

Task 1 – Design

You must:

- a) produce a detailed design specification that builds on the design criteria for the lifting device, including any references to research used
- b) sketch and annotate up to three potential designs for the mechanical lifting device
- c) select one appropriate design for development with justifications
- d) select and justify the use of the materials and components needed for the proposed design
- e) carry out calculations to support the proposed design:
 - the loading applied to any components of the design that are subject to stress
 - the mechanical advantage afforded by the design
- f) create engineering drawings of the proposed design using CAD software
- g) produce a virtual model of the proposed design using CAD software
- h) create a bill of materials (BoM) listing all of the parts required in your final design proposal.

Conditions of assessment:

- the time allocated for this task is **14 hours**
- you must carry out the task on your own, under **controlled conditions**.

Controlled conditions:

- you must only work on the tasks in the allocated times
- assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed
- you must not share or discuss your work with other candidates
- you are not permitted to bring any materials into the assessment session.

What must be produced for marking:

- design specification
- up to three annotated sketches
- justification of the choice of one design for further development
- justification of the selection of the materials and components
- design calculations, including all workings
- engineering drawings of the design proposal
- outcomes of the virtual modelling of the proposed design, either as screen captures or printouts
- bill of materials

Additional evidence

- any notes produced of research undertaken including citation of sources and internet search history must be submitted to ensure the authenticity of evidence produced.

Resources:

- access to the internet
- appropriate CAD software
- manufacturer's datasheets (for materials and components)
- scientific calculator for design calculations.

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