

## AS3020\*: Assignment 5

Module 5: Torsion

Posted on 13-Oct-2024; Due at 11.59PM on 21-Oct-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. Discussions among students is permitted for this assignment. But ensure that your submission is your own. Do not write anything that you do not understand.

## 1 Answer Briefly

- (2) Is it physically justifiable to apply the "Plane Sections Remain Planar and Perpendicular to the Neutral Axis" for studying torsion of beams? Answer in words without using equations.
- (2) What is the ratio between the the torsional rigidity of a solid elliptical section with aspect ratio 1.25 when the sections are allowed to warp versus when sections are not?
- (3) Write down the general expression for the torsional rigidity for
  - (1) a solid-section beam;
  - (1) a closed thin-section beam;
  - (1) an open thin-section beam.

## 2 Answer in Detail

- (8) Consider the I-section beam below undergoing a twisting moment  $M_1 e_1$ . What is the total twist of the section? Derive expressions for the warped section.

