CE marking

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Indicates that the product has been assessed before being placed on the market and that it meets the relevant EU safety, health and environmental protection requirement, regardless of where it is manufactured.

HSA

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The Health and Safety Authority

The WEEE Directive

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An EU directive to reduce waste from electrical and electronic equipment.

Red Safety Sign

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Signifies Prohibition



Blue Safety Signs

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Disc Safety Signs

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Signifies a mandatory action

Used for prohibitions and instructions. E.g. Safety helmets must be worn.



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Square Safety Signs

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Used for warnings. E.g. High voltage/Slippery surface

Used for emergency and information E.g. Fire exit routes

Toxic

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Health and Safety

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Poisonous Substances

Regulations and procedures intended to prevent accident or injury in workplaces or public environments.

Data Protection

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The Office of the Data Protection Commissioner

Food

technology

Additives

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Privacy rights of individuals in relation to the processing of their personal information

Responsible for upholding the privacy rights of individuals on relation to the processing of their data.

A branch of food science that deals with the production processes that make foods.

Put in food to improve flavor or smell

Food preservation

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Food preservation methods studyclix.ie The process of treating and handling food to stop or slow down food spoilage, loss of quality, edibility or nutritional value.

Refrigeration, freezing, vacuum packing, tinning and drying

Genetic Modification (GM)

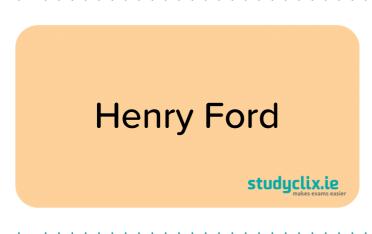
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Hydrogen fuel cells

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Any alteration of genetic material, as in agriculture, to make them capable of producing new substances or performing new functions

Strip electrons from hydrogen molecules creating an electric current. Used in hydrogen cars.



 \mathcal{A}

Create assembly line for mass production of cars

Karl Benz

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Created the internal combustion engine

George Stephenson

studyclix.ie

Satellites

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Created the steam powered train

Objects that orbit the earth. Some monitor weather, others are used for communications or investigating outer space.

Global Positioning System (GPS)

 \mathcal{A}

A satellite-based navigation system.

Radio waves

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Used to send signals from radio and television stations and to carry messages to and from mobile telephones.

CCTV

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Global Warming

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Closed circuit television.

Refers to the increase in average temperature of the Earth's atmosphere and oceans in recent decades.

The Carbon Trust

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Environmental Sustainability

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Social Sustainability

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An organization that helps businesses, governments and the public sector to make the move to a more sustainable, low carbon economy.

Use of renewable sources of energy, prevention of pollution of air, water, land and waste, as natural resources will eventually run out

An understanding of the needs of society including the development of a reasonable standard of living, education, community and equal opportunity.

Provide for profit, cost saving, economic growth with research and development

Economic Sustainability

studyclix.ie

Environmental Protection Agency

Responsible for ensuring that Ireland's environment is protected.

Disposable Products

Recycling

Acid Rain

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Once products are used or broken, they are designed to be able to be thrown out and not to be repaired and reused

The action or process of converting waste into reusable material

Rainfall made so acidic by atmospheric pollution that it causes environmental harm



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Ergonomics

Anthropometrics

Biometrics

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Relationship between people and their environment, efficient design of workspace

An early sample, model,

or release of a product

built to test a concept or

process.

Measurement and size/proportions of human body

The science of identifying humans by body characteristics such as fingerprints, eye retinas and voice patterns.



Å

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The movement of air as it interacts with solid objects such as aircraft wings. The flow of air will be influenced by the shape of these solid objects.

CAD

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WBS Chart

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Main phases of every project

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Computer Aided Design

Work breakdown structure chart. A type of chart that shows the decomposition of the work to be executed.

> Design/Planning. Implementation. Evaluation. Presentation.

