KARANATAKA 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 Grammars

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

BLOCK 3 Compositions

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 Proses

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. Orient Longman, Anna Salai, Chennai-600002.
2. The Advanced Learners Dictionary of Current English by A.S.Hornby, Oxford University Press. 1973
3. High School English Grammar and Composition by Wren & Martin, S.Chand & Co Ltd., 2005
4. Vocabulary in Practice - Part 1 to 4 by Glennis Pye, Cambridge University Press,
5. Learn Correct English by Shiv K. Kumar & Hemalatha Nagarajan, Pearson Longman, 2005
6. Essential English Grammar by Raymond Murphy, Cambridge University Press,
7. Common Errors in English by M.Thomas, Lotus Press, New Delhi, 2006
8. Basic English Usage by Michael Swan, ELBS/OUP, 1989
9. Communication Skills for Engineers by Mishra, Ist Edition, Pearson Longman
10. Basic English Dictionary by Longman Longman Ist Edition, Pearson Longman

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: Demoivre'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 by Dr M.K.Venkatraman, National Publishing Co.
2. Engineering Mathematics by Dr P.Kandasamy, S.Chand & Co, New Delhi
3. Higher Engineering Mathematics by Ramana, Tata McGraw Hill, New Delhi
4. Engineering Mathematics by Singh, Tata McGraw Hill, New Delhi
5. Advanced Engineering Mathematics by N.Bali,M.Goyal,C.Watkins,Lakshmi Publications (Pvt) Ltd, New Delhi
6. Engineering Maths by T.Veerarajan, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Technical Mathematics by Paul Calter, Tata McGraw Hill, New Delhi
8. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
9. Introduction to Engineering Mathematics by H.K. Dass, Dr.Rama Verma, S.Chand & Co, New Delhi
10. Applied Engineering Mathematics Vol-II by H.K.Dass, S.Chand & 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 motions 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. Physics by Resnick and Hoilday ,Wisley Toppan Publishers – England
2. Mechanics by Narayana Kurup , S. Chand Publishers – New Delhi
3. Engineering Physics by B.L. Theraja , S. Chand Publishers – New Delhi
4. Remote sensing by Dr.M.Anji Reddy, Jawaharlal Nehru Technological University –Hyderabad.
5. Engineering Physics by V.Rajendran, Tata McGraw Hill, New Delhi
6. Engineering Physics by Vikram Yadav, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Physics for Engineering and Science by Michael Browne, Tata McGraw Hill, New Delhi
8. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
9.Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Physics by Dipak Chandra Ghosh,Nipesh Chandra Ghosh,Prabir Kumar Haldar, Lakshmi Publications (Pvt) Ltd, New Delhi

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 Organic 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. Inorganic chemistry by Soni PL, Sultan Chand &sons.
2. Organic chemistry by Soni PL, Sultan Chand & sons.
3. Engineering chemistry by Jain & Jain, Dhanpat rai &co
4. Engineering chemistry by Uppal , Khanna publishers
5. Environmental chemistry &Pollution control by Dara .SS, S. Chand&co
6. Environmental Pollution by . Tripathy .SN , Sunakar panda - Vrinda publication
7. Rain water Harvesting-hand book by Chennai Metro Water
8. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
9. Engineering Chemistry by Dr.A.K.Pahari,Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi

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 prompts.

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. Fitting
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 by Dr M.K.Venkatraman, National Publishing Co.
2. Engineering Mathematics by Dr P.Kandasamy, S.Chand & Co, New Delhi
3. Higher Engineering Mathematics by Ramana, Tata McGraw Hill, New Delhi
4. Engineering Mathematics by Singh, Tata McGraw Hill, New Delhi
5. Advanced Engineering Mathematics by N.Bali,M.Goyal,C.Watkins,Lakshmi Publications (Pvt) Ltd, New Delhi
6. Engineering Maths by T.Veerarajan, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Technical Mathematics by Paul Calter, Tata McGraw Hill, New Delhi
8. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
9. Introduction to Engineering Mathematics by H.K. Dass, Dr.Rama Verma, S.Chand & Co, New Delhi
10. Applied Engineering Mathematics Vol-II by H.K.Dass, S.Chand & 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. Physics by Resnick and Hoilday ,Wisley Toppan Publishers – England
2. Mechanics by Narayana Kurup , S. Chand Publishers – New Delhi
3. Engineering Physics by B.L. Theraja , S. Chand Publishers – New Delhi
4. Remote sensing by Dr.M.Anji Reddy, Jawaharlal Nehru Technological University –Hyderabad.
5. Engineering Physics by V.Rajendran, Tata McGraw Hill, New Delhi
6. Engineering Physics by Vikram Yadav, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Physics for Engineering and Science by Michael Browne, Tata McGraw Hill, New Delhi
8. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
9.Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Physics by Dipak Chandra Ghosh,Nipesh Chandra Ghosh,Prabir Kumar Haldar, Lakshmi Publications (Pvt) Ltd, New Delhi

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 radioactive isotopes
Unit 4: Abrasives

BLOCK 2 Fuels and Refractory's

Unit 1: Fuels - classification
Unit 2: Solid and Liquid Fuels
Unit 3: Gas Fuels
Unit 4: Refractory's

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. Inorganic chemistry by Soni PL, Sultan Chand &sons.
2. Organic chemistry by Soni PL, Sultan Chand & sons.
3. Engineering chemistry by Jain & Jain, Dhanpat rai &co
4. Engineering chemistry by Uppal , Khanna publishers
5. Environmental chemistry &Pollution control by Dara .SS, S. Chand&co
6. Environmental Pollution by . Tripathy .SN , Sunakar panda - Vrinda publication
7. Rain water Harvesting-hand book by Chennai Metro Water
8. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
9. Engineering Chemistry by Dr.A.K.Pahari,Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi

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 Gopalakrishnan.K.R., (Vol.I and Vol.II), Dhanalakshmi publishers, Edition 2, 1970
2. First Year Engineering Drawing by Barkinson & Sinha, Pitman Publishers, London, Edition 3, 1961
3. A Book on AutoCAD Release 2007.
4. Engineering Drawing by Shah/Rana,Ist Edition Pearson Longman
5. Machine Drawing with AutoCAD by Pohit/Ghosh, Ist Edition Pearson Longman
6. Engineering Graphics by Prof.P.J.Shah, S.Chand & Co, New Delhi
7. Computer Graphics including CAD,AUTOCAD &C by A.M.Kuthe, S.Chand & Co, New Delhi
8. Engineering Graphics by Dhawan R.K, S.Chand & Co, New Delhi
9. Auto CAD 2005 for Engineers by Ionel Simon, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Drawing by Agrawal, Tata McGraw Hill, New Delhi

