



**DEPARTMENT OF MECHANICAL ENGINEERING**  
**BMS COLLEGE OF ENGINEERING**  
**(AUTONOMOUS COLLEGE UNDER VTU, BELGAUM)**  
**BANGALORE-560019**

**EXPERIENTIAL LEARNING ON:**  
**AIRCRAFT PROPELLER WITH HUB**

**COURSE: ENGINEERING VISUALIZATION**  
**COURSE CODE: 21ME2ESEVI**

**ASSIGNMENT SUBMITTED ON THE PARTIAL FULFILMENT**  
**OF THE AAT FOR SEMESTER 2**

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# AIRCRAFT PROPELLER WITH HUB

## 1.OBJECTIVE:

The objective of this project is to create a three-dimensional model of an aircraft propeller with its hub.

## 2. PROBLEM STATEMENT:

To create a three-dimensional model of an aircraft propeller with its hub and generate its different views in 3D and 2D.

## 3. ABOUT THE MODEL:

An aircraft propeller is a mechanical device which is required to move the aircraft forward or backward through the air under different aircraft operating conditions, while satisfying the requirements on aerodynamic efficiency, vibration and strength.

The propeller consists of two or more **rotor blades** connected together by a **central hub** that attaches the blades to the engine shaft.

The blades are made in the shape of an airfoil like wing of aircraft. The **blade elements** are the airfoil sections joined together side by side to form the blade airfoil. These elements are placed at different angles in rotation of the plane of rotation which gives the blade a small twist.

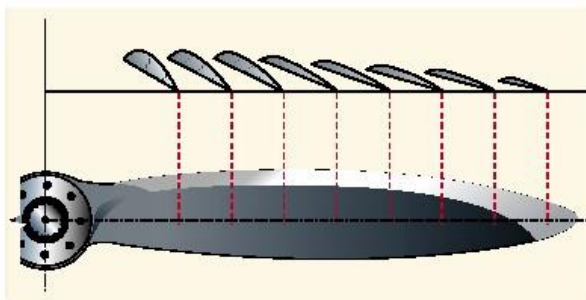


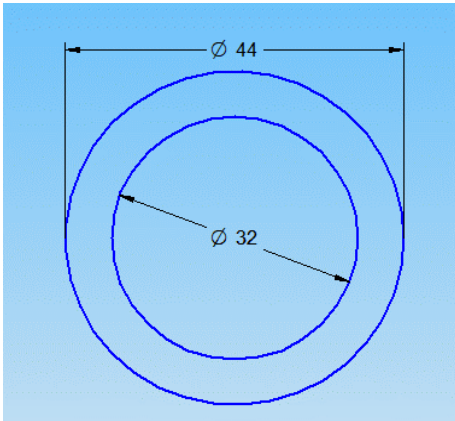
Figure 4-35. Airfoil sections of propeller blade.



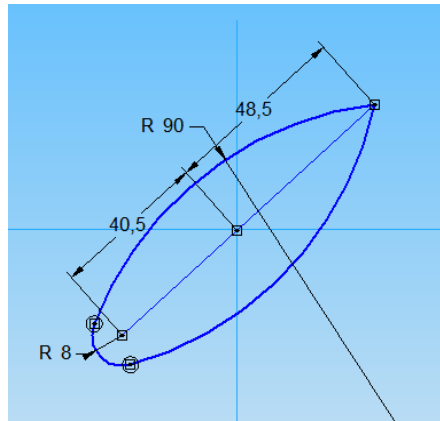
## 4. BLADE:

### 4.1 DIMENSIONS AND THE PROGRESS OF CREATING THE BLADE MODEL:

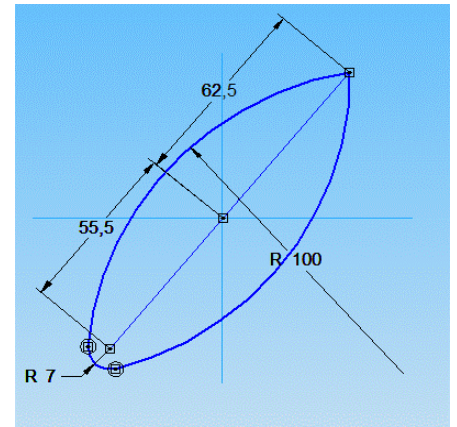
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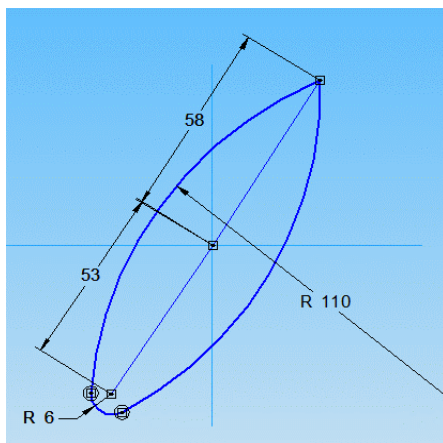
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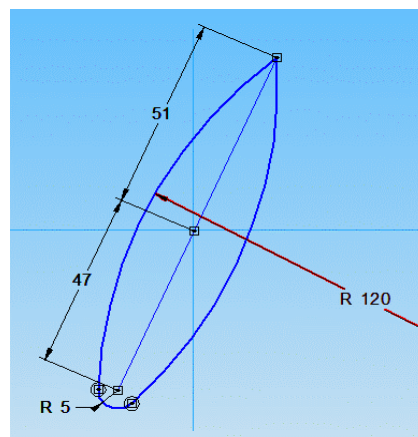
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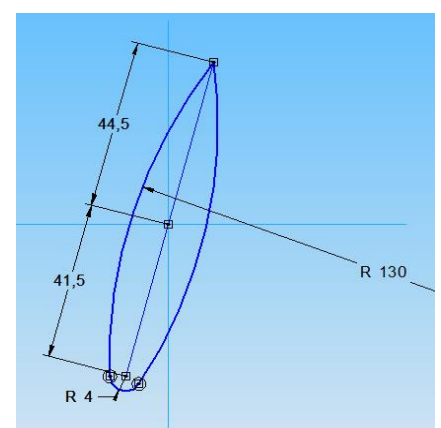
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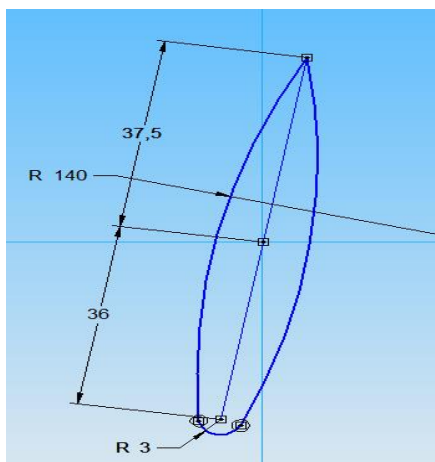
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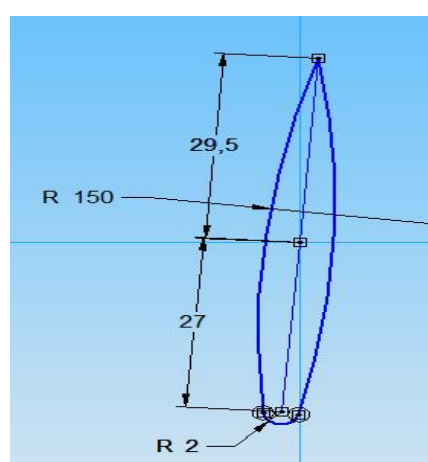
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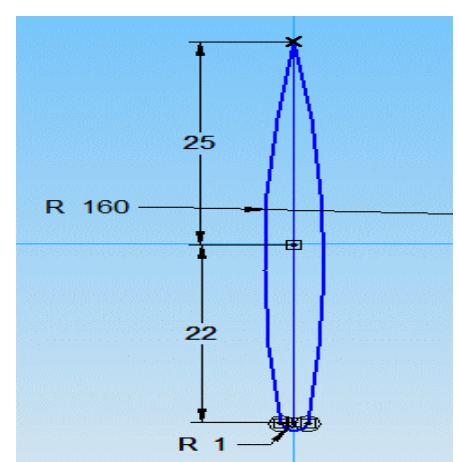