Project management

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Gantt chart

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The Critical Path

EST

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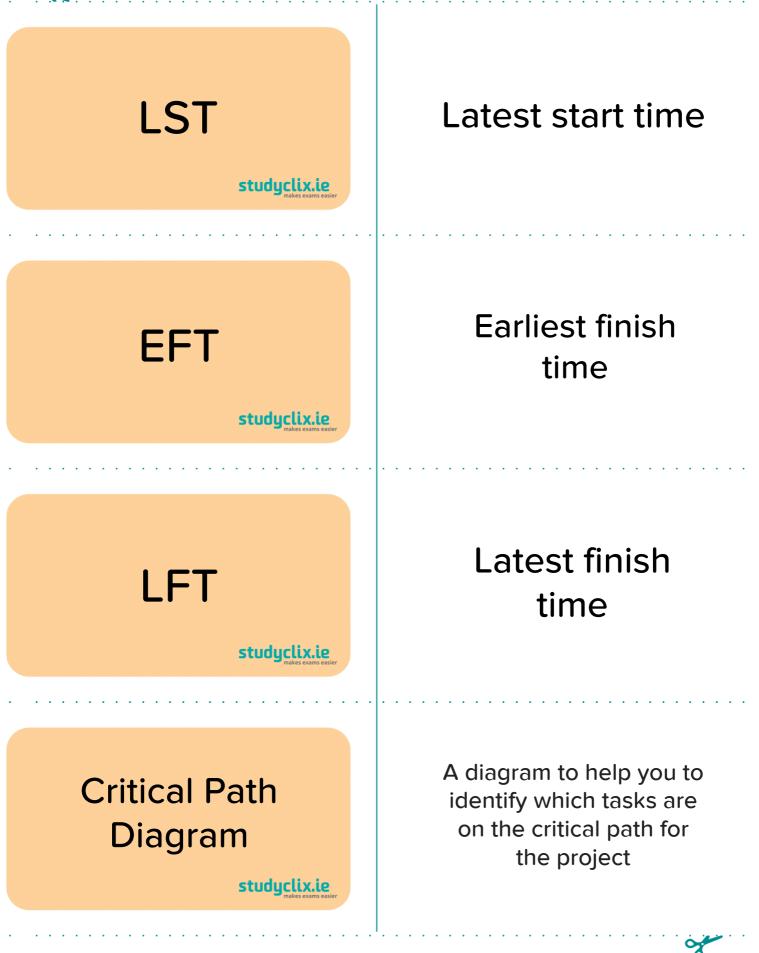
The name given to a number of techniques used in industry to manage complex activities such as road and bridge building.

A scheduling tool used to visually display the status of a project's tasks.

The series of tasks that must each be completed on time for the whole project to be completed on schedule.

> Earliest start time

Å



Quality

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The desired standard in a product, project or process.

Reliability

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It's probability of operating correctly for a given time frame under specified conditions

Durability

Conformance

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Measures the length of a product's life

The ability of performance and physical characteristics to meet established standards

Aesthetics

 \mathcal{A}

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Portable

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Bathtub curve

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Product lifecycle phases

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Allow the user to judge how the product looks, feels, smells or tastes, etc.

Able to be easily carried or moved, especially because being of a lighter and smaller version than usual.

Shows the likelihood of products failing over the course of time.

Introduction.
Growth.
Maturity.
Decline.



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A quality management method for the control and continuous improvement of processes and products. Companies use repeated four-step management method.

Cause and effect diagrams

QC

ŊΔ

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A tool that is used to logically organize the possible causes of a specific problem or effect by displaying them with increasing detail.

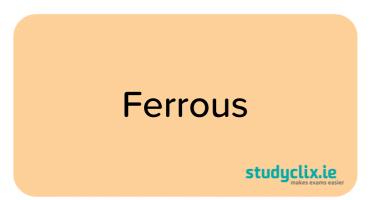
Quality Control

Quality Assurance



Cut dotted horizontal lines. Fold vertical line.

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Metals that contain iron, have good tensile strength and are magnetic.

Non-ferrous

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Alloys

Mild Steel

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Metals that do not contain iron. They are light metals, do not rust and are non-magnetic

A mixture of two or more metals that will form a new metal with enhanced properties, e.g. Brass (alloy of copper and zinc) etc.

Alloy of iron and carbon

Composite Material

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Plastics

Thermoplastic

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Usually made from oil, but can also be made from coal, natural gas, wood or grain.

