**Subject Name: Elements of Machine Design (22564) Date:- 22/08/2024**

**Assignment No: - 1 Course Outcome: 225 .1**

**Topic Name: - Introduction to Design**

1. What is factor of safety? State its importance in design of machine elements.
2. What are the factors to be considered for selection of materials for design of machine elements.
3. Define (i) Ductility (ii) Toughness (iii) Creep.
4. Explain the following type of stresses: (a) Transverse shear stress (b) Compressive stress (c) Torsional shear stress.
5. Explain with neat sketches the methods of reducing stress concentration in cylindrical members with shoulders and holes separately.
6. Identify the material and its composition. (i) X10Cr18Ni9Mo4Si2 (ii) XT72W18Cr4V1.
7. State the theories of elastic failure. Explain maximum normal stress theory and maximum shear stress theory with equations.

**Subject Name: Elements of Machine Design (22564) Date :- 22/08/2024**

**Assignment No: - 2 Course Outcome: 225.2**

**Topic Name: - Design of Joints, Levers and Offset links**

1. Write the design procedure of a spigot and socket cotter joint with a neat sketch.
2. Write the design procedure of knuckle joint with neat sketch.
3. Why taper is provided on cotter? What is its normal value?
4. Differentiate between ‘direct stress’ and ‘bending stress’.
5. Write four applications of cotter joint and knuckle joint each.

**Subject Name: Elements of Machine Design (22564) Date :- 09/10/2024**

**Assignment No: - 3 Course Outcome: 225.5**

**Topic Name: - Design of Springs**

1. State the meaning of following terms related to helical spring: (i) Spring index (ii) Spring rate (iii) Solid length.
2. Explain the stresses induced in helical springs of circular wire.
3. Explain what do you understand by A.M. Wahl’s factor? State its importance in the design of helical springs.
4. Draw a graph of Wahl’s stress factor versus spring index for helical compression spring and state the effect of curvature of coil on stress distribution.
5. Explain different end conditions for helical compression springs.
6. Explain springs in series and parallel
7. Draw a neat sketch of semi-elliptical leaf spring with construction details. What material is used for leaf spring?

**Subject Name: Elements of Machine Design (22564) Date :- 09/10/2024**

**Assignment No: - 4 Course Outcome: 225.6**

**Topic Name: - Antifriction Bearing**

1. Explain ‘Classification of bearings’.
2. Differentiate between ‘Hydrodynamic and Hydrostatic bearings’.
3. Give classification of roller contact bearings.
4. Differentiate between rolling contact and sliding contact bearings.
5. How will you select bearing from manufacturer catalogue?

**Subject Name: Elements of Machine Design (22564) Date :- 04/11/2024**

**Assignment No: - 5 Course Outcome: 225.3**

**Topic Name: - Design of Shafts, Keys and Couplings**

1. What do you understand by torsional rigidity and lateral rigidity?
2. “A hollow shaft has greater strength and stiffness than solid shaft of equal weight”. Justify.
3. Explain the strength equations of rectangular sunk key.
4. Sketch a protective type flange coupling and explain its design.
5. Describe design procedure of bush-pin type flexible coupling with neat sketch.
6. Explain the design considerations for gear.\
7. State Lewis equation for beam strength of spur gear. State meaning of each term in equation with their units.