Drawing Practices

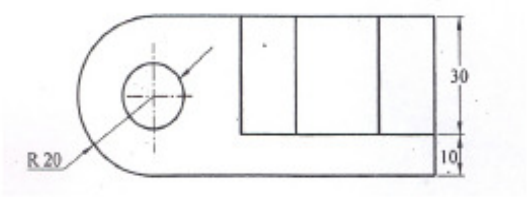


Fig – 1

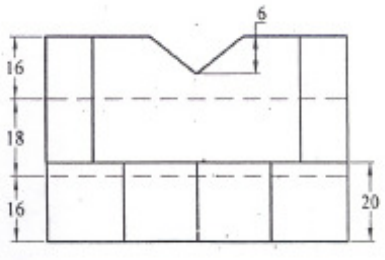


Fig- 2

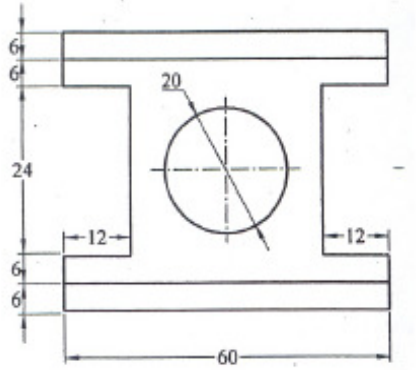


Fig. 3

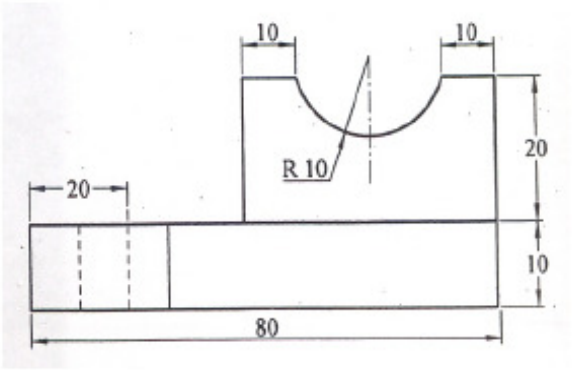


Fig. 4

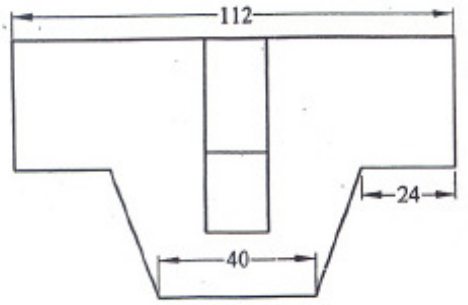


Fig. 5

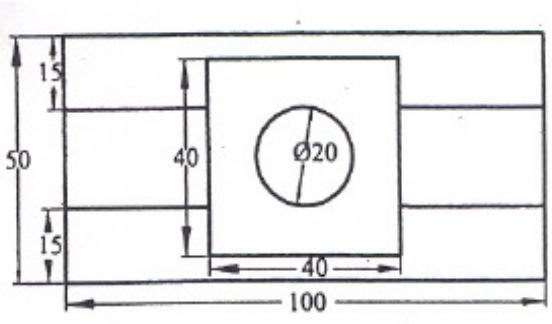


Fig. 6

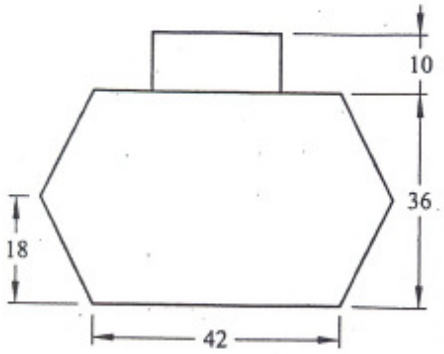


Fig. 7

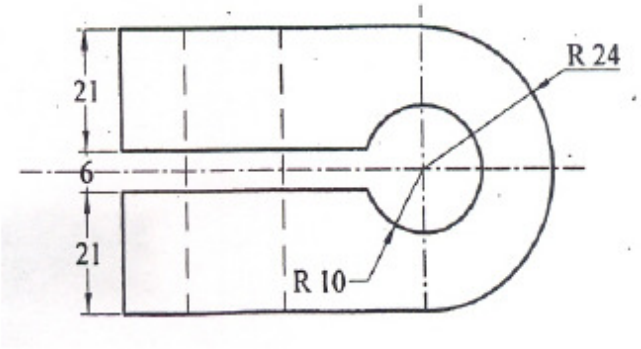


Fig. 8

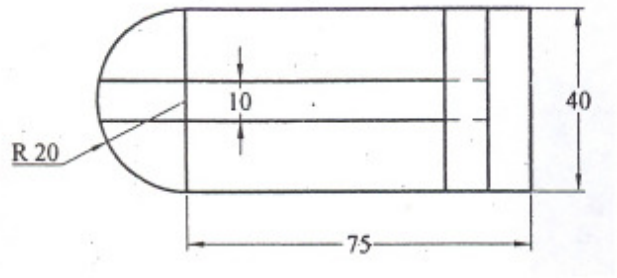


Fig. 9

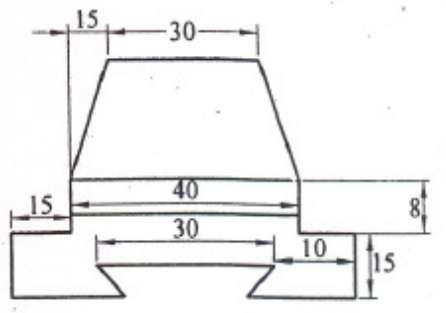


Fig. 10

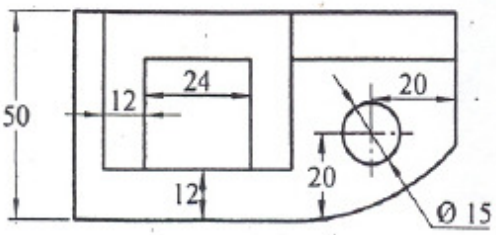


Fig.11

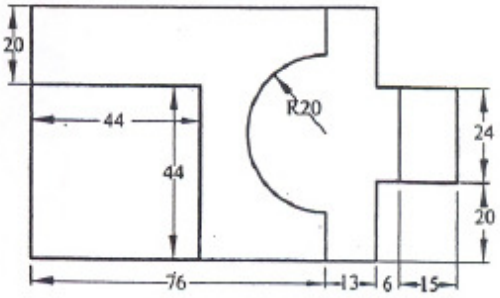


Fig. 12

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. Epsum(Magnesium Sulphate)
10. Analysis of an Effluent (containing pollutants like Lead, Cadmium, Zinc, and 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)

ACIDIMETRYAND 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.

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: Tortional 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
3.Applied Mechanics by SB Junnarkar, Dr. HJ Shara, Charator publishing house, Anand 388001
4. Strength of Materials by S. Ramamrutham Dhanpat Rai Pub. Co, New Delhi.
5. Strength of Materials by L.Negi, Tata McGraw Hill, New Delhi
6. Schaum's Outline Of Statics and Mechanics of Materials by William Nash, Tata McGraw Hill, New Delhi
7. Mechanics of Materials by Ferdinand Beer.E, Russell Johnson, Jr John DeWolf.David Mazurek, Tata McGraw Hill, New Delhi
8. Strength of Materials by S.Rattan, Tata McGraw Hill, New Delhi
9. Strength of Materials by B.Sarkar, Tata McGraw Hill, New Delhi
10. Mechanics of Materials by Ansel Ugural, Tata McGraw Hill, New Delhi

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.
3. Elements of workshop Technology Volume I & II, Edn by Hajra Chowdry & Bhattacharaya,
   Media Promoters & Publishers Pvt. Ltd., Mumbai
4. Workshop Technology, Volume I, II, & III by WAJ Chapman, Vima Books Pvt.Ltd., New Delhi
5. Workshop Technology by Raghuwanshi, Khanna Publishers
6. Production Technology, Edn. XII, by Jain & Gupta, Khanna Publishers
7. Production Technology, Edn. X by P. C. SHARMA, S.Chand & Co. Ltd., Ram Nagar, New Delhi
8. Production Technology, Edn. 18 by HMT, Tata McGraw Hill
9. Manufacturing Engineering & Technology by Kalpakjian, Tata McGraw Hill
10. A Text Book of Manufacturing Technology by R.K.Rajput, Lakshmi Publications Pvt Ltd, 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. A Text Book of Hydraulics, Fluid Mechanics by R.S. Khurmi, S.Chand & Co, New Delhi
2. A Text Book of Hydraulics R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
3. Hydraulic Machines by Jagadishlal, Metropolitan Book Co, New Delhi
4. Fluid Mechanics and Hydraulic Machines , Edn. 8 by R.K.Bansal, Lakshmi Publications Pvt Ltd, New Delhi
5. Hydraulics and Pneumatics (A Technician's and Engineer's Guide) by Andrew Parr
6. Fundamentals of Pneumatic control Engineering by FESTO manual
7. Text book of Hydraulics by H. Meixner and R.Kober , FIESTO DIDACTIC KG, D 7300 Esslingen
8. Fluid Mechanics and Hydraulic Machines by T.S.Desmukh, Lakshmi Publications Pvt Ltd, New Delhi
9. Fluid Mechanics by Cengel, Tata McGraw Hill
10. Fluid Mechanics and Machinery by Rao, Tata McGraw Hill