A combination of two or

more chemically distinct materials which takes

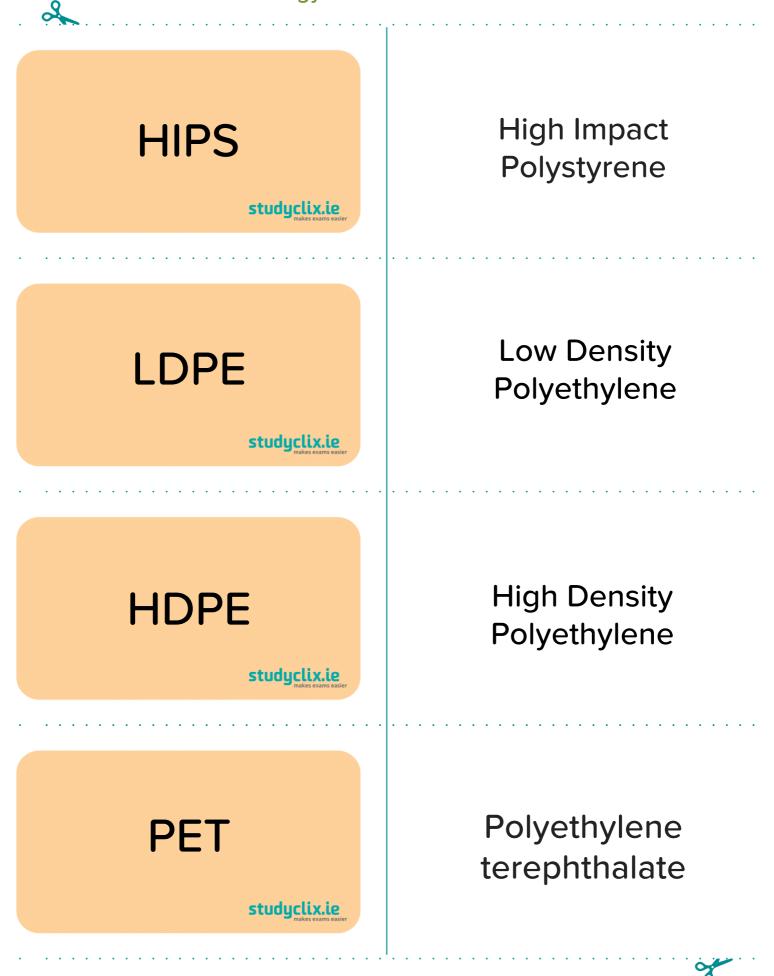
advantage of the favorable properties of each.

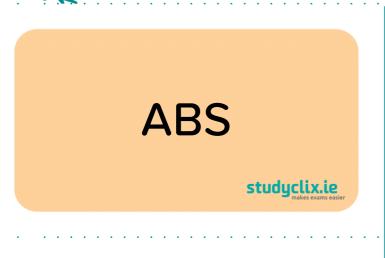
Can be shaped again with heat (strong primary covalent bonds with weak adjacent bonds). Acrylic, PVC, polystyrene, polythene

Can only be set once (strong primary and adjacent bonding, cross linking) Phenolic Resin, Polyester resin, Bakelite.

Thermosetting

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Acrylonitrile Butadiene Styrene

PVC

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Polymers

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Ceramics

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Polyvinylchloride

Consists of a large number of repeating small molecules bonded together in a chain.

Inorganic, non-metallic materials that can be shaped the heated and cooled to make hard, heat resistant objects.

Smart materials

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Thermochromics

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Photochromic

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Self-healing materials

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Those that change in response to changing conditions in their surroundings or in the application of other, directed influence.

Substances which have a reversible change of colour when heated or cooled.

Changes colour in response to light conditions.

Materials that have the ability to repair damage caused by mechanical usage over time.

Thermal Conductivity

Å

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Electrical Conductivity

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Strength

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Elasticity

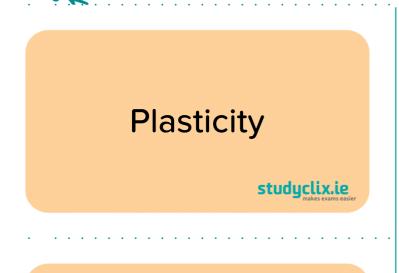
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Ability to conduct heat

Ability to conduct electricity

Ability to withstand a force without being damaged

Measure of which material deforms reversibly under stress



Malleability

Ductility

Hardness

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Measure of ability to be shaped or formed

Ability of material to be stretched out in all directions without breaking

Ability of a material to be drawn out/stretched into wire

Ability of a material to resist wear, scratching and indentation.



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Durability

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Stiffness

Corrosion

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Ability of a material to absorb energy and plastically deform without fracturing

A measure of the length of time for which the material can be used until it is no longer possible/economical to use.

