

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Automation & Robotics) (Sem.-4)

**DESIGN OF MACHINE ELEMENTS**

Subject Code : BTAR-401-18

M.Code : 77597

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Q1 Answer briefly :**

- a) What are the steps in machine design process?
- b) Why are metals in their pure form unsuitable for industrial use?
- c) Define 'mechanical property' of an engineering material.
- d) What are fits and tolerances?
- e) Define equivalent twisting moment.
- f) What is threaded joint?
- g) What is a key? State its function.
- h) Write the applications of cone clutch.
- i) Enlist the different kinds of lever.
- j) What do you understand by diamond riveting?

## SECTION-B

2. State any six mechanical properties give their definitions and one example of the material possessing the properties.
3. What are flexible couplings and what are their applications? Illustrate your answer with suitable examples and sketches.
4. Discuss the possible modes of failure of riveted joint.
5. What is the function of breaks? Write the classification of breaks.
6. Write the design steps of straight lever.

## SECTION-C

7. A hollow steel shaft transmits 600 kW at 500 r.p.m. The maximum shear stress is 62.4 MPa. Find the outside and inside diameter of the shaft, if the outer diameter is twice of inside diameter, assuming that the maximum torque is 20% greater than the mean torque.
8. What is a cotter joint? Explain with the help of a neat sketch, how a cotter joint is made?
9. A bracket is bolted to a column by 6 bolts of equal size as shown in Fig. 1. It carries a load of 50 kN at a distance of 150 mm from the centre of column. If the maximum stress in the bolts is to be limited to 150 MPa, determine the diameter of bolt.

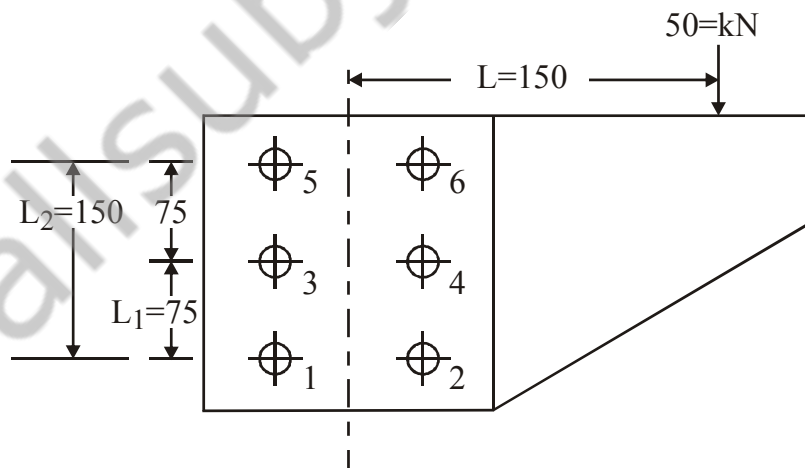


Fig.1

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**