

ACMA5002 Coursework Feedback

Student: Joseph Davies

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Selected topic/product/project: Mobile Phone Design and Development

Final mark: 71/100

1. Engagement with Literature Skills — 10/15

The report draws on a broad range of sources covering DFM, DFA, injection moulding, common defects, QFD, FMEA, DOE, FEA, material selection and cost analysis. Literature is used throughout the report to explain the manufacturing process, support material decisions and justify defect-mitigation strategies. Figures and technical information are generally referenced, and the report includes a complete reference list. The research base is relevant to the task and demonstrates clear independent reading. However, the work relies substantially on general technical websites and commercial sources, with less use of current peer-reviewed engineering literature and recognised standards. Greater critical comparison between sources and stronger evidence for technical assumptions, process settings and material performance would support a higher mark.

2. Knowledge and Understanding Skills — 22/30

The submission demonstrates very good understanding of DFM, DFA, injection moulding, manufacturing defects, material behaviour and high-volume production. The literature review clearly explains the manufacturing process, machine functions, defect mechanisms and design principles. The Granta study compares TPU, fibre-reinforced polycarbonate and silicone using strength, hardness, density, elongation and cost before selecting polycarbonate through a reasoned discussion. Functional, design, manufacturing and sustainability requirements are also clearly defined. The report recognises important trade-offs involving impact resistance, stiffness, flexibility, surface quality and cost. The main limitations are that some material conclusions are not fully precise, particularly the distinction between reinforced and standard polycarbonate, and the required step-by-step manufacturing process plan from material preparation to inspection is not clearly provided.

3. Cognitive and Intellectual Skills — 20/30

The report applies QFD in a structured manner using customer requirements, engineering characteristics, a relationship matrix, weighted scores and a roof matrix. The FMEA identifies ten relevant failure modes and proposes sensible actions linked to material choice, surface treatment, tolerances, geometry and impact performance. The proposed DOE includes material type, wall thickness and ribbing as variables, with appropriate response measures identified. Injection-moulding and FEA results are interpreted rather than only displayed, and the costing section includes cycle time, batch production, labour, equipment, tooling, unit cost and break-even calculations. However, the DOE remains largely planned rather than completed, with no comparative results across the identified factor combinations. The final design is also described as suitable for mass production despite only 75.725% cavity fill, and several costing calculations contain inconsistencies, particularly the change in batch quantity and the use of variable cost in the break-even analysis.

4. Practical Application Skills — 11/15

The submission demonstrates good use of Fusion 360 for CAD, injection-moulding simulation and FEA, together with Granta for material selection and numerical tools for cost modelling. The CAD model includes the main functional features required for the phone case, and a technical drawing is provided. The plastics analysis evaluates fill performance, sink marks, weld lines and warpage, while the FEA presents a minimum safety factor of 5.084 and approximately 0.83 mm displacement under a 25 N load. The simulation findings are discussed and used to recommend changes to wall thickness, gate arrangement, cooling and geometry.

However, the proposed improvements were not implemented and re-simulated, so the work shows diagnosis more strongly than completed optimisation. The drawing would also benefit from fuller dimensions and tolerances, while simulation assumptions, mesh settings, material data, loads and constraints require clearer documentation.

5. Transferable Skills for Life and Professional Practice — 8/10

The report is substantial, logically organised and presented in a recognisable professional engineering format. It contains an abstract, contents page, lists of figures and tables, numbered sections, technical diagrams, equations, recommendations and a conclusion. The progression from design principles and customer requirements through material selection, simulation, costing and sustainability is clear. The report communicates the principal findings effectively and identifies limitations in the design, including camera and button protection, incomplete filling and potential moulding defects. Some grammatical errors, repeated phrases, numbering inconsistencies and small or difficult-to-read figures reduce the overall polish. More careful proofreading, more consistent figure numbering and stronger alignment between the evidence and final claims would improve the professional standard.

Mark summary

Assessment category	Maximum mark	Mark awarded
Engagement with Literature Skills	15	10
Knowledge and Understanding Skills	30	22
Cognitive and Intellectual Skills	30	20
Practical Application Skills	15	11
Transferable Skills for Life and Professional Practice	10	8
Total	100	71