

# KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agri.Engg) 2014 Admission  
I<sup>st</sup> Semester Final Examination- January -2015

Cat. No: Iden.1101

Title: Engineering Mechanics (2+1)

Marks: 50.00

Time: 2 hours

## I Match the following

(10 x 1=10)

1. Tension : Toothed wheel
2. Spur gearing : Velocity ration
3. Prony brake : Kinetic
4. Dynamical friction : Dynamometer
5. Speed cones : Tie

## State True or False

6. The total momentum of a system of bodies is unaltered by mutual action between them
7. Kinetic energy of rotary motion depends on torque and angular displacement
8. The property of virtue of which bodies rebound after impact is called as stress [called elasticity]
9. When two bodies impinge they compress each other so that the contact is not merely at point but on a circle of definite area is called period of restitution [ called period compression]
10. The mean effective pressure on the engine piston is determined by means of an instrument called an indicator

## II Write short notes on any FIVE questions

(5 x 2=10)

1. State Hookes Law
2. State varignons theorem and lami's theorem
3. What is radius of gyration and what is the unit of moment of inertia
4. Differentiate angular velocity and relative velocity
5. What is macroscopic and microscopic form of energy
6. What is meant by break horse power
7. How to calculate the mechanical efficiency of an engine

## III Write short notes on any FIVE questions

(5 x 4=20)

1. Explain law of triangle of forces
2. List the general conditions of equilibrium
3. State laws of static friction and dynamic friction
4. Two bodies weighing 50 kg and 100 kg rest on an inclined plane and are connected by a cord which is parallel to the plane .The body weighing 50 kg is below the one weighing 100 kg and

for 50 kg body is 0.2 and that for 100 kg , body is 0.5 .Find the inclination of the plane of the horizontal and the tension in the cord when motion is about to take place down the incline

5. The engine operated at 300 rpm, dead load on brake was 140 kg; spring balance reading was 55 kg. Wheel diameter was 2 m ;the brake rope diameter was 2.6 cm only and mechanical efficiency is 76.5% .Estimate IHP of the engine

6. Derive the relation  $KE = \frac{1}{2} I\omega^2$

I- Moment of Inertia about axis of rotation

W- Angular Momentum

7. A point is moving eastward with a velocity of 20 m/sec and one hour afterwards it is moving north -east with the same velocity ;Find the change of velocity and the mean acceleration

**IV Write an essay on any ONE**

**(1 x 10=10)**

1. State the theorem of work done and explain the graphical representation of work done
2. Derive the time of flight of the projectile and range of projectile on an inclined plane

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