

KERALA AGRICULTURAL UNIVERSITY
B.Tech (Food. Engg) 2012 Admission
IIIrd Semester Final Examination- December /January -2013

Cat. No: Meen.2105

Title: Kinematics of Machinery (2+1)

Marks: 80
Time: 3 hours

I. Fill in the blanks:

(10x1 = 10 marks)

1. The cam and follower without a spring forms a pair
2. The inversion of single slider crank mechanism is
3. The Grubler's criterion for determining degrees of freedom (n) of a mechanism having plane motion is
4. In a kinematic chain a quaternary joint is equivalent tobinary joints
5. If the angle of inclination α of the plane to the horizontal is such that the body begins to move down the plane then the angle α is called
6. Due to the slip of the belt, the velocity ratio of the belt drive
7. The centrifugal tension in belts the power transmitted
8. Type of gears used to connect two non-parallel non intersecting shafts are..... gears
9. Product of circular pitch and diametral pitch is equal to
10. If the speed of the engine fluctuates continuously above and below the mean speed, a governor is said to be.....

II. Write short notes on ANY TEN:

(10x3 = 30 marks)

1. What is a machine? Giving example differentiate between machine and structure?
2. Define rubbing velocity
3. Explain the term kinematic link? Give the classification of kinematic link?
4. State the laws of static and dynamic friction
5. What is centrifugal tension in a belt? How does it affect the power transmitted?
6. Explain the terms
i. Module ii. Pressure angle iii. Addendum
7. What is the function of a governor? How does it differ from that of a flywheel?
8. Write short notes on cams and followers?
9. Why a roller follower is preferred to that of knife-edge follower?
10. Define terms amplitude, period, and frequency as applied to simple harmonic motion?

11. Write short note on journal bearing?
12. Write short note on creep on belts?

III. Write short essays on any SIX:

(6x5 = 30 marks)

1. Derive an expression for the magnitude and direction of coriolis component of acceleration?
2. Draw the acceleration diagram of a slider crank mechanism?
3. What are straight line mechanisms? Describe one type of exact straight line motion mechanism with the help of a sketch?
4. For a flat belt, prove that $\frac{T_1}{T_2} = e^{\mu\theta}$
5. Derive an expression for the length of arc of contact in pair of meshed spur gears?
6. State and prove law of gearing?
7. Discuss various types of gear trains?
8. Prove that the sensitiveness of a Proell governor is greater than that of a Porter governor.

IV. Write an essay on ANY ONE:

(1x10= 10 marks)

1. A punching press is required to punch 40 mm diameter holes in a plate of 15mm thickness at the rate of 30 holes per minute. It requires 6 N-m of energy per mm² of sheared area. If the punching takes 1/10th of a second and the r.p.m of the flywheel varies from 160 to 140, determine the mass of the flywheel having radius of gyration of 1 metre.
2. Sketch and explain two inversions of slider crank mechanism?