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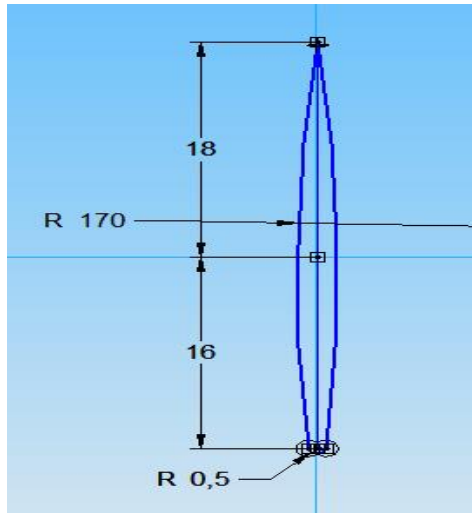
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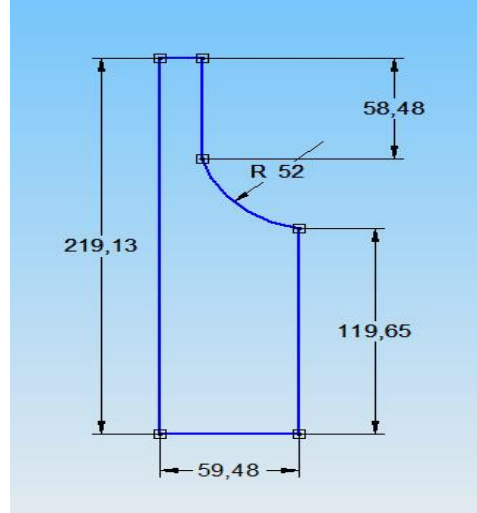
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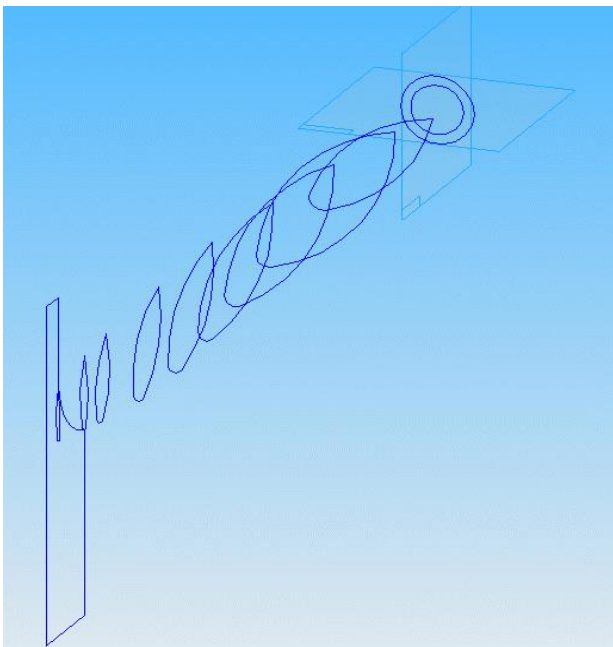
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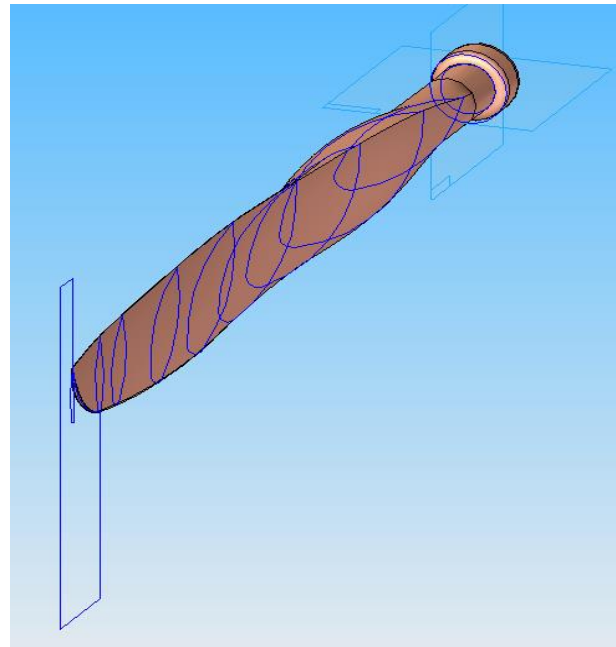
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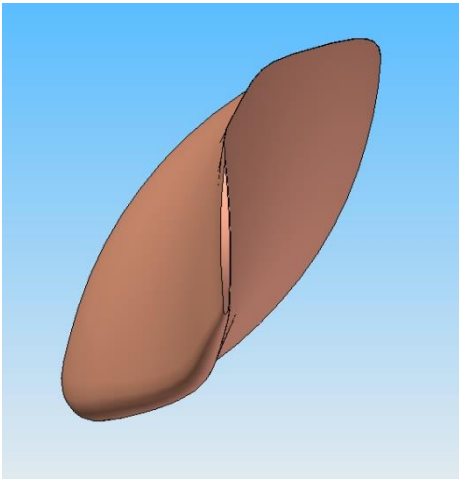
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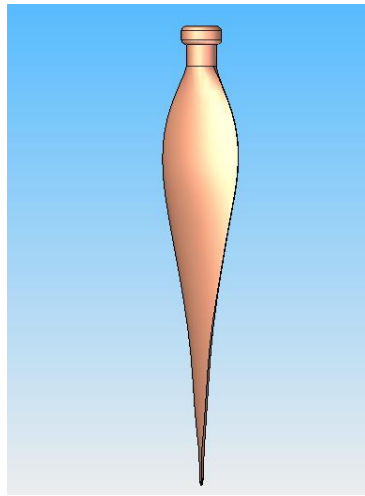
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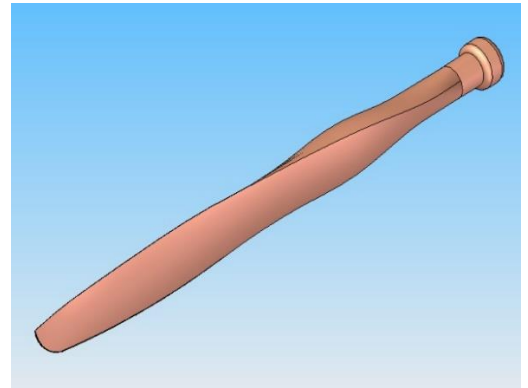
## 4.2 DIFFERENT VIEWS OF THE BLADE IN 3D:



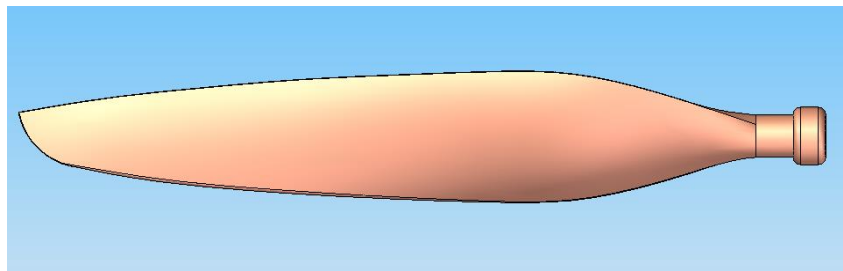
FRONT VIEW



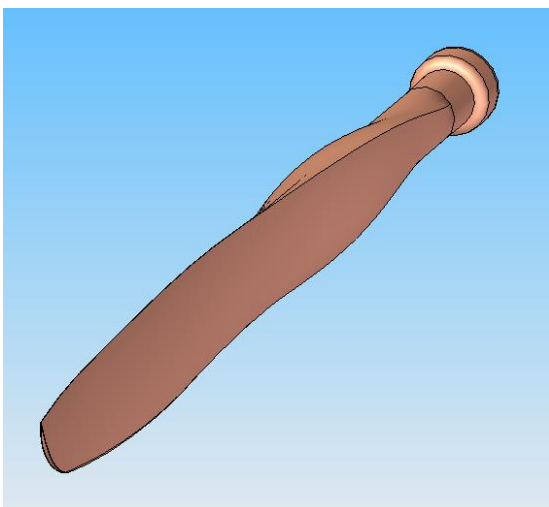
TOP VIEW



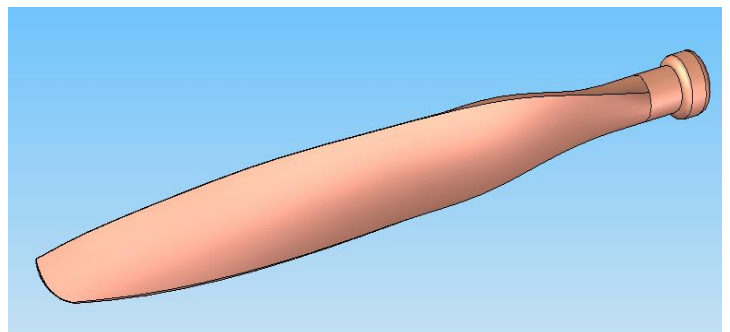
ISOMETRIC VIEW



RIGHT VIEW



