



KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Food Engg) 2019 Admission
IV Semester Final Examination- -November 2021

Cien.2204

Mechanics and Strength of Materials (2+1)

Marks: 50
Time: 2 hours
(10x1=10)

1 Fill in the blanks

1. Two coplanar couples having equal and opposite moments are_____.
2. The maximum twisting moment a shaft can resist, is the product of the permissible shear stress and_____.
3. The maximum frictional force which comes into play when a body just begins to slide over another surface is called_____.
4. The unit of work or energy in S.I. units is _____.
5. The shear force on a simply supported beam is proportional to_____.

State true or false

6. The unit of force in S.I. units is Newton.
7. For structural analysis, Maxwell's reciprocal theorem can be applied to Elastic structures.
8. The coefficient of friction depends on Strength of surfaces.
9. When equal and opposite forces applied to a body, tend to elongate it, the stress so produced, is called tensile stress.
10. Center of gravity of a solid cone lies on the axis at the height One-fourth of the total height above base.

II Write short notes on ANY FIVE of the following

(5x2=10)

1. Define Perfect frames.
2. Define Resultant force.
3. Define Volumetric Strain.
4. Define torsional rigidity of a shaft?
5. What are the different types of load acting on a beam?
6. Define D'Alembert's Principle?
7. What is equivalent length of the column?

III Answer any FIVE of the following

(5x4=20)

1. What are the assumptions modes in the Euler's column theory?
2. Write short notes on end conditions of long column?
3. Write a note on Mohr's circle of stresses
4. Define the terms
 - (i) Moment of inertia
 - (ii) Radius of Gyration
5. A simply supported beam of length 6m carries a point load 3 kN and 6 kN at a distance of 2m and 4m from left end. Draw the SFD and BMD.
6. Find the maximum shear stress induced in a solid circular shaft of diameter 15 cm when shaft transmits 150 kW power at 180 rpm.
7. A rectangular bar of cross sectional area 1000mm² is subjected to an axial load of 20kN. Determine the normal and shear stress on a section which is inclined at an angle of 30° with normal cross-section of the bar.

IV

Write an essay on any ONE of the following

(1x10=10)

1. A simply supported beam of length 6m carries point load of 3 kN and 6 kN at distances of 2m and 4m from the left end. Draw the shear force and bending moment diagrams for the beam.
- 2.. A solid circular shaft transmits 75kW power at 200rpm. Calculate then shaft diameter, if the twist in the shaft is not to exceed 1° in 2 meters length of shaft , and shear stress is limited to 50 N/mm².