The ability to resist deformation when a force is applied.

The chemical breakdown of a metal due to atmospheric conditions

Elevation

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Orthographic Projection

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Pictorial Projection

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Oblique Projection

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An external view of an object, taken straight on from a particular direction

A way of drawing a 3-dimensional object in two dimensions

Represent an object in picture form and are used to give an idea of the overall appearance of an object

A simple type of technical drawing of graphical projection used for producing two-dimensional images of three-dimensional

LC Technology – Communications and Graphic Media

Isometric Projection

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Exploded view

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Schematic

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Perspective drawing

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A method for visually representing threedimensional objects in two dimensions in technical and engineering drawings.

Shows the components of an object slightly separated by distance as though they had been exploded out

A diagram that represents the elements of a system using graphic symbols rather than realistic pictures.

Very realistic drawings representing an object as it you would see it.

Centre of gravity

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Frame structure

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Shell structure

Arch structures

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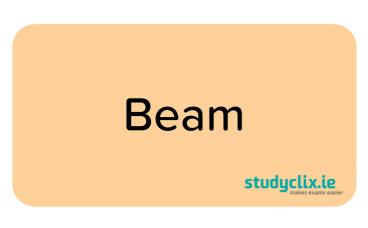
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The point where weight of the object is evenly dispersed and in equilibrium

These structures have a sort of skeleton and can be either open or closed

These structures derive their strength from their shape which often involves the use of curves or ridges

A vertical curved structure that spans an elevated space and may or may not support the weight above it



A long, sturdy piece of squared timber or metal used to support the roof or floor of a building

Cantilevers

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Force

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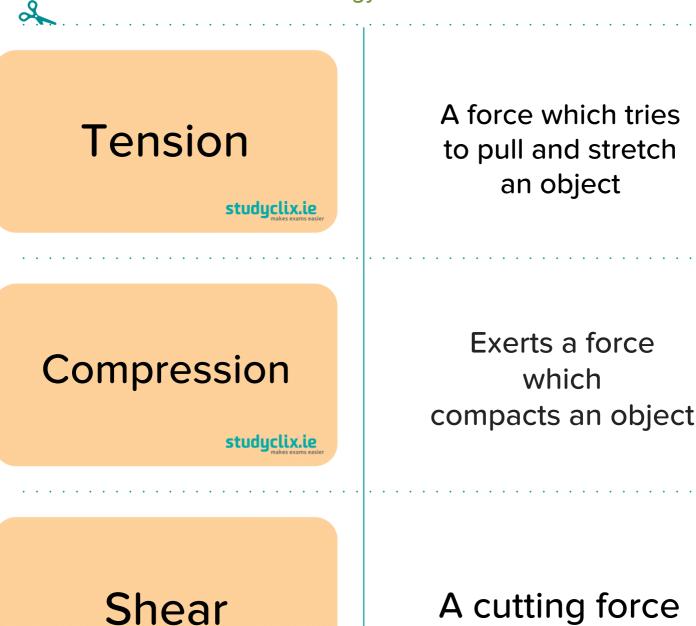
Loads

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Beams that are held and supported at one end only

Something that causes an object to change its shape, speed or direction of movement

A force measured in newtons. Either static or moving.



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Torsion

A force that causes a twisting action

В	er	Id	in	q
				J

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Redundant member

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Ties

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Struts

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A force that occurs when the upper surface of a structure is in compression and the lower surface is in tension

Part of a structure that is neither in tension nor compression

A structural member that is in tension

A structural member that is in compression

Triangulation

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Factor of safety (FoS)

Lever

Equilibrium

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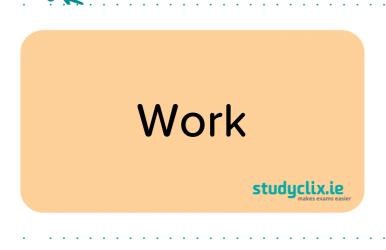
Adds stability, strength and rigidity to structures as weight and force are pushed down from the top to the wider base of the triangle

The ratio of its actual loading capability over its required loading expressed as a percentage

A rigid bar pivoted around a fixed point

A state in which opposing forces or influences are balanced

LC Technology – Mechanisms



Power

FLE

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The amount of mechanical energy transferred by a force to an object

The rate at which work is done. Unit is watts

Mechanical advantage

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The ratio of the two forces, load and effort

A method of remembering the lever classes, 1 2 3

LC Technology – Mechanisms



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rotational system at a distance from the axis of

Torque

Gear train

Cams

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The size of force exerted to cause rotation

The turning effect of

a force applied to a

rotation

An arrangement of several simple gears connected together.

