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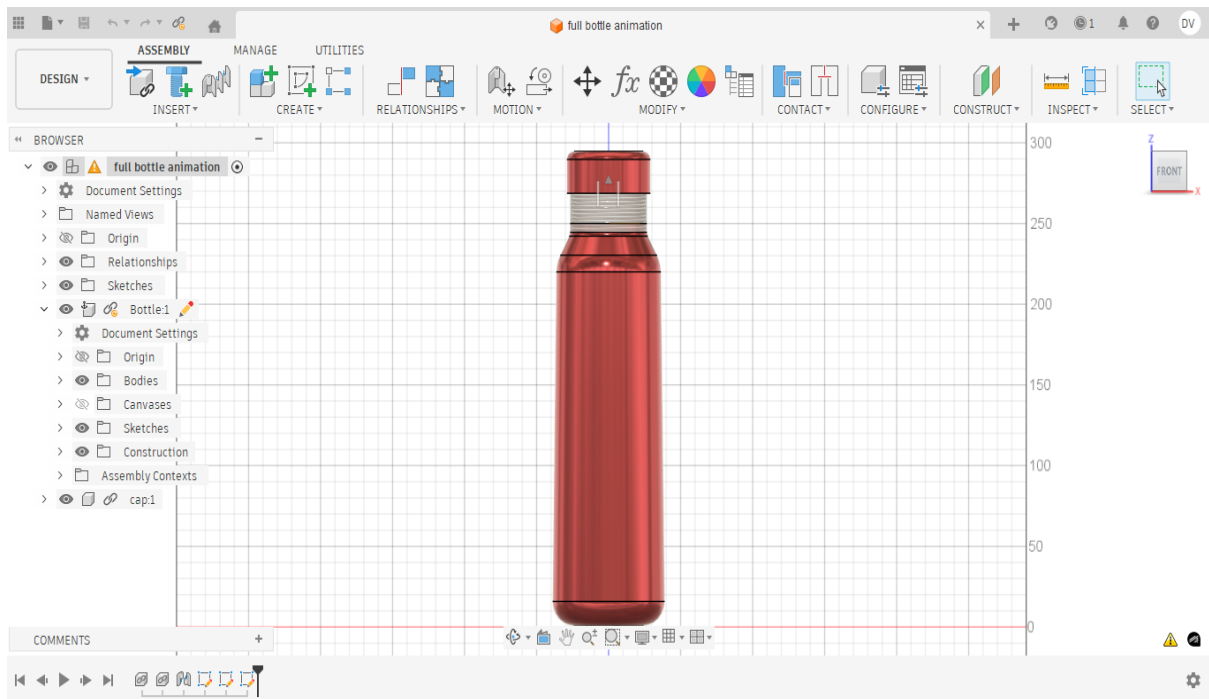
ROLL NO; 23BTT304

DEPARTMENT; TEXTILE TECHNOLOGY

DESIGN AND MODELING OF 1-LITER WATER BOTTLE USING AUTODESK FUSION 360

1. Introduction

This assignment focuses on the design and 3D modelling of a 1-liter water bottle using **Autodesk Fusion 360**, a professional CAD/CAM software widely used in engineering design and product development. The objective of this project was to create a parametric 3D model of a water bottle and its cap, assemble the components, and apply appropriate dimensions and constraints.

2. Objective

- To design a 1-liter water bottle using parametric modelling.
- To model bottle body and cap as separate components.
- To create threads and proper fitting between bottle neck and cap.
- To perform assembly using joints and constraints.
- To generate realistic rendering and visualization

3. Software Used

Software Name: Autodesk Fusion 360
Type: CAD/CAM/CAE Software
Application: 3D Modelling, Assembly, Rendering, and Simulation

Fusion 360 integrates solid modelling, surface modelling, assembly tools, and motion study features in a single platform.

4. Design Methodology

4.1 Sketch Creation

- A 2D profile of the bottle was created on the front plane.
- Dimensions were applied to define height and diameter.
- The profile was fully constrained using geometric constraints.

4.2 Revolve Feature

- The 2D profile was revolved 360° around the central axis.
- This created the hollow cylindrical bottle body.