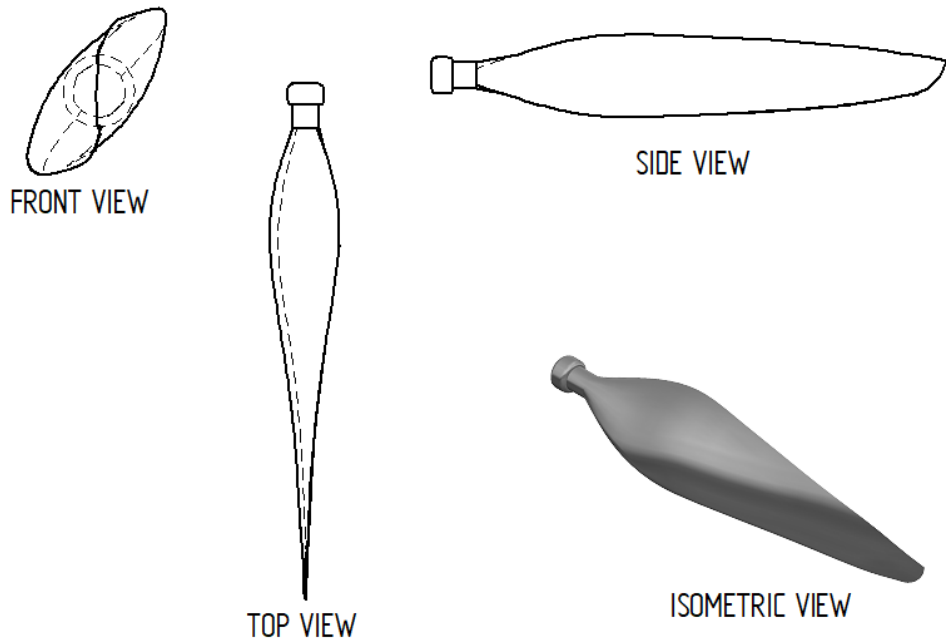
DIMETRIC VIEW



TRIMETRIC VIEW

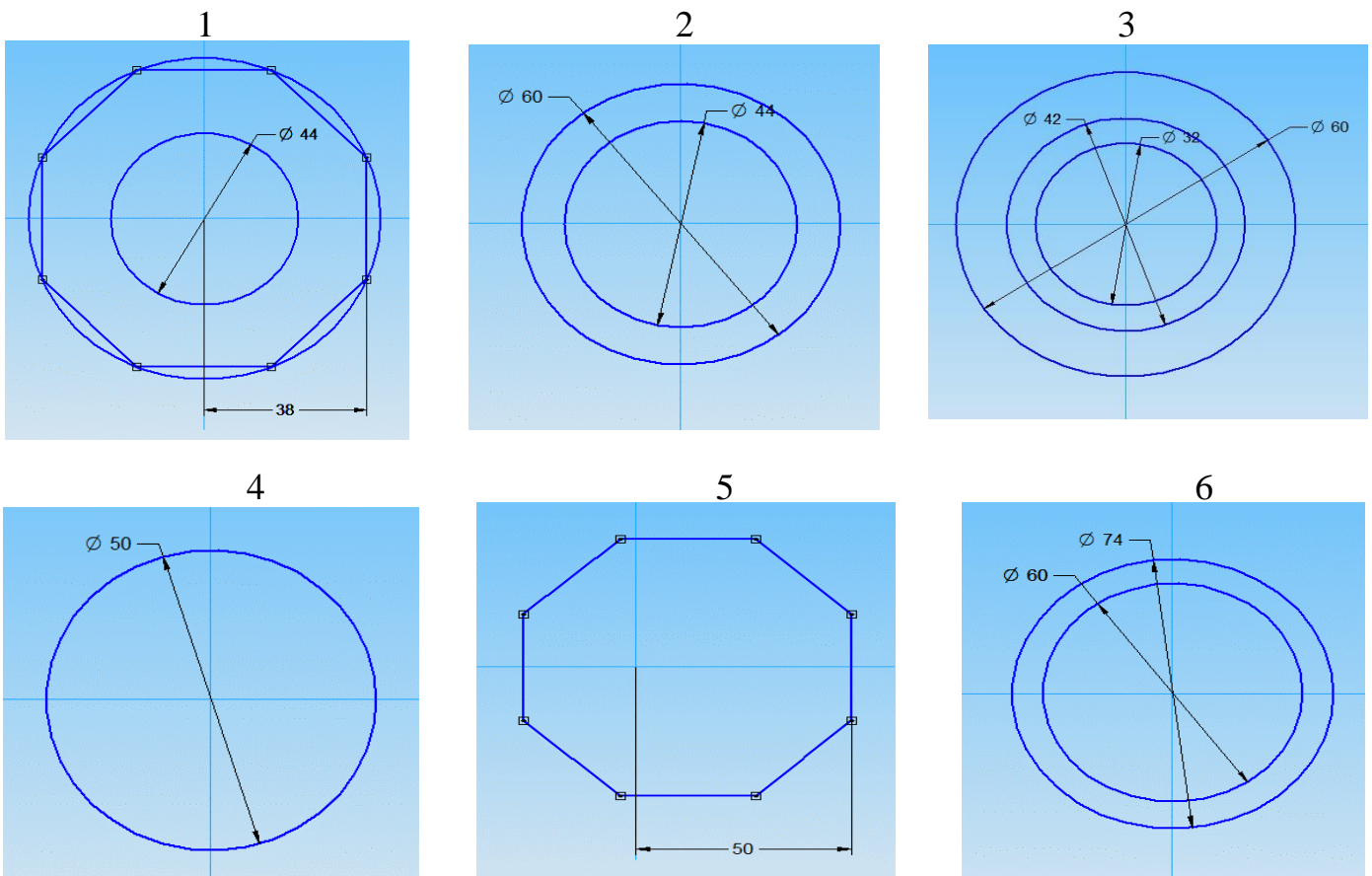


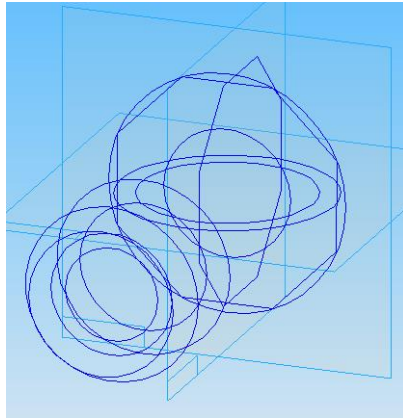
### 4.3 DIFFERENT VIEWS OF BLADE IN 2D:



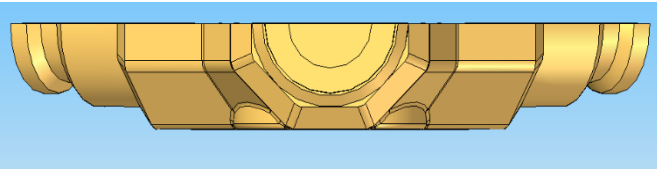
## 5. HUB:

### 5.1 DIMENSIONS AND PROGRESS OF CREATING THE HUB MODEL:

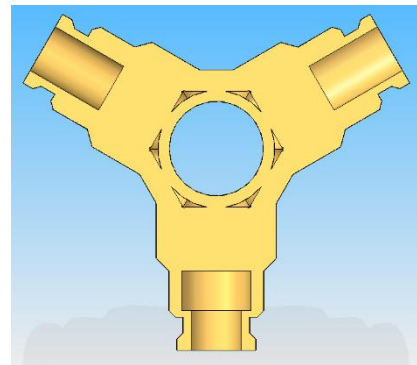




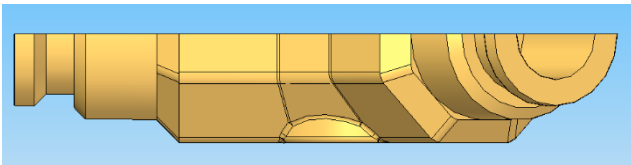
## 5.2 DIFFERENT VIEWS OF THE HUB IN 3D:



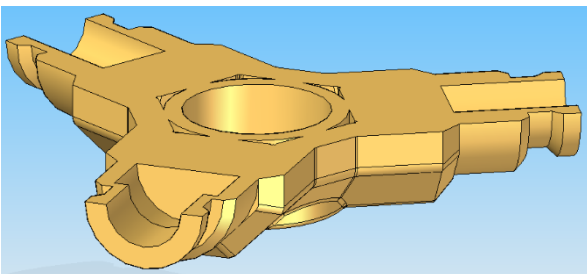
FRONT VIEW



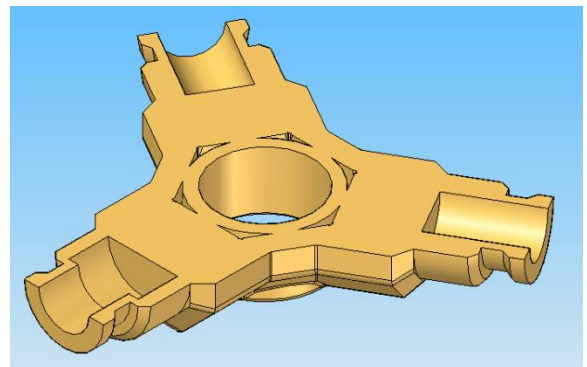
TOP VIEW



RIGHT VIEW



DIMETRIC VIEW



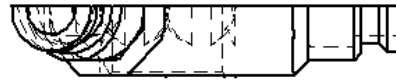
ISOMETRIC VIEW



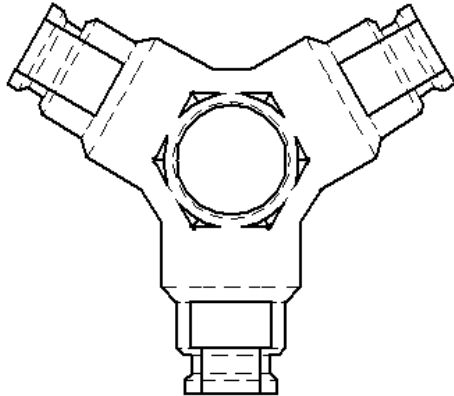
### 5.3 DIFFERENT VIEWS OF HUB IN 2D:



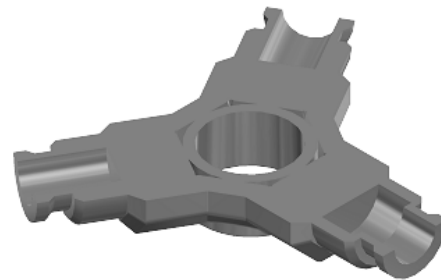
FRONT VIEW



SIDE VIEW



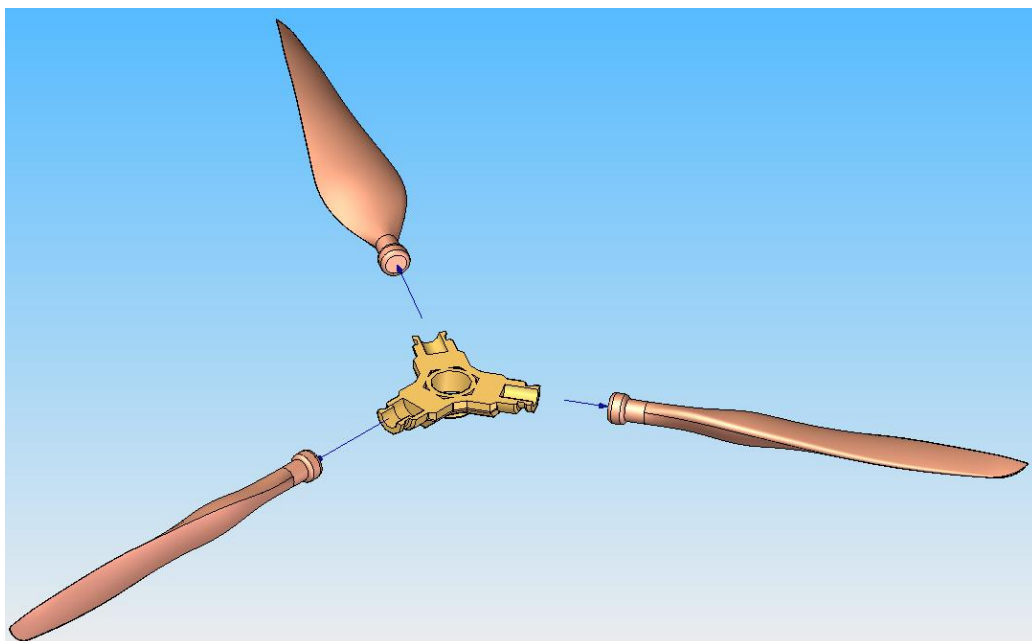
TOP VIEW

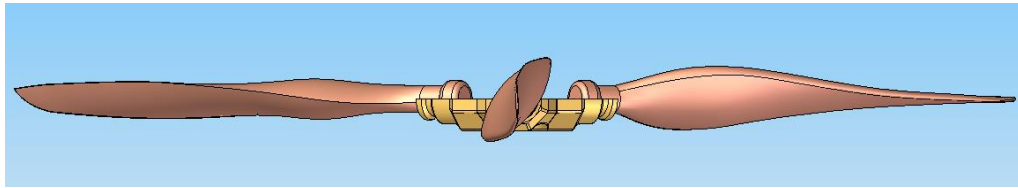


ISOMETRIC VIEW

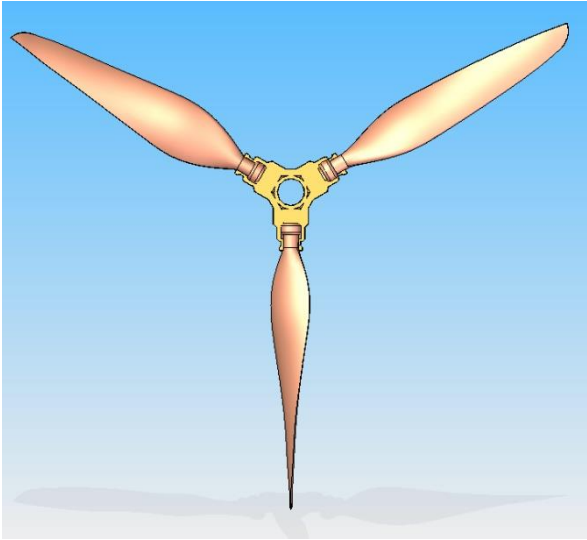
### 6. THREE AND TWO DIMENTIONAL VIEW OF AIRCRAFT PROPELLER WITH HUB:

On assembling the blade and hub in assembly file (.asm extension), we obtain the model as shown below.