A type of mechanism that can be used to change one kind of motion to another

LC Technology – ICT

Hardware

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The physical components of a computer

Software

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Programs that run inside the computer

Data

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The information that is stored inside the computer or device

Central Processing Unit (CPU)

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The brain of the computer, responsible for running the computer programs

LC Technology – ICT

Peripheral Devices

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Read only memory (ROM)

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Random access memory (RAM)

Repeater

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Any input, output or storage devices of a computer

An IC programmed with data when it was manufactured, it is not modified by the user

The main computer memory, programmers in use are held in this form of memory with contents lost if the computer is switched off

A device that allows existing signals from wireless router to be broadcasted to create or extend networks

Operating System (OS)

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Applications

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Shareware

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Freeware

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Interface between hardware and user, responsible for the management and coordination of activities and the sharing of the resources of the computer

Software designed to perform a variety of functions

Copyrighted software that is available free of charge on a trial basis

Completely free software, usually made available over the internet

Trial Software

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Word processor software

Database

Spreadsheet

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Contains all functionality of full version but can only be used for a limited time period, try before you buy

Software designed for writing documents and written pieces.

A computerized filing system with the capacity to store and organize large volumes of information.

Software to sort information in tables, graphs, charts and mathematical forms

Firewall

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Open Source

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Programmes or devices that acts as a barrier to keep destructive elements out of a network or specific computer. They are configured with specific criteria to block unauthorized access to a network

Refers to a program in which the source code is available to the general public for use and/or modification from its original design free of charge.

Wi-Fi

Cookies

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A local area wireless technology that allows an electronic device to exchange data or connect to the internet without a direct physical connection

Pieces of data stored on a user's computer by their web browser, they can be used for storing site preferences, authentication, tracking computer activity

Cache

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Phishing

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Socially Engineered Malware_{studyclix.ie}

Smart Cards

A block of RAM used for the temporary storage of data that is likely to be used again, it will determine how fast data can be accessed.

Attempting to gain sensitive information such as usernames, passwords and credit card details by targeting content relevant to the user.

An attack that tricks users into downloading and installing malicious software that compromises the security of their system

Cards with embedded integrated circuits

Local Area Network (LAN)

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Wireless Local Area Network (WLAN)

Switches

Router

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Group of computers networked together, uses electric signals to transmit data, has wired connections.

A group of computers networked together without a cable), uses high energy radio frequency waves to transmit data, can be subject to interference.

A computer networking device that connects devices together on a computer network by using packet switching to receive, process and forward data to the destination device

A networking device that forwards data packets and determines the best path for information to travel between computer networks.

Network Node

 \mathcal{A}

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Motherboard

System Bus

Expansion Bus

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transmissions.

This is a connection point, either a redistribution

point or an end point for data

The main PCB on a computer

Part of the motherboard and connects the processor to main memory. Also called the front side bus

Allows the processor to communicate with peripherals

Screen Resolution

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WiFi Hotspot

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Bitmap Images

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Vector Images

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Tells you how many pixels your screen can display horizontally and vertically

A location where internet access is available wirelessly.

Made of pixels in a grid, tiny dots of individual colour, resolution dependent e.g. photographs.

A series of geometric objects such as lines and curves. Each object has properties such as colour, width, size, etc. High quality, sharp images are developed



a

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Ensuring the safety and privacy of personal data. This is provided for in Irish law

Internet service

provider

ISP

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Bluetooth

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Amplification

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Short range radio technology that allows communication

Increasing the strength of the signal. Opposite to attenuation

LC Technology – Energy

Carbon neutral

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Fossil fuels

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Nuclear Energy

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Non-renewable energy

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The aim of balancing carbon emitted into the atmosphere with actions that reduce or offset these culminating with net zero carbon emissions

A natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.

The energy released during nuclear fission or fusion, especially when used to generate electricity.

Energy sources that will eventually run out

LC Technology – Energy

Renewable energy

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Biomass Energy

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A type of energy that can be replenished.