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. Machine Drawing, Edn.37 by N.D.Bhatt, Charotar Publishing House
2. Engineering Drawing by R.C.Parkinson, Published by English University Press, London
3. Engineering Drawing by K. R. Goplakrishnan, Dhanalakshmi Publishers, Chennai
4. A First year Engineering Drawing. First Rep 1982 by A. C. Parkinson, A.H. Wheeler & Company (P) Ltd, Allahabad
5. Machine Drawing by Sidheswar Tata McGraw Hill
6. Machine Drawing by Singh Tata McGraw Hill

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 Orifice meter
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. Thermal Engineering, Edn. 18 by R.S.Khurmi and J.K. Gupta, published by S.Chand & Co
2. Applied Thermodynamics, Edn.24 by P.K.Nag, , TMC, New Delhi.
3. Applied Thermodynamics by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
4. A Text Book of Internal Combustion Engines by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
5. A Text Book of Engineering Thermodynamics by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
6. Thermal Science and Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
7. Thermal engineering, Edn. 24 by P.L Ballaney, Khanna Publishers, New Delhi
8. Thermal engineering, Edn. 3 by B.K Sarkar, Dhanpat Rai &Sons, New Delhi
9. Applied Thermodynamics, Edn. 2 by Domkundwar and C.P kothandaraman, Khanna Publishers, New Delhi
10. Thermal Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, 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.
3. Production Technology, Edn. 18 by HMT, Tata McGraw Hill, New Delhi
4. Manufacturing process, Edn. 5 by Myro N Begman, Tata McGraw Hill, New Delhi
5. Workshop Tech Vol I,II, III by WAJ. Chapman, Viva Books Pvt. Ltd, New Delhi
6. Production processes by NITTTR, Tata McGraw Hill Publishing Co, New Delhi
7. Manufacturing Technology-II by Dr.R.Kesavan,B.Vijaya Ramnath, Lakshmi Publications Pvt Ltd, New Delhi
8. Manufacturing Engineering & Technology by Kalpakjian, Tata McGraw Hill
9. A Text Book of Manufacturing Technology by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
10. R.S. Khurmi & J.K. Gupta, A Text Book of workshop Technology, Edn.2, S.Chand & Co., 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.
3. Automation, Production System and Computer Integrated Manufacturing, Edn. 2 by Mikell P. Groover, Pearson Education, New Delhi
4. Electrical Design Estimating and Costing, Edn. 6 by KB Raina & S.K.Battachariya, Tata McGraw Hill Publishing Co, New Delhi
5. Introduction to Programmable logic controls by Gary Dummy, Thomson Debnar learning second edition second reprint 2003
6. Electrical Technology Vol. I & II, by B.L.Theraja & A.K. Theraja, S.Chand & Co.
7. Basic Electrical and Electronics Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
8. Basic Electronics Engineering & Devices by Dr.R.K.Singh,Ashish Dixit, Lakshmi Publications Pvt Ltd, New Delhi
9. Basic Electronics by Rakesh Kumar Garg, Ashish Dixit,Pawan Yadav, Lakshmi Publications Pvt Ltd, New Delhi
10. Basic Electronics and Instrumentation by Saifullah Khalid, Neetu Agarwal, Mukesh Jain, Lakshmi Publications Pvt Ltd, New Delhi

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 Comport 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.
2. V.K.Jain, Refrigeration and air conditioning.
3. Basic Refrigeration and air conditioning by Ananthanarayanan, Lakshmi Publications Pvt Ltd, New Delhi
4. Refrigeration and air conditioning by Arora, Lakshmi Publications Pvt Ltd, New Delhi
5. Refrigeration and Air-condition by Manohar Prasad, Wiley Eastern Ltd, New Delhi
6. Thermal Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
7. A course in refrigeration and air conditioning by Domkundwar
8. Principles of refrigeration by Dossat
9. Home refrigeration and air conditioning by Audels, Theo. Audel & Co, New York
10. Refrigeration and air conditioning by C.P Arora

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

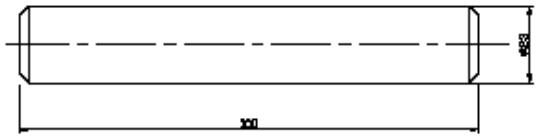
Note: The dimensions may be modified according to the materials specified.

Enclosure: Sketches of Lathe, drilling & shaping Exercises.

LATHE

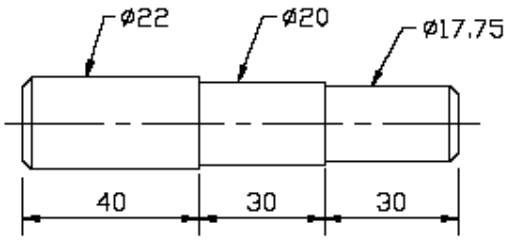
1.0 LATHE

EX.NO.1 PLAIN TURNING

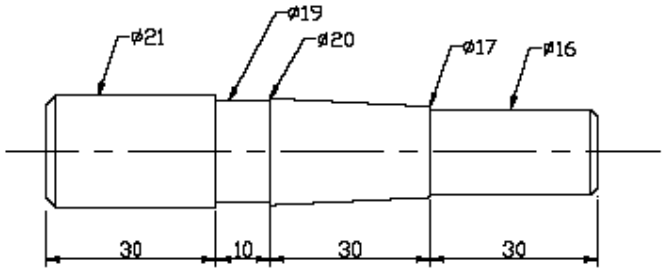


MATERIAL:M.S. OF SIZE DIA
25X105mm.

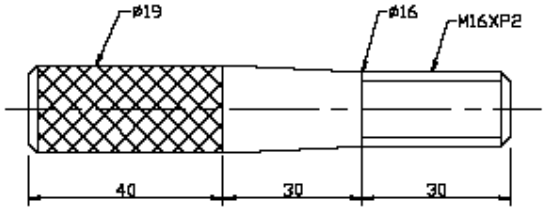
EX.NO.2 STEP TURNING



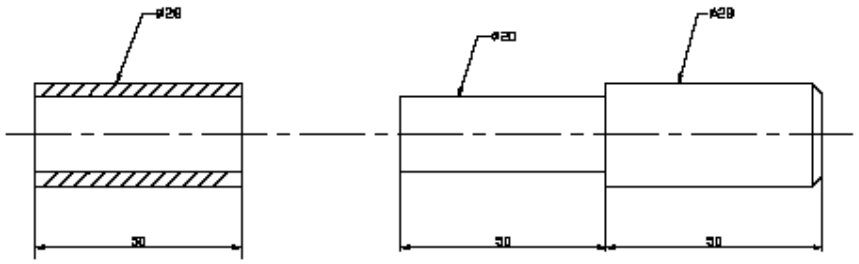
EX.NO.3 TAPER TURNING



EX.NO.4 THREAD CUTTING AND KNURLING



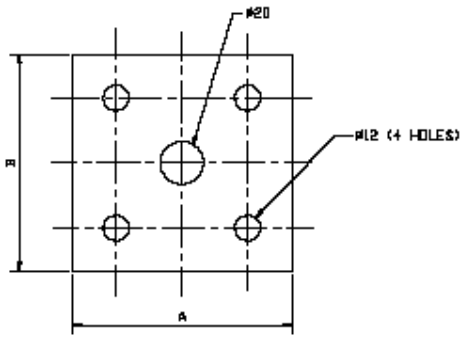
EX.NO.5 BUSHING



DRILLING

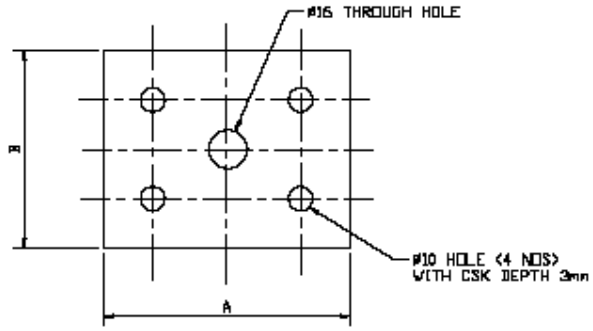
2.0 DRILLING

EX.NO.1 THROUGH HOLE DRILLING



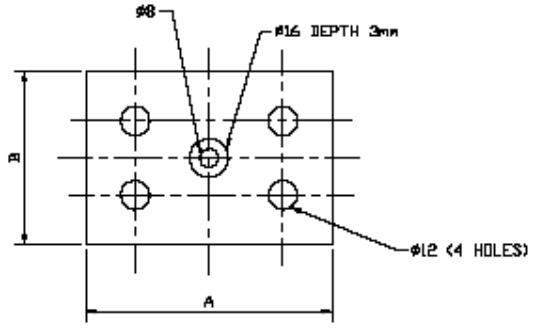
MATERIAL:M.S. OF SIZE 75X50X6mm.