4.3 Shell Operation

- The shell feature was applied to create wall thickness.
- Wall thickness was defined based on standard plastic bottle design.
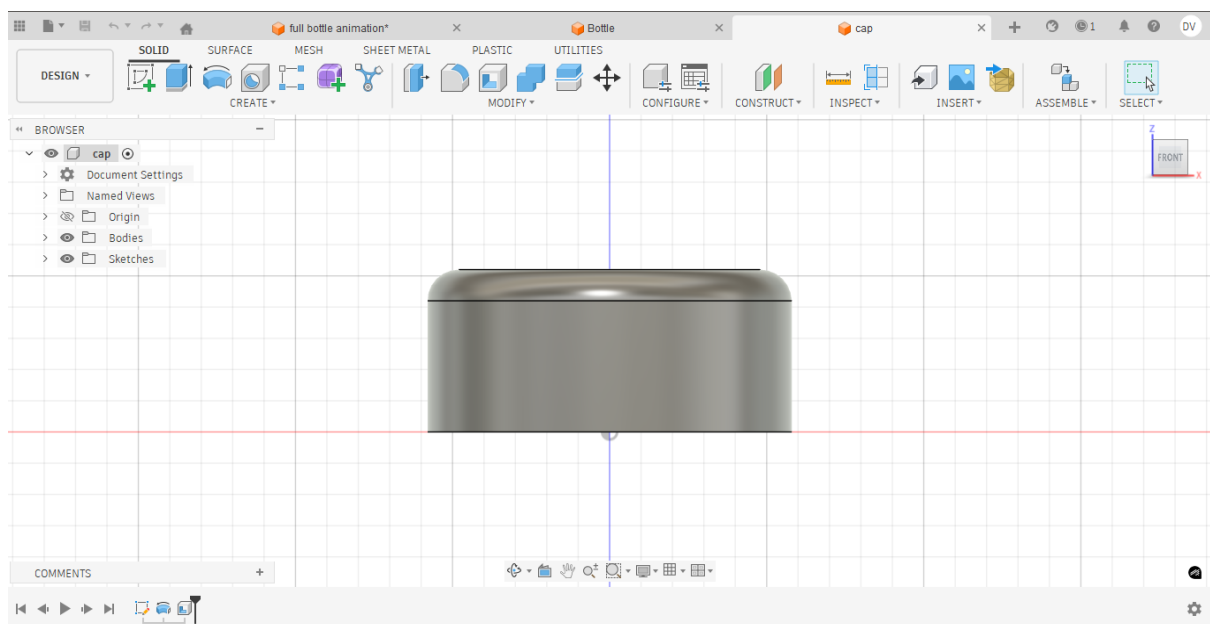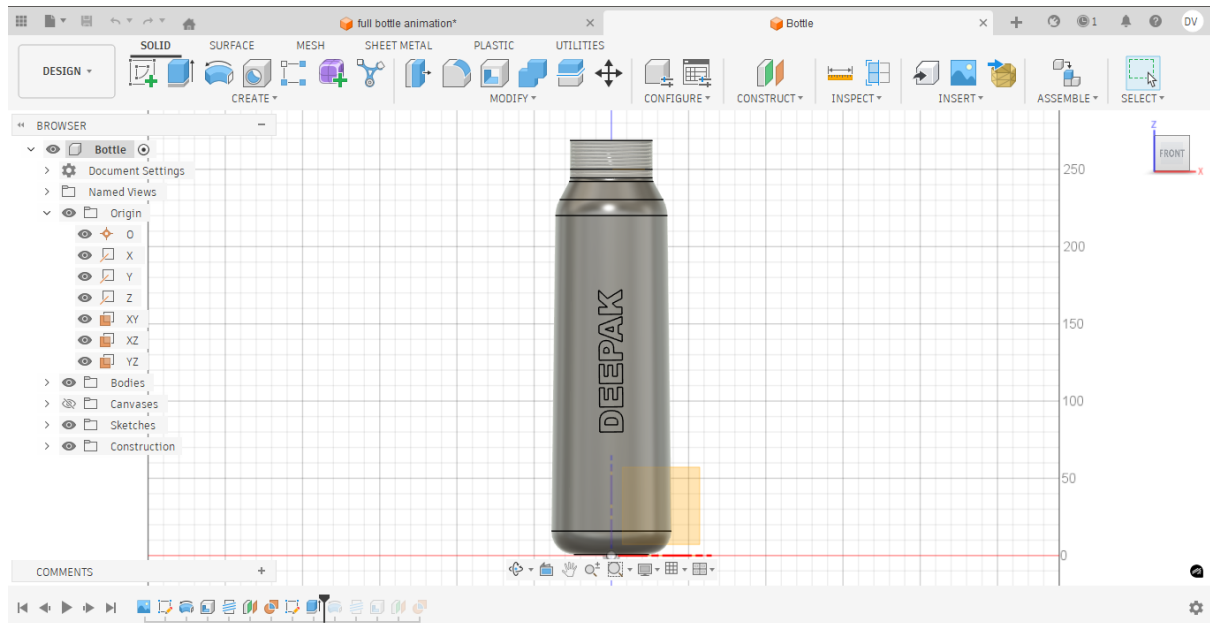
4.4 Neck and Thread Design

- The bottle neck was modeled separately.
- Threads were created to allow proper cap fitting.
- Thread standards were applied using Fusion 360 thread tool.

4.5 Cap Design

- The cap was designed as a separate component.
- Internal threads were created to match the bottle neck.
- Fillets were applied for smooth edges.

4.6 Assembly

- Both bottle and cap were assembled using joint constraints.
- Motion relationship was applied to simulate opening and closing.
- Proper alignment was ensured along the central axis

5. Technical Specifications

- Bottle Capacity: 1 Litre
- Total Height: ~250–300 mm
- Outer Diameter: ~70–80 mm
- Wall Thickness: 2–3 mm
- Material (Assumed): PET Plastic
- Cap Type: Screw Cap with Thread

6. Features Used in Fusion 360

- Sketch
- Revolve
- Extrude
- Shell
- Thread
- Fillet
- Assembly Joints
- Appearance Rendering

7. Results

The final model successfully represents a realistic 1-liter water bottle with a functional screw cap. The design demonstrates:

- Parametric modelling
- Proper dimensional control
- Thread alignment and assembly fit
- Clean surface finishing
- Realistic visualization

8. Conclusion

The project enhanced my understanding of solid modelling, parametric design, and assembly techniques using Autodesk Fusion 360. It provided practical experience in designing consumer products with real-world dimensional and manufacturing considerations.

This assignment improved my skills in:

- CAD modelling
- Component assembly
- Design for manufacturability
- Engineering visualization