Refers to biological materials that are living or have recently been alive that are used as an energy source e.g. wood

Potential Energy

Electrical

energy

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The capacity to do work

Refers to the movement of electrons through an electrical conductor

LC Technology – Energy

Solar Energy

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Hybrid Cars

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Energy Efficiency

Kinetic Energy

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Energy from sunlight

A vehicle that uses two or more distinct power sources to move the vehicle

To reduce the amount of energy required to provide products and services.

Energy due to the motion of an object

Voltage

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Astable Circuit

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An electromotive force or potential difference expressed in volts

A circuit with no stable states. The states change continuously

Polarity

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Current

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Electric current flowing from + to – (positive to negative). Device that only works when connected a particular way in a circuit.

A flow of electricity which results from the ordered directional movement of electrically charged particles.

Resistance

Å

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Resistors

Frequency

Semiconductor

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Devices providing different levels of resistance to electric current

The measure of the difficulty

with which electrons move through a material or electronic component.

How often an AC cycle repeats

Materials that have the resistance levels between those of a conductor and an insulator

Polarised

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Diodes

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Transistors

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Solenoid

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The component must be connected the right way round with + leg connected to + power supply.

Semiconductor devices that allow current to flow in one direction only

Sensitive electronic switches, the main process components used in most electronic devices

An electrical device that converts electric current to movement in a straight line



Product Recycling Fund (PRF)

A mechanical switch that is electrically activated

The charge applied to offset the cost of recycling electrical goods. It is applied to the purchase price and varies according to the type of electrical item

Analogue Signal

Digital Signal

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Continuously variable signal/system

A signal/system with discrete value, one of a number of distinct possible values, usually 1 and 0.

Open-loop system

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Closed-loop system

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Those systems with no feedback to determine if the input has achieved its desired goal, selfmonitoring

Those systems that use feedback given from sensors to controller to ensure correct/accurate operation of machine.

Peripheral Interface Controller

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Flowcharts

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A type of microcontroller that can be programmed to respond to one or more inputs and control one or more outputs

Used to design and describe programs by visually representing what a program is supposed to do.

Programmable Logic Controller (PLC)

An industrial grade computer that carries out similar functions to a PIC

Pneumatics

Air

compressors

Single acting

actuator

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The use of mechanical energy stored in compressed air as a source of energy to do work

Used to generate the compressed air for pneumatic systems

A pneumatic output device that delivers mechanical power in one direction only

Unidirectional flow valve

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3/2 Valve

Shuttle Valve

Robotics

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A control valve that restricts the flow of air to one direction only at a given time

A valve which acts as a simple switch controlling the air flow in a pneumatic circuit

A valve with two inputs and one output.

The branch of technology that deals with the design, construction, operation, and application of robots

LC Technology – Option: Applied Control Systems



Manipulators

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Degrees of freedom

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Work Envelope

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The 'muscles' of a robot, convert potential energy to kinetic.

Act as a robot's arms allowing robots to carry out particular tasks

The number of axes along or around which an object can move

The volume of space in which a robot can work

Cartesian Arm

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Scara Robot

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End Effectors

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Encoder

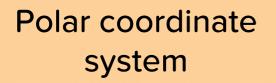
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A robot with 3 axes linear movement (XYZ), axes movement at 90 degrees to each other, used as a pick and place robot

A robot consisting of two rotary joints with a horizontal axis and a linear joint with a vertical axis

The equivalent to a robot's hand, allows the robot to hold, lift, move or turn objects.

Give movement feedback to robots. This will determine speed, distance and position for robotic control



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Cylindrical coordinate system

Servo motors

Stepper motors

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Radius, angle and longitude/ latitude required to specify points in space

Radius, height and angle required to specify points in space

Widely used for powering robot arms as they offer accurate positioning and smooth control of speed.

A type of open-loop DC motor, controlled through the use of electromagnets.