EX.NO.2 THROUGH HOLE DRILLING WITH COUNTER SUNK



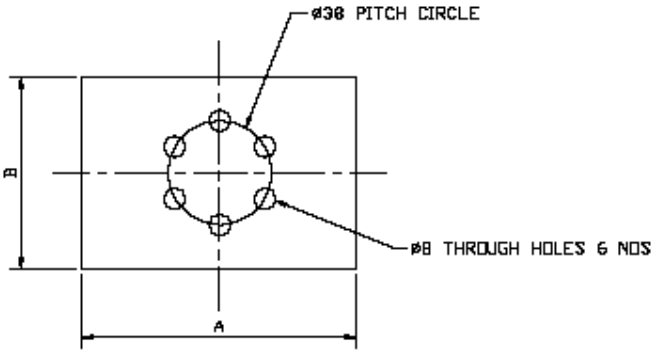
MATERIAL:M.S. OF SIZE 75X50X6mm.

EX.NO.3 PART DRILLING



MATERIAL:M.S. OF SIZE 75X50X6mm.

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

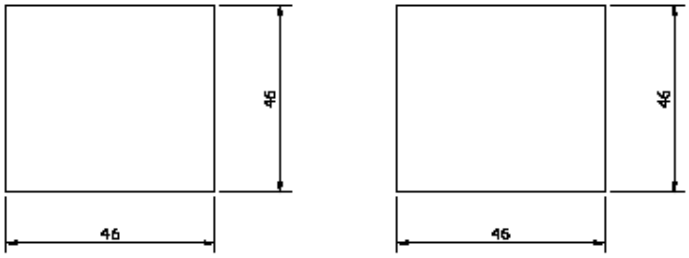


MATERIAL:M.S. OF SIZE 75X50X6mm.

SHAPING

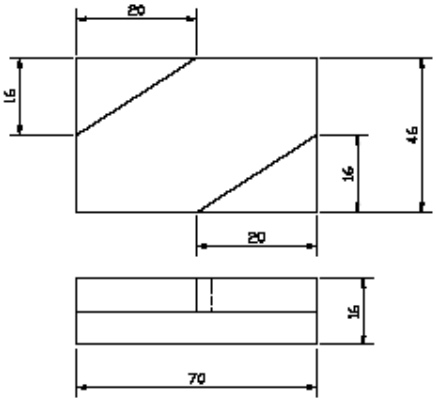
3.0 SHAPING

EX.NO.1 MACHINING FLAT SURFACE USING A SHAPER



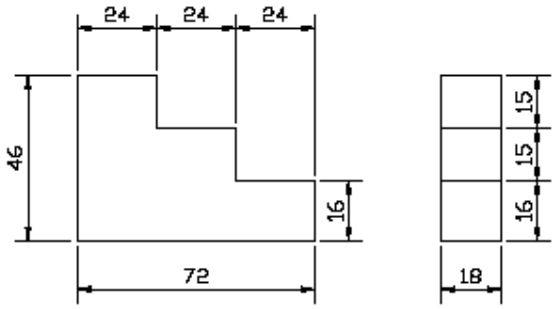
MATERIAL:C.I. OF SIZE 50X50X50mm.

EX.NO.2 CROSS CUT MACHNINING USING SHAPER



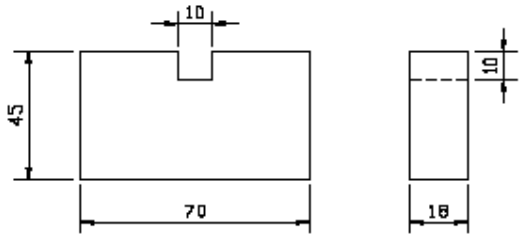
MATERIAL:C.I. OF SIZE 75X50X20mm.

EX.NO.3 MACHINIG A STEPPED BLOCK



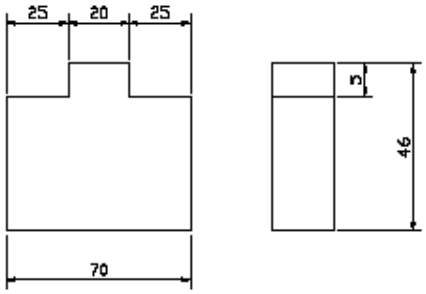
MATERIAL:C.I. OF SIZE 75X50X20mm.

EX.NO.4 SLOTTING USING A SHAPER



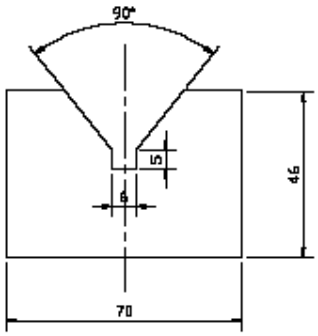
MATERIAL:C.I. OF SIZE 75X50X20mm.

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 Designs 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 Designs 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. Machine Design, Edn. 1995 by Pandya & Shah, Charotar Publishing House.
2. A text book of machine design, Edn. 18 by R.S.Khurmi & J K Gupta, New Delhi.
3. Machine Design by S.E.Sundararaja Moorthy & N. Shanmugam, Narayana Publications, Chennai
4. Design Data Book, by PSG College of Technology, Coimbatore
5. Design Data Book, Bala Chitra Publishers, Coimbatore
6. Design of Machine Elements by Bhandari, Tata McGraw Hill, New Delhi
7. Introduction to Machine Elements by Bhandari, Tata McGraw Hill, New Delhi
8. Machine Design(Schaum's Outlines Series) by Hall, Tata McGraw Hill, New Delhi
9. Design of Machine Elements by Ganesh Babu, Tata McGraw Hill, New Delhi
10. Machine Series(sigma series) by Kulkarni , Tata McGraw Hill, 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, S.Chand & Co, New Delhi.
3. Thermal Engineering, Edn. 24 by P.L.Ballaney, Khanna Publishers, New Delhi
4. Thermal Engineering, Edn. 3 by B.K.Sarkar, Dhanpat Rai &Sons, New Delhi
5. Power plant Engineering by S.Domkundwar, A.V.Domkundwar S.C.Arora
6. Power plant Engineering by Nagpal, Khanna Publishers, New Delhi
7. Power plant Engineering by P.C.Sharma
8. Conventional Energy sources, Edn.4 by G.D.Rai, Non, Khanna Publishers, New Delhi
9. Refrigeration and Air condition, Edn. 4 by P.L.Ballaney, Khanna Publishers, New Delhi
10. Refrigeration and Air-condition by Manohar Prasad, Wiley Eastern Ltd, 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.
3. Industrial Maintenance, Reprint 2002 by Garg.H.P, S.Chand & Co. Ltd., New Delhi
4. Engineering Metrology, 2002 by R.K.Jain, Khanna Publisher, New Delhi
5. Hand Book of Industrial Metrology by ASTME, Prentice Hall of India, New Delhi
6. Metrology and Measurements by Bewoor, Tata McGraw Hill, New Delhi
7. Process/Industrial Instruments and Contols hand Book by Considine, Tata McGraw Hill, New Delhi
8. Measurement Systems by Doebelin, Tata McGraw Hill, New Delhi
9. Experimental Methods for Engineers by Holman, Tata McGraw Hill, New Delhi
10. A Text Book of Engineering Material and Metallurgy by Er.Amandeep Singh Wadhwa, Er.Harvinder Singh Dhaliwal, Tata McGraw Hill, 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: Pneumtaic 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.
3. Mechatronics, 2nd Edition 2001 by W.Bolton, Pearson Education, New Delhi
4. Mechatronics System Design, 1st Reprint, 2001 by Devdas Shetty & Kolk, PWS Publishing Co. Boston.
5. Electromechanics, 1st Edition 2003 by James H.Harter, Prentice-Hall of India, New Delhi.
6. Mechatronics, 1st Edition 2006 by M.D.Singh & J.G.Joshi, Prentice-Hall of India, New Delhi
7. Introduction to Mechatronics and Measurement Systems by Alciatore, Tata McGraw Hill, New Delhi
8. Mechatronics by HMT, Tata McGraw Hill, New Delhi
9. Mechatronics by Mahalik, Tata McGraw Hill, New Delhi
10. MEMS by Mahalik, Tata McGraw Hill, 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 lable exercise) to an accuracy of 0.02mm using vernier caliper.
3. Determination of the inside diameter of a bush component to an accuracy off 0.02 using vernier caliper.
4. Determination of diameter of a cylindrical component to an accuracy 0f 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 planning 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 planning 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.

