

Enroll No

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Empowered Autonomous Institute, affiliated to SUK)
Unit Test -I (2025-26)

Q.P. Code
UT2936

T.Y. B.Tech.- Robotics and Automation

Course Code: RA303

Course Name: Design of Machine Elements

Day & Date: Monday 14/08/2025

Time: 2:30 To 3:30

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures in rounded () brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
 - 3) CO is the index number of the Course Outcome statement.
 - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate, and create respectively.
 - 5) Assume suitable data if necessary.
 - 6) Use of non-programmable calculators is allowed

			Marks	BT Level	COs
Q.1	A	Compare the design approach based on craft evolution with the approach based on drawing.	6	BL4	1
	B	What is factor of safety? (2 marks) Discuss any four factors which affects the factor of safety (4 marks).	6	BL2	1

OR

Discuss the fundamental steps of the machine design process.

- Q.2 A An electric motor weighing 15 kN is lifted by means of an eye bolt. The eyebolt is screwed into the frame of the motor. The eye bolt has coarse threads. It is made of plain carbon steel 30C8 ($S_{yt} = 400 \text{ N/mm}^2$) and the factor of safety is 5. Determine the size of the bolt.



Eye Bolt

OR

Apply the basic stress analysis principle and discuss the simple stress analysis of bolted joint.



- B In following figure 1, 2, 3 and 4 are bolts made of plain carbon steel 45C8 ($S_{yt} = 380 \text{ N/mm}^2$). These are used to connect two plates. The load applied on plate is $P = 3 \text{ kN}$. Consider factor of safety is 2 and determine size of the bolts.

8 BL3 2

