

AS3020*: Assignment 1

Module 1: Design of Aircrafts

Posted on 15-Aug-2024; Due at 11.59PM on 23-Aug-2024

General Instructions

1. Write this honor code and sign your name against it in the first page of your submission. **Evaluation will not be done unless this is present in the submission.**

Upon my honor I state that I have received no unauthorized support and can attest that the submission reflects my understanding of the subject matter.

2. While resources on the internet may be used if necessary, no use of generative AI is permitted for this assignment. Discussions among students is permitted for this assignment, **but your submission must be your own work.**
3. For the essay question, please type "**=ESSAY START=**" and "**=ESSAY END=**" at the beginning and end of your essay. This will help me automate some of the evaluation. **Read the guidelines for the essay carefully.**

1 Match the Following terms with their definitions 5

Term	Definition
① Ductility	Ⓐ Area under stress-strain curve beyond proportionality
② Yield strength	Ⓑ Stress level until which stress-strain is linear
③ Toughness	Ⓒ Area under stress-strain curve until proportionality
④ Ultimate Strength	Ⓓ Elongation at fracture
⑤ Proportionality limit	Ⓔ Stress at initiation of plastic behavior
⑥ Resilience	Ⓕ Maximum stress level material can support

2 Provide True or False answers 5

1. (1) Ductile fracture cracks propagate very fast, while brittle fracture propagates slowly.
2. (1) Atoms find it harder to undergo diffusion at lower temperatures than at higher temperatures.
3. (1) It is not possible to observe brittle fractures in ductile materials.
4. (1) Elastic deformation corresponds to stretching of bonds, plastic deformation corresponds to movement/reconfiguration of crystal lattice defects.
5. (1) Tempering of martensite steel will be more effective if conducted at temperatures above the Eutectoid temperature.

3 Write a 600-800 word essay on one of the following: 10

1. In-service engine failure of a Boeing 777 aircraft.
 - Link to NTSB report.
2. Fatigue failure of the deHavilland Comet 1.
 - Link to lecture on youtube
 - Summary paper

You can use any other resources you may find online also, but you are not authorized to use generative AI tools.

Aspects to focus on:

- The exact failure mechanism.
- Materials involved in the failure.
- How was it detected? How was it rectified?

3.1 Your essay will be assessed based on:

- (5) Content
- (2.5) Succinctness (strike a right balance between verbosity and precision)
- (2.5) Language (grammar is important)
- Total length (every 10 words in excess of 800 will incur one negative point).

3.2 Guidelines to help me Automate Evaluation

- Please type "=ESSAY START=" at the beginning of your essay,
- And "=ESSAY END=" at the end of your essay. (All Caps)
- You can have figures, but please attach the figures in a separate section.
- Do NOT have any header or footer in the pdf.
- I will parse the text from "=ESSAY START=" to "=ESSAY END=" and only consider this for language checks and word counts.