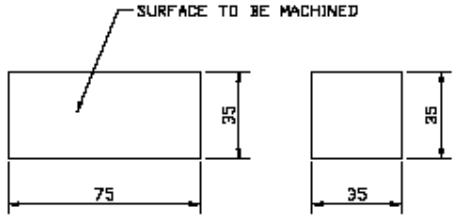
11. Setting of work, tools and cutters in planning, slotting, milling and grinding machines.

12. Operation performed in planning, slotting, milling and grinding machines.

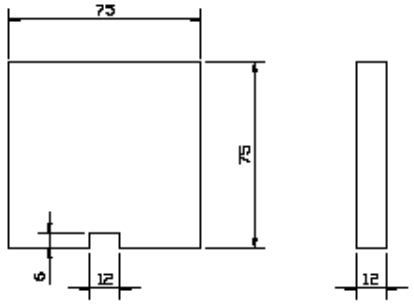
13. Operation of planning, slotting, milling, grinding, capstan and turret machines.

Enclosure: Sketches for Exercises

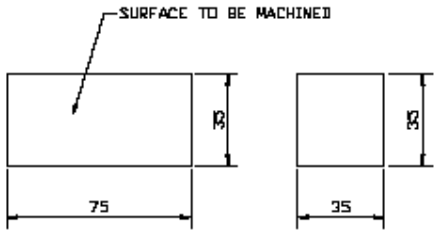
1. STUDY OF PLANNING MACHINE AND MACHINE A FLAT SURFACE



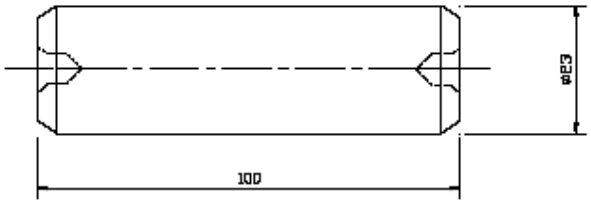
2. STUDY OF SLOTTING MACHINE AND MACHINE A SIMPLE SLOT



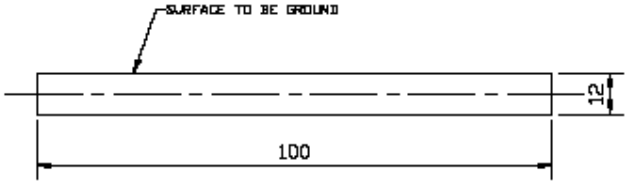
3. STUDY OF MILLING MACHINE AND MACHINE A PLANE SURFACE USING PLAIN MILLING CUTTER



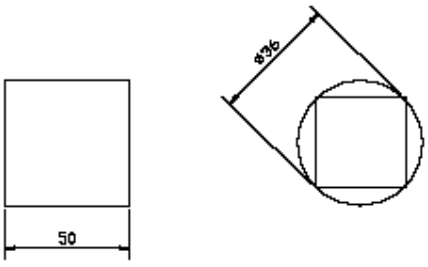
4.STUDY OF CYLINDRICAL GRINDER AND GRIND A CYLINDER



5. STUDY OF SURFACE GRINDER AND GRIND A PLANE SURFACE



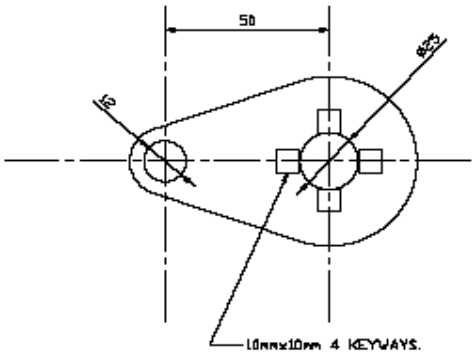
6. PLANNING A SQUARE -CAST IRON 50mmX50mm



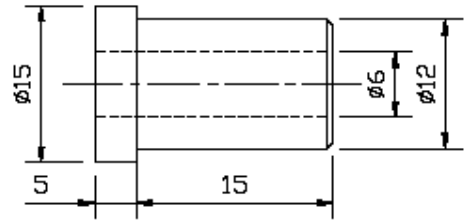
MATERIAL:ø36mmX50mm M.S.ROUND ROD

7. SLOTTING:

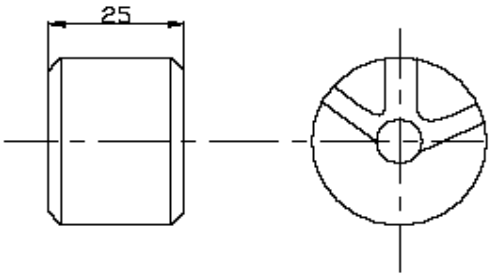
DRILLING HOLES IN RADIAL DRILLING MACHINE.MAKING INTERNAL KEYWAY AND MACHINING AN EXTERNAL PROFILE.