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Inductor

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Transformer

PSU

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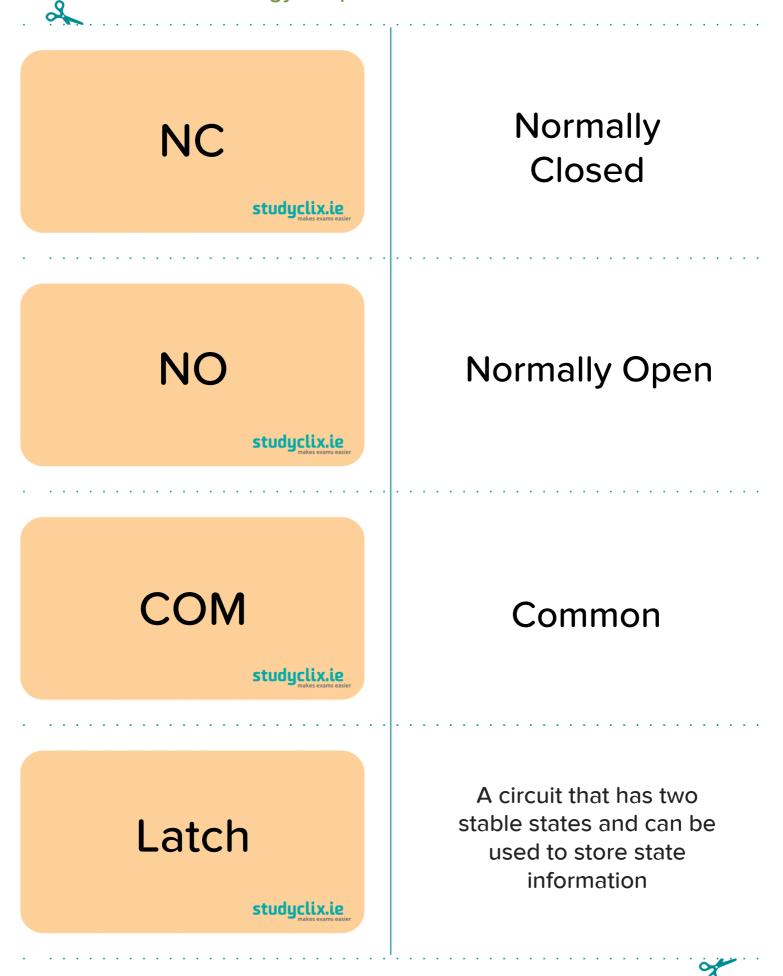
Electronic equipment that provides visual images of varying electrical quantities

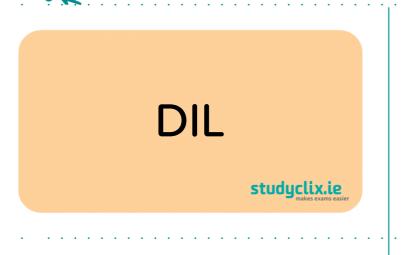
Consists of a coil of wire. Used to block any unwanted AC signal circulating in a DC circuit

Made from 2 or more inductors. They are used to convert one AC voltage to a different AC voltage

Power supply unit

LC Technology – Option: Electronics and Control





Dual in line

Uninterruptible Power Supplies (UPS)

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Large boxes that can continue to provide mains or DC voltage outputs even when the mains supply is cut off

Photodiode

Amplifiers

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A diode that functions as a light sensor

A device that magnifies a signal.

Breadboard

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The Current Rule

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A panel that does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design

The inputs of an op-amp draw no current

The Gain Rule

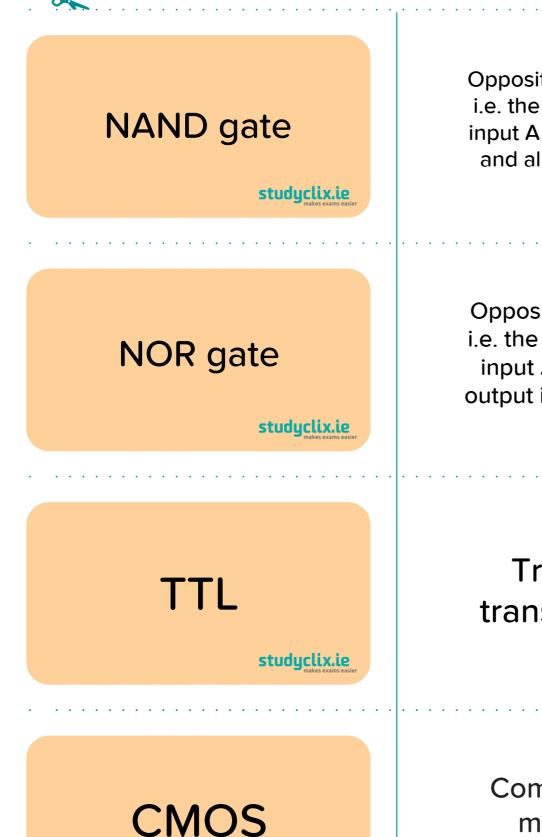
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The Voltage Rule