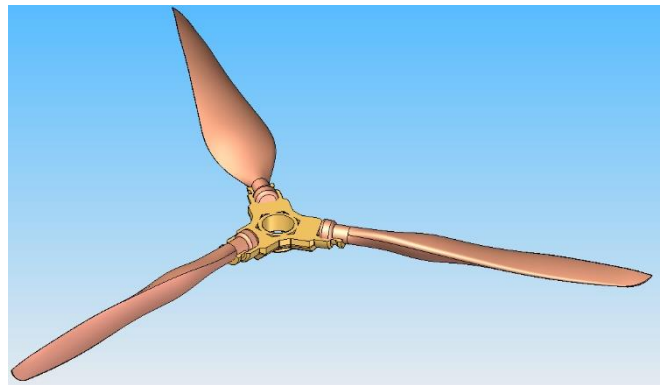




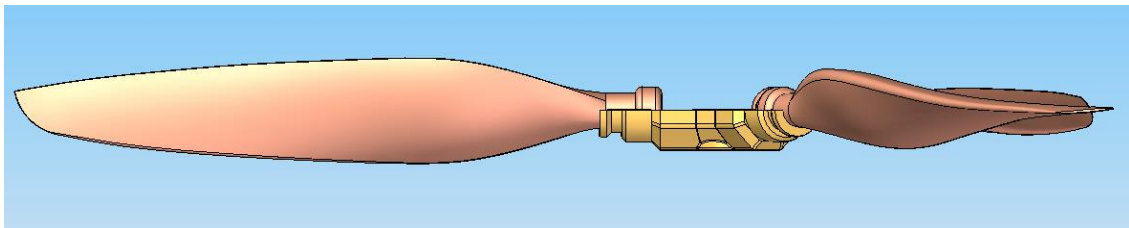
FRONT VIEW



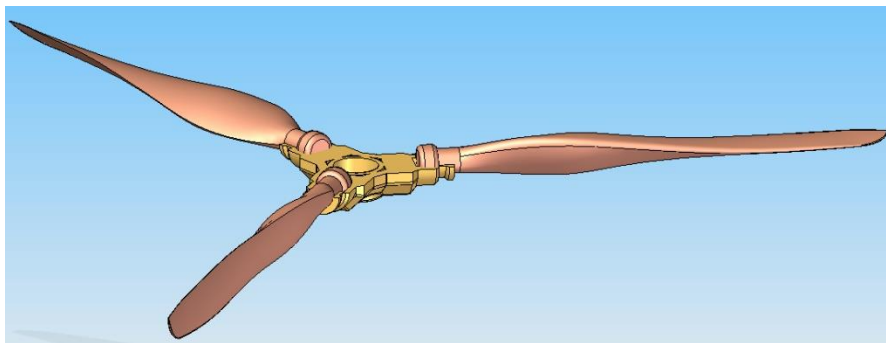
TOP VIEW



ISOMETRIC VIEW



RIGHT VIEW



DIMETRIC VIEW

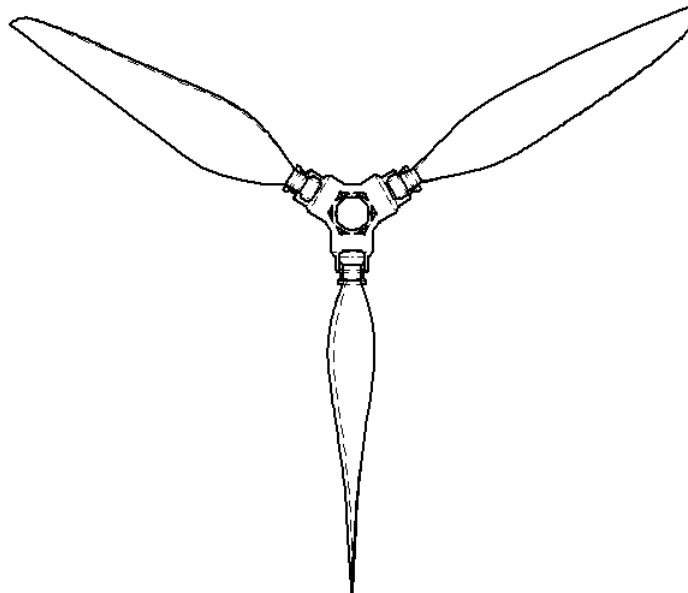
2D VIEW:



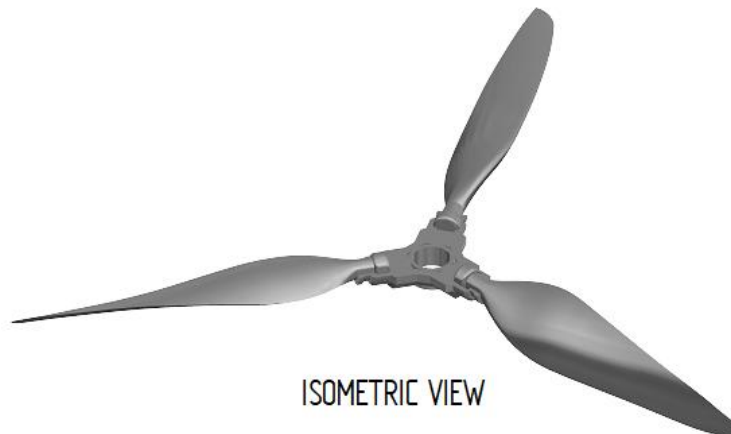
FRONT VIEW



SIDE VIEW



TOP VIEW



ISOMETRIC VIEW

## 7. CHARACTERISTICS OF AIRCRAFT PROPELLER:

A 3-blade propeller has the following characteristics:

- The manufacturing cost is lower than other types.
- Are normally made up of aluminium alloy.
- Gives a good high-speed performance.
- The acceleration is better than other types.
- Low-speed handling is not much efficient.

## 8. CONCLUSION:

To summarise, I made an effort to create a model of an **aircraft propeller** using **Solid Edge software** and generate its three- and two-dimensional views. This was an extremely knowledgeable and fun experience which gave an opportunity to explore the software more and consolidate my learning in 'Engineering Visualisation'. Working on this helped me render three- dimensional objects more realistically. This is definitely a great addition to my skillset.

## 9. REFERENCE:

[https://www.thaitechnics.com/propeller/prop\\_intro.html](https://www.thaitechnics.com/propeller/prop_intro.html)  
<https://www.youtube.com/watch?v=bkHCE6Ow-cs>