7.b. BUSH TURNING



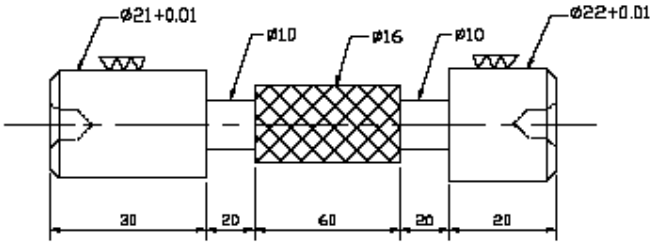
8. GEAR CUTTING IN MILLING MACHINE



Spur Gear1. No of Teeth-24 Module -2mm

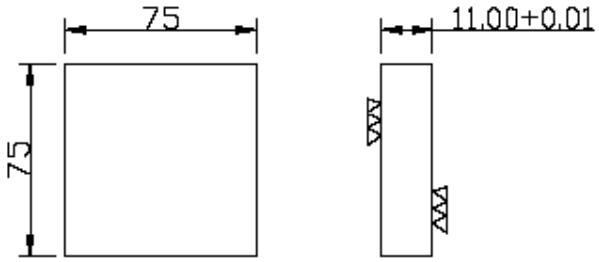
Spur Gear2. No of Teeth-17 D.P -10

9. GRINDING A CYLINDER IN CYLINDRICAL GRINDING MACHINE



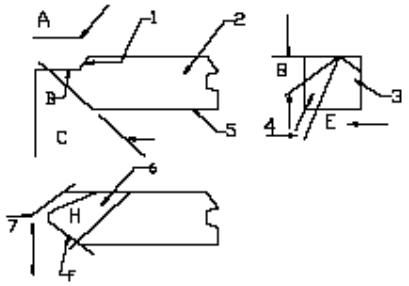
MATERIAL: ø25X100mm M.S ROUND ROD

10. GRINDING A FLAT SURFACE IN SURFACE GRINDER



MATERIAL: 75X75X12mm

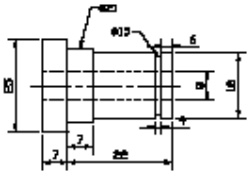
11. GRINDING A SINGLE POINT CUTTING TOOL IN TOOL AND CUTTER GRINDER



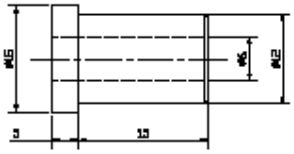
A - TOP RAKE ANGLE
B - LIP ANGLE
C - FRONT CLEARANCE ANGLE
D - SIDE RAKE ANGLE
E - END CLEARANCE ANGLE
F - SIDE CUTTING EDGE ANGLE
G - END CUTTING EDGE ANGLE
H - NOSE ANGLE

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.
3. Engineering Economics and Management by T. R. Banga & S. C. Sharma, McGraw Hill, New Delhi
4. Management, A global perspective by Heinz Weihrich,Harold Koontz, McGraw Hill, New Delhi
5. Industrial Engineering by N.J.Manek, Lakshmi Publications Pvt Ltd, New Delhi
6. Industrial and Business Management by Telsang Mertand.T, S.Chand & Co, New Delhi
7. Principles & Practice of Public Enterprise Management by Laxmi Narayan, S.Chand & Co, New Delhi
8. Entrepreneurial Development by Khanka,S.S, S.Chand & Co, New Delhi
9. Training Manual for Industrial Training Institutes and Centres by DGE&T, Tata McGraw Hill, New Delhi
10. Engineering Economy by Riggs Tata McGraw Hill, 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, Prentice Hall of India

3. NC Programming, I Edition, 2001 by S.K.Sinha, Galgotia Publications Pvt. Ltd

4. CAD/CAM Principles and Applications, 2002 by Dr.P.N.Rao, Tata Mc Graw Hill Publishing Company, New Delhi

5. Mastering CAD/CAM, Special Indian Edition 2007 by Ibrahim Zeid, Tata Mc Graw Hill Publishing Company, New Delhi

6. Automation, Production Systems, and Computer-Integrated Manufacturing by Mikell P. Groover, Pearson Education Asia

7. Computer control of manufacturing systems, International Edition by Yoram Koren, Tata Mc Graw Hill Publishing Company, New Delhi

8. Computer Aided Manufacturing by C.Elanchzian, T.Sunder Selwyn, G.Shanmuga Sundar, Laxmi Narayan, S.Chand & Co, New Delhi

9.CAD/CAM: Principles and Applications by Rao, Tata Mc Graw Hill Publishing

10.CAD/CAM: Theory and Practice by Zeid, Tata Mc Graw Hill Publishing Company, New Delhi

SEMESTER : VI
Subject Code : ME 603
Subject Title : Automobile Technology
Structure of the Course Content

BLOCK 1 Automotive Engine

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 Transmissions

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, by William.H.Grouse.
2. Automobile Engineering by Narang. G.B.S., Khanna Publishers, New Delhi.
3. Automobile Electrical Equipments by William.H.Grouse
4. Automotive Engineering by Kirpal Singh, Standard Publishers, New Delhi
5. Automobile Engineering by Banga and Singh, Khanna Publishers, New Delhi
6. Motor vehicle technology and practical work by Dolan.J.A, ELBS
7. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi
8. Automotive Mechanics, Edn. 6 by Srinivasan, McGraw Hill Co., New York
9. Automotive Electrical Equipment by Kohli,TMC, New Delhi
10. Automotive Mechanics by Crouse, McGraw Hill Co

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

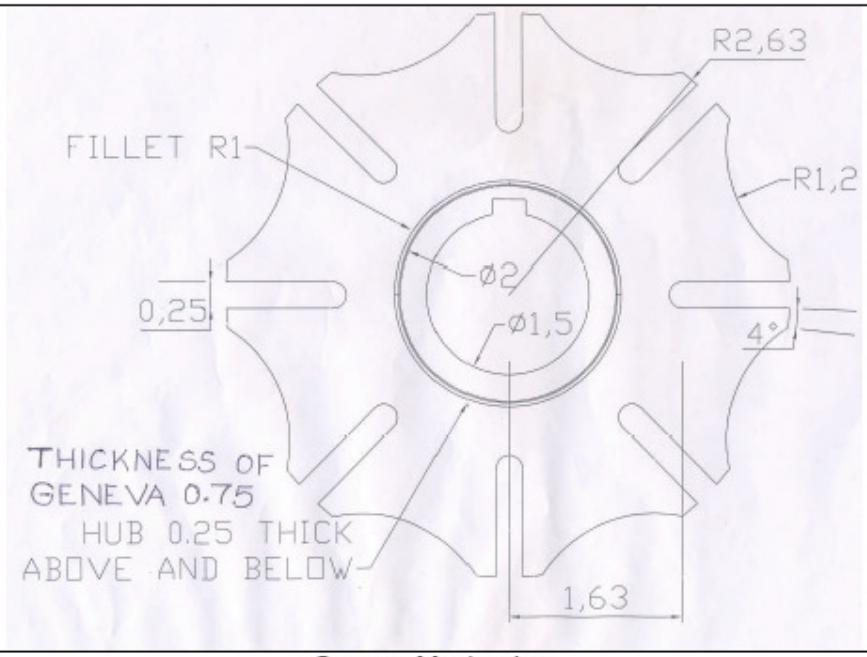
4. Solid Rendering – material attaching and detaching – shade with color – slice and sectioning –script – 3D orbit – calculating mass properties

5. Developing LISP program – constructing a list – input/output functions – control structures -arithmetic operations – trigonometric functions – special functions.

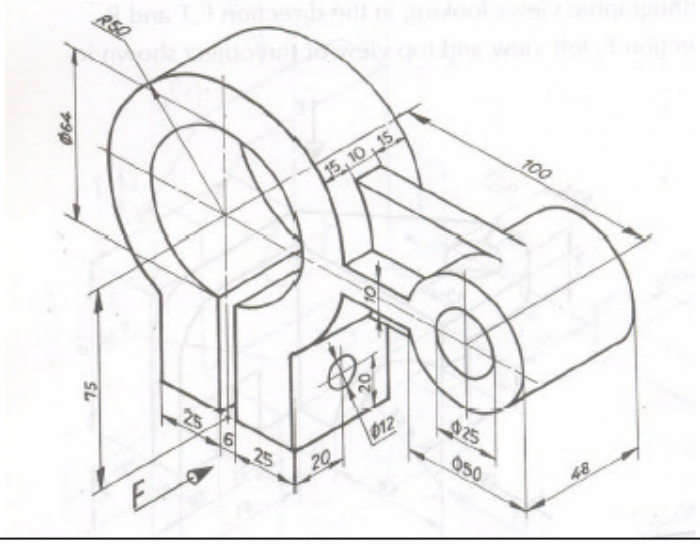
3D solid modeling and LISP programming practice
i) Geneva Mechanism
ii) Cast Iron Block
iii) Bearing Block
iv) Bushed Bearing
v) Gib and Cotter joint
vi) Screw Jack
vii) Universal Coupling

