

SHANTILAL SHAH ENGINEERING COLLEGE
Production Engineering Department
B.E.SEMESTER– 4th SEM, SUB CODE: 2142506
SUB: Fundamentals of Machine Design.

Tutorial :1

Tutorial 1: To study about different types of loads and stresses on machine component and problems related to it.

Q-1: Explain following terms.

- 1) Stress and strain.
- 2) Tensile Stress and strain.
- 3) Compressive stress and strain.
- 4) Shear stress and strain.
- 5) Bending stress.
- 6) Eccentric axial stress.
- 7) Factor of safety.
- 8) Residual stress.
- 9) Crushing (bearing) stress.
- 10) Principle stresses.

Q-2: Define stress concentration and explain different methods of relieving stress concentration.

Q-3: Give the classification of machine design.

Q-3: Explain general procedure in machine design.

Q-4: Explain morphology of design.

Q-5: Solve following Examples.

Example: **4.3, 4.4, 4.5, 4.7, 4.8, 4.9, 4.10, 4.16.**

Note: Above examples is from A Textbook of Machine design By R.S.Khurmi & J.K.Gupta, S.CHAND publication, Edition 2009.

Staff Incharge

(Asst.Prof. M.V.Gohil)

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Tutorial :2

Tutorial 1: To study about different types of joints like riveted joint, welded joint, threaded joint & miscellaneous joints for simple and eccentric loading and problems related to these joints.

(a) Riveted joint.

Q-1: What do you understand by term riveted joint? Explain necessity of such a joint.

Q-2: Explain different types of riveted joints and important terms used in riveted joints.

Q-3: Explain caulking and fullering of riveted joint with neat sketch.

Q-3: Discuss different types of failures of riveted joint.

Q-4: Give the design procedure of longitudinal butt joint for boiler.

Q-5: Give the design procedure of circumferential lap joint in boiler.

Q-6: what do you understand by term 'efficiency of riveted joint'? According to I.B.R. what is the highest efficiency required of riveted joint.

Q-7: What is an eccentric riveted joint? Explain the method adopted for designing such a joint.

Example: 9.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.10, 9.14, 9.15, 9.16, 9.17.

(b) Welded joint.

Q-1: What do you understand by the term welded joint? How it differs from riveted joint?

Q-2: Explain different types of welded joints.

Q-3: Explain different special cases of fillet welded joint.

Q-4: what is eccentric loaded welded joint? Explain design procedure for Eccentric loaded welded joints.

Example: 10.4, 10.5, 10.7, 10.9, 10.10, 10.11, 10.12, 10.14.

(c) Miscellaneous joints

Q-1 what is cotter joint? Explain with neat sketch; give the application of cotter joint.

Q-2: Discuss the design procedure of spigot and socket cotter joint.

Q-3: Distinguish between cotter joint and knuckle joint.

Q-4: Sketch two views of knuckle joint and explain design procedure for knuckle joint.

Q-5: Explain the purpose of turn buckle. Describe its design procedure.

Example: 12.1, 12.7, 12.8, 12.9.

(d) Threaded joint.

Q-1: Explain common types of screw fastenings with neat sketch.

Q-2: Explain different locking devices with neat sketch.

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Tutorial :3

Tutorial 3: To study about Shaft, Keys and Coupling.

(1) Shaft

Q-1: Explain design procedure for shaft subjected to twisting moment only.

Q-2: Explain design procedure for shaft subjected to bending moment only.

Q-3: Explain design procedure for shaft subjected to combined twisting and bending moment.

Q-4: Discuss the design procedure of shaft based on rigidity and stiffness.

Example: 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 14.14, 14.15.

(2) Keys & couplings

Q-1: Discuss different types of keys with neat sketch.

Q-2: Discuss design procedure of sunk key.

Q-3: Discuss different types of shaft couplings.

Q-4: Discuss design procedure of sleeve and muff coupling.

Q-5: Discuss design procedure of flange coupling.

Example: 13.1, 13.2, 13.3, 13.4, 13.5, 13.6.

Tutorial :4

Tutorial 4: To study about Levers.

Q-1: Give the design procedure of lever also give application of levers in engineering practice.

Q-2: Discuss various types of lever with figure.

Example: 15.1, 15.2, 15.6

Tutorial :5

Tutorial 5: To study about column and strut.

Q-1: Give the different types of end condition of column; also explain Euler's column theory with assumptions.

Q-2: Discuss Rankine's formula for columns.

Q-3: Discuss design procedure of piston rod.

Q-4: Discuss design of push rods.

Q-5: Discuss Design of connecting rod.

Example: 16.1, 16.2, 16.3, 16.4, 16.5.

Tutorial :6

Tutorial 6: To study about production, assembly drawing & symbols.

Q-1: Explain various elements of production engineering drawing.

Q-2: Draw different Roughness and machining symbols and explain it.

Q-3: Explain methods of indication on drawing

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