Mechanics (ME10001)
Suggested Reading Materials

List of abbreviations

BJ - Beer, Johnston, Mazurek, Cornwell and Sanghi, *Vector Mechanics for Engineers,* 10th Edition in SI Units, McGraw Hill Education (India) Pvt. Ltd.

MC – Meriam and Kraige, *Engineering Mechanics – Statics,* 6th Edition, Wiley India.

BJS – Beer, Johnston and DeWolf, *Mechanics of Materials,* 3rd Edition (in SI units), Tata McGraw-Hill Publishing Company Ltd.

P – Popov, *Engineering Mechanics of Solids,* 2nd Edition, PHI Learning Pvt. Ltd.

Pre-Mid Semester Examination: Engineering Mechanics

Force systems:

- Representation of force as vector – BJ(2.2, 2.7, 2.12, 2.13) or MC(2/2, 2/3, 2/7)
- Moment of a force about a point and about an axis – BJ(3.6, 3.7, 3.8, 3.11) or MC(2/4, 2/8)
- Couple and its moment – BJ(3.12 to 3.16) or MC(2/4, 2/8)
- Reduction of a force system to a force and a couple – BJ(3.17 to 3.20) or MC(2.6, 2.9)

Equilibrium:

- Free body diagram – BJ(4.2, 4.3, 4.9) or MC(3/2, 3/4)
- Equations of equilibrium – BJ(4.4, 4.8) or MC(3/3, 3/4)
- Problems in two and three dimensions – BJ(4.6, 4.7) or MC(3/3, 3/4)
- Plane frames – BJ(6.9, 6.10) or MC(4/6)
- Plane truss – BJ(6.2, 6.3, 6.4, 6.7) or MC(4/2, 4/3, 4/4)

Friction:

- Laws of Coulomb friction – BJ(8.2, 8.3) or MC(6/3)
- Friction problems with large and small contact surface – BJ(8.4, 8.5) or MC (6/3)
- Application: belt friction – BJ(8.10) or MC(6/8)

Properties of areas:

- First moment of area – BJ(5.3, 5.4 5.5) or MC(5/3, 5/4)
- Second moment of area and polar moment of area – BJ(9.2 to 9.7) or MC(Appendix A/2, A/3)
- Pappus-Guldinus theorem – BJ(5.7) or MC(5/5)

Bending Moment and Shear Force Diagram:

- Shear force and bending moment in beam – BJS(5.3, 5.3) or P(7.8 to 7.11)

Post Mid-Semester Examination: Strength of Materials

Concept of stress and strain:

- Normal stress – BJS(1.3 to 1.5) or P(1.6)
- Shear stress – BJS(1.6) or P(1.8)
- State of stress at a point – BJS (1.11, 1.12) or P(1.3, 1.4)
- Ultimate strength, allowable stress and factor of safety – BJ(1.13) or P(1.10, 1.11)
- Normal strain – BJS(2.2) or P(2.2)
- Shear strain – BJS(2.14) or P(5.2)
- Hooke's law – BJS(2.3, 2.6) or P(2.3 to 2.5)
- Poisson's ratio – BJS(2.11) or P(2.6)
- Generalized Hooke's law – BJS(2.12, 2.15) or P(5.6, 5.7)
- Analysis of axially loaded members – BJS(2.8) or P(3.2)
- Simple applications in design – BJS(16 to 1.8) or P(1.6, 1.7)
- Application: Thin pressure vessels – BJS(7.9) or P(5.9)

Transformation of stress:

- Transformation of stress – BJS(7.2) or P(11.2, 11.3)
- Principal stress and maximum shear stress – BJS(7.3) or P(11.4, 11.5)
- Mohr's circle for plane stress – BJS (7.4) or P(11.6)

Torsion

- Torsional stress in cylindrical bars and deformation – BJS(3.1 to 3.5) or P(6.3 to 6.6)

Flexural loading:

- Flexure formula – BJS(4.2 to 4.4) or P(8.3, 8.5)