Part-2 CAM Practical

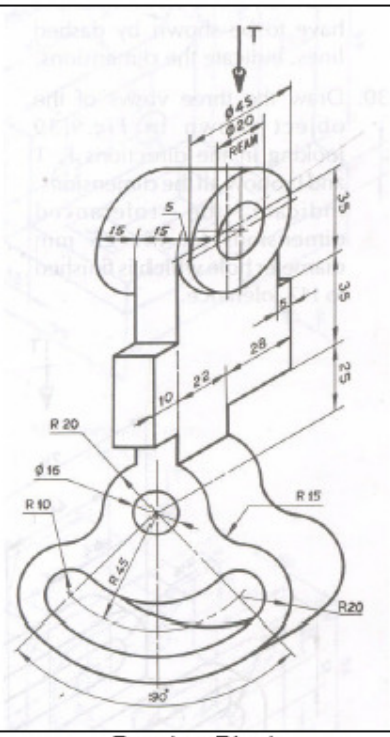
Exercise practice
CNC Lathe
1. Develop a part program for step turning and simulate
2. Develop a part program for taper turning and simulate
3. Develop a part program for circular interpolation and simulate
4. Develop a part program for multiple turning operation and simulate
5. Develop a part program 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



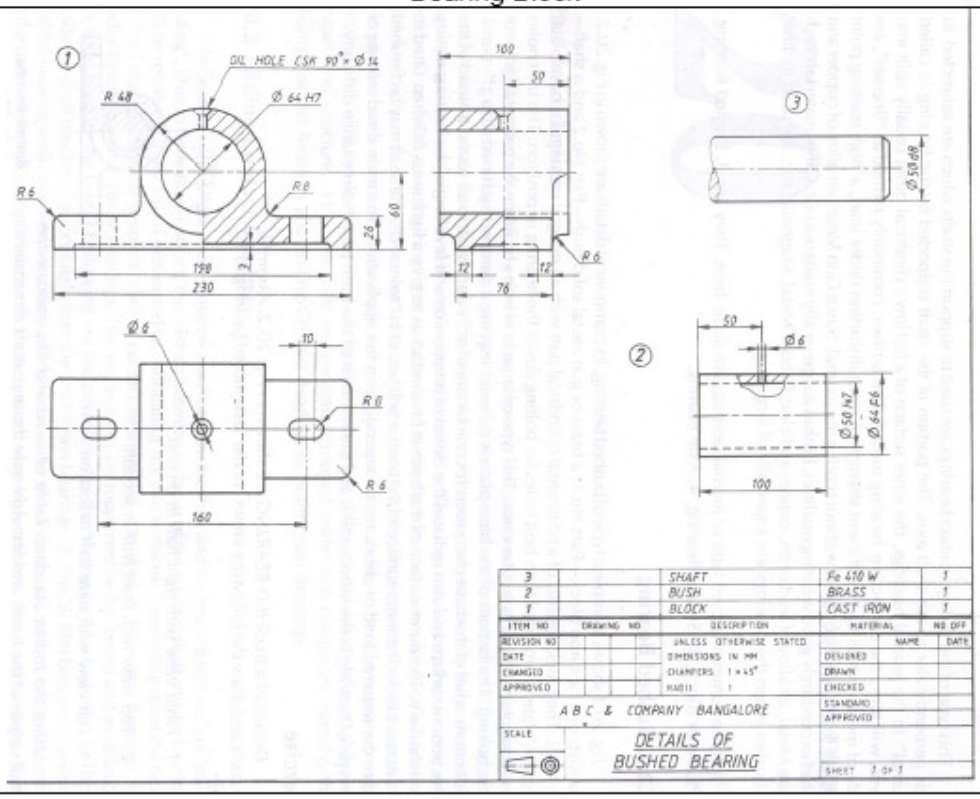
Geneva Mechanism



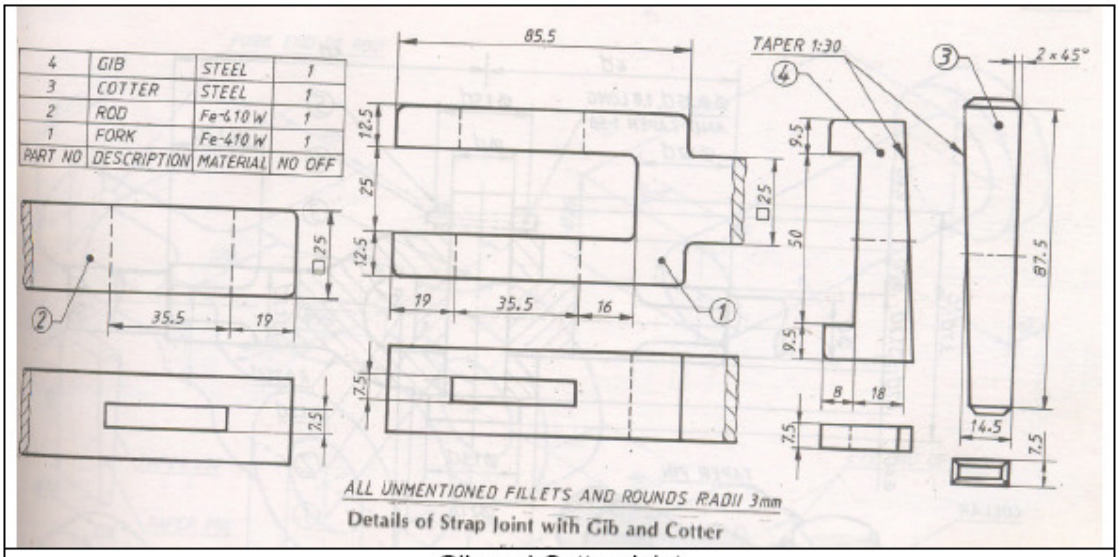
Cast iron Block



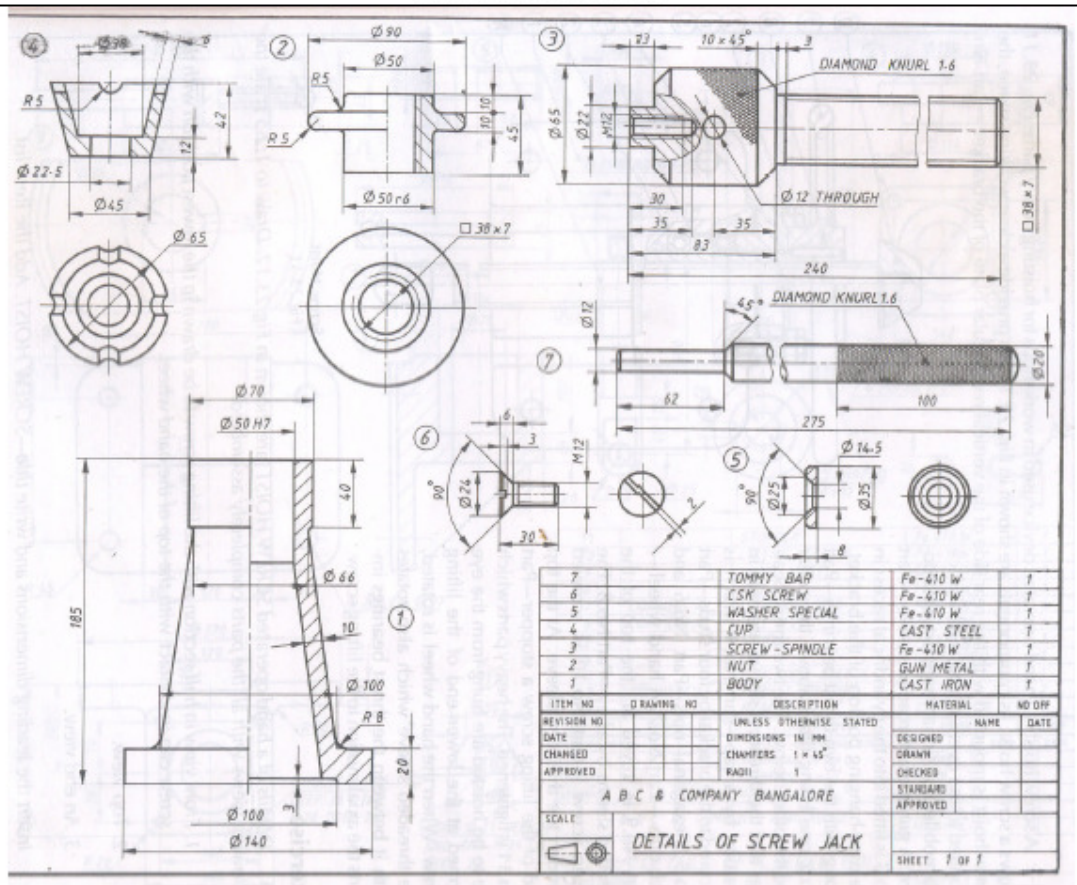
Bearing Block



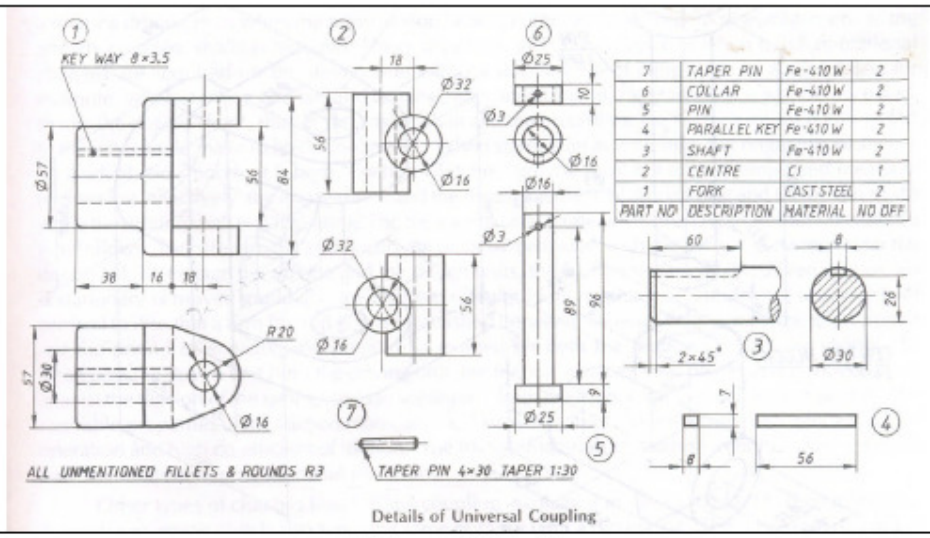
Bushed Bearing



Gib and Cotter Joint



Screw Jack



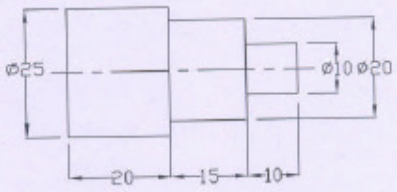
PART NO	DESCRIPTION	MATERIAL	NO OFF
7	TAPER PIN	Fe-410 W	2
6	COLLAR	Fe-410 W	2
5	PIN	Fe-410 W	2
4	PARALLEL KEY	Fe-410 W	2
