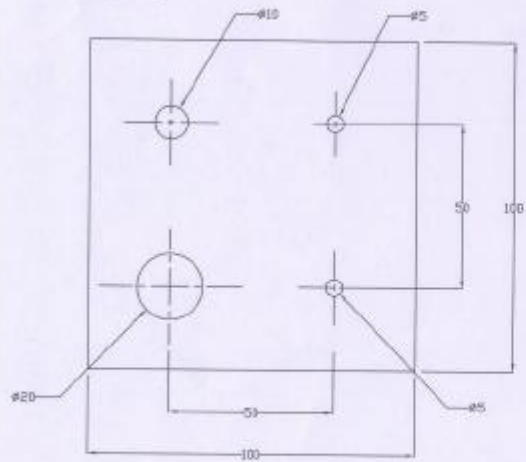
GROOVING



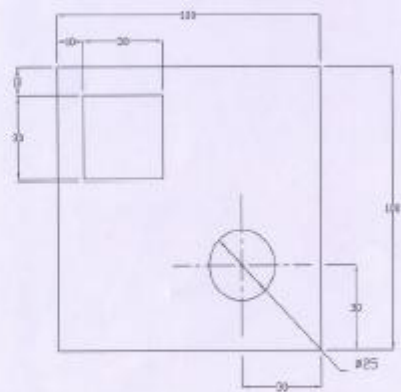
MIRRORING WITH SUBROUTINES



DRILLING



RECTANGULAR POCKETING & CIRCULAR POCKETING-POCKET DEPTH 5mm



SEMESTER : VI

Subject Code : ME 605

Subject Title : Project