

AS level Resistant Materials PLC

Topic	Yes I'm Happy	No, I need more information
<p>I understand the aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following metals when manufacturing products:</p> <p>Ferrous</p> <ul style="list-style-type: none"> • mild steel • carbon steel • cast iron <p>Non-ferrous</p> <ul style="list-style-type: none"> • aluminium • copper • zinc <p>Alloys</p> <ul style="list-style-type: none"> • stainless steel • duralumin • brass. 		
<p>I understand the aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following polymers when manufacturing products:</p> <p>Thermoplastics</p> <ul style="list-style-type: none"> • acrylic • polyethylene • high density polyethylene (HDPE) • low density polyethylene (LDPE) • polyethylene terephthalate (PET) • polyvinyl chloride (PVC) • polypropylene (PP) • polystyrene (PS) • ABS (Acrylonitrile butadiene styrene) <p>Thermosetting plastics</p> <ul style="list-style-type: none"> • epoxy resins • urea formaldehyde • polyester resin. 		
<p>I understand the aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following woods when manufacturing products:</p> <p>Hardwoods</p> <ul style="list-style-type: none"> • oak • mahogany • beech <p>Softwood</p> <ul style="list-style-type: none"> • pine. 		
<p>I understand the aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following composites when manufacturing products:</p> <ul style="list-style-type: none"> • carbon fibre • glass reinforced plastics (GRP) • medium density fibreboard (MDF) • chipboard. 		
<p>I understand the aesthetic, functional and mechanical properties, application and advantages/disadvantages of the following laminates when manufacturing products:</p> <ul style="list-style-type: none"> • plywood • block-board. 		

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<p>I understand the application and advantages/disadvantages of the following modern materials and products when manufacturing products:</p> <ul style="list-style-type: none"> • thermo-ceramics • tinted glass • solar panels • liquid crystal displays (LCDs) • electroluminescent (EL) lighting. 		
<p>I understand the application and advantages/disadvantages of the following smart materials and products when manufacturing products:</p> <ul style="list-style-type: none"> • shape memory alloys (SMA) • reactive glass • photochromic paint • quantum tunnelling composites. 		
<p>I understand the characteristics, application and advantages/disadvantages of the following components used in products:</p> <ul style="list-style-type: none"> • nuts, bolts, spacers and washers (metric size and thread form) • screws <p>Rivets</p> <ul style="list-style-type: none"> • pop • snap • gears <p>Simple and compound gear trains</p> <ul style="list-style-type: none"> • rack and pinion • worm and wheel • bevel and mitre gears • spur gears <p>Bearings</p> <ul style="list-style-type: none"> • plain bearings • journal bearings • ball bearing • bushes <p>Cams</p> <ul style="list-style-type: none"> • pear shaped • circular or eccentric • heart shaped • snail <p>Followers</p> <ul style="list-style-type: none"> • flat-foot • knife-edge • roller. 		
<p>I understand the characteristics, application and advantages/disadvantages of the following scales of production in the manufacture of products:</p> <ul style="list-style-type: none"> • one-off • batch • mass • continuous. 		

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<p>I understand the characteristics, preparation, processes, application and advantages/disadvantages of the following methods when manipulating materials and components:</p> <ul style="list-style-type: none"> • sand casting • die casting • milling/routing • drilling • turning • blow moulding • injection moulding • vacuum forming • extrusion • rotational moulding. 		
<p>I understand the preparation, application and advantages/disadvantages of the following when manufacturing products and components:</p> <ul style="list-style-type: none"> • jigs • patterns • Formers • moulds. 		
<p>I understand the characteristics, preparation, processes, application and advantages/disadvantages of using the following permanent and semipermanent methods when joining materials and components:</p> <p>Mechanical</p> <ul style="list-style-type: none"> • nuts, bolts and washer • rivets <p>Heat</p> <ul style="list-style-type: none"> • oxy-acetylene welding • MIG welding • brazing • hard soldering <p>Chemical</p> <ul style="list-style-type: none"> • Tensol cement • polystyrene cement • adhesives • polyvinyl acetate (PVA) • epoxy resin • contact adhesive • hot melt glue. 		
<p>I understand the characteristics, preparation, processes, application and advantages/disadvantages of the following methods when manipulating materials:</p> <ul style="list-style-type: none"> • cutting • abrading. 		
<p>I understand the characteristics, preparation, processes, application and advantages/disadvantages of the following heat treatment methods when altering the appropriate material and component to enhance their properties:</p> <ul style="list-style-type: none"> • annealing • hardening and tempering • normalising 		

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<ul style="list-style-type: none"> • work hardening. 		
<p>I understand the Preparation, processes and advantages/disadvantages of the following conversion and seasoning methods:</p> <p>Conversion</p> <ul style="list-style-type: none"> • through and through (slab) sawn • quarter sawn <p>Seasoning</p> <ul style="list-style-type: none"> • natural • kiln-drying. 		
<p>I understand the characteristics of the following faults in woods and why such faults occur:</p> <ul style="list-style-type: none"> • cupping • twisting • splitting • knots. 		
<p>I understand the processes, application and advantages/disadvantages of the following CAD systems when designing products:</p> <ul style="list-style-type: none"> • 2D design to create and modify designs • 3D modelling for creating 'virtual' products. 		
<p>I understand the processes, application and advantages/disadvantages of the following 3D modelling and prototyping techniques to aid the development of manufacturing products:</p> <ul style="list-style-type: none"> • block modelling • rapid prototyping using CAD/CAM. 		
<p>I understand the processes, application, production and advantages/disadvantages of the following CNC (Computer Numerically Controlled) systems when manufacturing products:</p> <ul style="list-style-type: none"> • lathes • routers • milling machines • laser cutters. 		
<p>I understand the concept, characteristics, application and advantages of the following when designing and manufacturing commercial products:</p> <ul style="list-style-type: none"> • Quality assurance (QA) systems for monitoring the quality of a product from its design and development stage, through its manufacture, to its end-use performance and degree of customer satisfaction • Quality control (QC) as part of the achievement of QA concerning the monitoring and achieving of high standards and degree of tolerance by inspection and testing, including computer aided inspection • Total quality management (TQM) when applying quality assurance procedures at every stage of the production process (ISO 9000 series). 		
<p>I understand the process of testing products, components and materials against external quality standards set by the following organisations:</p>		

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<ul style="list-style-type: none"> • British (BSI and relevant kitemarks) • European (CEN and CE) • International (ISO). 		
<p>I understand the principles and application of the Health and Safety at Work Act (1974) when designing and manufacturing commercial products:</p> <ul style="list-style-type: none"> • Procedures to safeguard the risk of injury to people: • personal and protective equipment (PPE) • signage • warning symbols 		
<p>Carrying out risk assessments in accordance with the Health and Safety Executive (HSE) for the design of products using computers and manufacture of products using computers or workshop practices:</p> <ul style="list-style-type: none"> • identify potential hazards • identify people at risk • evaluate the risks • decide upon control measures • record assessment 		
<p>Control of Substances Hazardous to Health (COSHH) regulations:</p> <ul style="list-style-type: none"> • risk assessment to control the storage and use of solvent-based • substances containing volatile organic compounds (VOCs). 		