



**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech. (Food Engg.) 2019 Admission**  
**V Semester Final Examination-January 2022**

Meen.3107

Machine Design (2+1)

Marks: 50  
Time: 2 hours

**I Fill in the blanks (10x1=10)**

1. When the spring is cut into two springs, the stiffness of cut spring will be \_\_\_\_\_.
2. The normal stress across a principal plane is called \_\_\_\_\_.
3. In a belt drive, the tension on the tight side is \_\_\_\_\_ than in the tension on the slack side.
4. The taper on a rectangular sunk key is \_\_\_\_\_.
5. The ratio of PCD to the number of teeth is \_\_\_\_\_.

**State True or False**

6. In turn buckle joint both the rods have left hand threads.
7. In thrust bearings, the load acts along the axles of rotation.
8. The eye bolts are used for lifting and transporting heavy machine.
9. The size of the gear is usually specified by addendum.
10. Weldability is a technological property of material.

**II Write short notes on ANY FIVE of the following (5x2=10)**

1. Distinguish between machine shaft and transmission shaft.
2. Differentiate between endurance limit and elastic limit.
3. Differentiate between notch sensitivity and stress concentration.
4. Differentiate between V belt drive and flat belt drive.
5. Explain the mechanical properties of materials.
6. Define factor of safety and explain its importance.
7. Mention different types of bearings and explain their uses.

**III Answer ANY FIVE of the following (5x4=20)**

1. Explain the spur gear terminologies with a neat sketch.
2. Mention different types of keys and write the design procedure of a sunk key
3. Mention different types of springs and distinguish between spring index and spring rate
4. Write the design procedure of a cotter joint and its applicability.
5. Write the design procedure of a leaf spring along with their usage.
6. Write the design procedure of a rocker arm for diesel engine.
7. Write short notes on crane hook and thin cylindrical shells.

**IV Write an essay on ANY ONE of the following (1x10=10)**

1. Explain the design procedures of a bolted joint in shear and discuss the law of belting along with the design of V belt drive
2. Explain the different theories of failure and their applicability.

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