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There is infinite gain between the output signal and the difference between the two input signals

When an op-amp is used in a negative feedback circuit the output of an op-am attempts to do whatever is necessary to make the voltage difference between its two inputs equal zero



Opposite of an AND gate i.e. the output is 0 when input A and input B are 1, and all other cases the output is 1

Opposite of an OR gate i.e. the output is 0 when input A or input B is 1, output is 1 when A and B are 0

Transistortransistor logic

Complementary metal oxide semiconductor

Cut dotted horizontal lines. Fold vertical line.

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Qualitative accelerated life testing

Quantitative accelerated life testing studyclix.ie

The process of testing a product by subjecting it to conditions (stress, strain, temperatures, voltage, vibration rate, pressure etc.) in excess of its normal service parameters in an effort to uncover faults and potential modes of failure in a short amount of time.

Consists of tests designed to quantify the life characteristics of the product, component or system under normal use conditions, and thereby provide reliability information.

Uses the most effective product in the market as a basis for developing new Improvements.

Competitors' products are dismantled and inspected with the best features incorporated into a new design

Benchmarking

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Reverse engineering

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LC Technology – Option: Manufacturing Systems

International Organization for Standardization (ISO)

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Batch Production

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Mass Production

Once-off

Production

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An international standardsetting body composed of representatives from various national standards organizations

Products produced over a particular period of time i.e. toys for Christmas.

Products produced in large volumes, demand is high and stable, used for household electrical items etc.

Producing a prototype for a new product

Just in Time Manufacturing (JIT)

Design for Environment (DfE)

Inventory strategy that reduces inprocess inventory and associated costs. Process relies on signals between different points in process, which tell production when to make next part.

A set of guiding principles in environmentally responsible design and manufacturing

Break Even Quantity (BEQ)

Kanban System

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This quantity determines which manufacturing system is best to use in the production of a product, depending on the number (quantity) of the product which is required.

A signalling system used in JIT manufacturing to manage the stock and material levels at each station in the factory

Pareto Principle

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Business Strategy

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This is the 80/20 rule where roughly 80% of the effects come from 20% of the causes e.g. 80% of computer crashes are contributed to 20% of software bugs

Provides direction and focus for the company through defining of the primary task, assess core competencies, determine order qualifiers and order

Manufacturing Strategy

Facility Layout

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Decides how to offer a product and determines production

Refers to the arrangement of machines, departments, workstations, storage areas, aisles and common areas within a factory



LCL

Upper Control Limit

Lower Control Limit

Quality Control

Quality

Assurance

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This ensures products and services meet consumer expectations, it is product oriented and focuses on defect identification

This is the process or set of processes used to measure and assure the quality of a product and focuses on defect prevention

Sequential design

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Concurrent Design

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Different areas of the design team work independently, e.g. wall between functional areas, modifications made by the production and marketing teams

Walls broken down, design team picked from all parts of spectrum, representatives from engineering, marketing, water, land and waste, as natural resources will eventually run out

Feasibility Study

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Quality Function Deployment An analysis of the ability to complete a project successfully, taking into account legal, economic, technological, scheduling and other factors

A process that identifies, priorities and ranks customer requirements in such a way that the most important and achievable features are made available in the next release of a product

Prefabrication

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Resistance to impact

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Embodied Energy

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Reinforced concrete

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Components which are made in a factory and assembled on site

Ability of a material to cope with shock load. Indicator of material toughness

The sum of all the energy required to produce any goods or services, considered as if that energy was incorporated in the product itself

Concrete on its own is weak in tension, so steel bars are cast in the wet concrete, the combined material when set has high tensile and compressive strength

Draft Angle

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Glulam

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Veneers

Plywood

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The amount of taper for molded parts perpendicular to the parting line

Consists of a number of layers of timber bonded with durable, moisture resistant adhesive

A thin layer of hardwood or softwood applied to manufactured wood for aesthetics

Composed of thin layers of wood stuck together



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Corrosion

Creep

Fatigue

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The sudden failure due to high compression

Destruction of metal due to chemical reaction

Material deforms under stress, usually with heat

Cracking of metals