3	SHAFT	Fe-410 W	2
2	CENTRE	C.I	1
1	FORK	CAST STEEL	2

Details of Universal Coupling

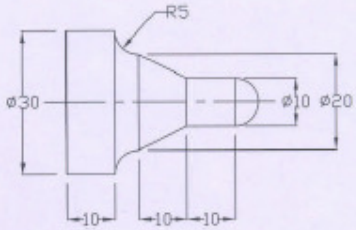
Universal Coupling

CAM Practicals – Lathe

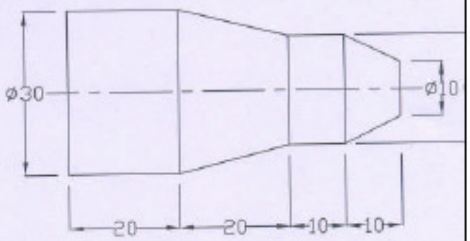
STEP TURNING



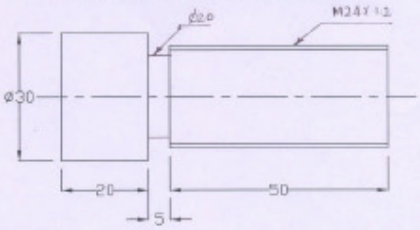
MULTIPLE TURNING CYCLE



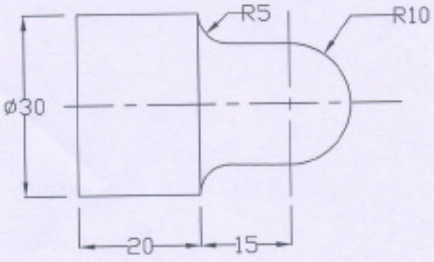
TAPER TURNING



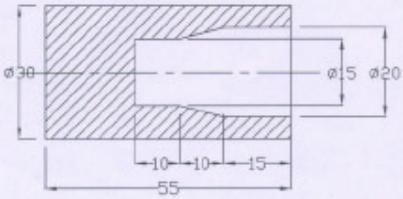
THREADCUTTING &GROOVING



CIRCULAR INTERPOLATION

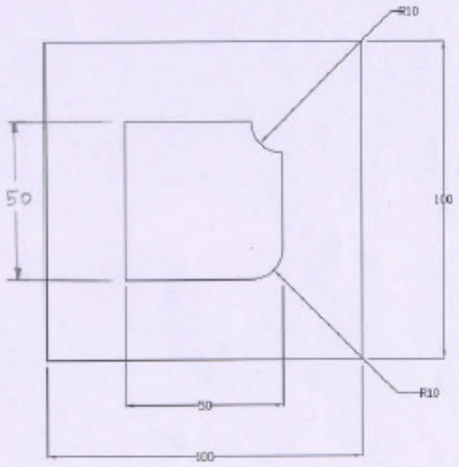


INTERNAL DRILLS&BORES

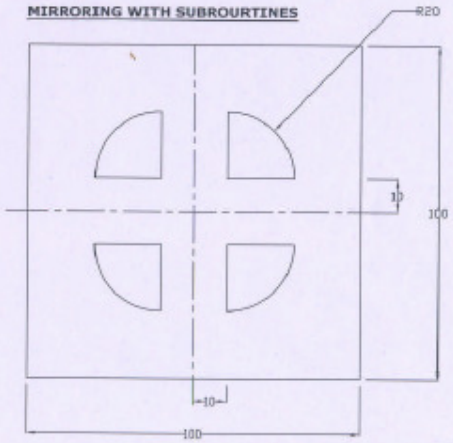


CAM Practical - Milling

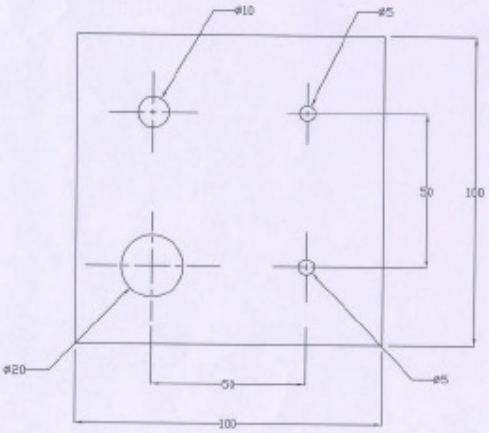
GROOVING



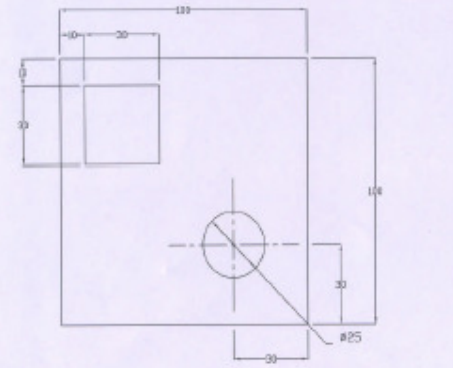
MIRRORING WITH SUBROURTINES



DRILLING



RECTANGULAR POCKETING &CIRCULAR POCKETING-POCKET DEPTH 5mm



SEMESTER : VI

Subject Code : ME 605

Subject Title : Project