



KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agrl. Engg.) 2022 Admission
I Semester Final Examination – March 2023

Iden.1101

Engineering Mechanics (2+1)

Marks: 50
Time: 2 hours

I Fill in the blanks (10x1=10)

1. principle states that the moment of a force about any point is equal to the algebraic sum of moments of its components about that point.
2. If three forces act at a joint and two of them are along the same straight line then the third force would be
3. means the forces are intersecting at a common point.
4. The moment of inertia of a circular section is
5. The relationship between angle of friction (ϕ) and co-efficient of friction (μ) is expressed as

State True or False

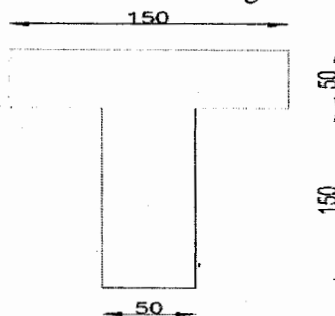
6. The force of friction, acting on a body when the body is moving, is called static friction.
7. Hooke's law states that within the elastic limit, the stress is proportional to strain.
8. The planes, which have no normal stress, are known as principle planes.
9. Point of contra flexure is the point where Shear force is zero.
10. A shaft is in torsion, when equal and opposite torques are applied at the two ends of the shaft.

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

1. Free body diagram
2. Modulus of Elasticity
3. Centre of gravity
4. Power transmitted by shafts
5. Types of loads in mechanics
6. Types of friction
7. Principal stresses.

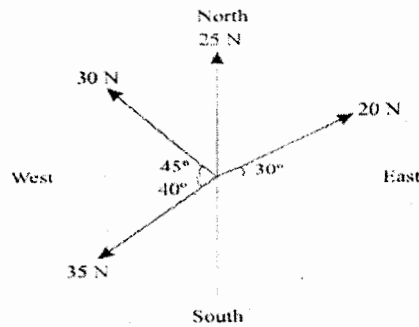
III Answer ANY FIVE of the following (5x4=20)

1. Write a short note on perpendicular axis theorem.
2. Find the moment of inertia of the section shown in figure.



3. Write a short note on Laws of Friction.
4. Derive the relationship between modulus of elasticity and bulk modulus.
5. Draw the shear force and bending moment diagrams of a cantilever beam carrying a point load of W kN at the free end of span L .

6. What are the assumptions made in the theory of simple bending?
7. Find the resultant of the force system shown in figure.



IV

Write an essay on ANY ONE of the following

(1x10=10)

1. A tensile test was conducted on a mild steel bar. The following data was obtained from the test.

(i) Diameter of the steel bar	= 4 cm
(ii) Gauge of the steel bar	= 25 cm
(iii) Load at elastic limit	= 250 kN
(iv) Extension at a load of 150 kN	= 0.21 mm
(v) Maximum load	= 390 kN
(vi) Total extension	= 80 mm
(vii) Diameter of rod at failure	= 2.30 cm

Determine

- (i) Young's modulus
 - (ii) stress at elastic limit
 - (iii) % of elongation
 - (iv) Percentage decrease in area
2. A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Calculate the percentage saving in material, if the material to be used is also same.
