



KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agri. Engg.) 2023 & Previous Admissions
II Semester Final Re - Examination – July 2026

Fpme.1202

Theory of Machines (2+0)

Marks: 50
Time: 2 hours

I Fill in the blanks

1. A rotary internal combustion engine has cylinders.
2. is the surface of the gear tooth above the pitch surface.
3. Work done per cycle is calculated as
4. The V-belts are particularly suitable for drives.
5. The sensitiveness of an isochronous governor is

(10x1=10)

Answer the following

6. The equilibrium speed of a governor varies from 30 rpm to 20 rpm, find the sensitiveness of the governor.
7. Define Fluid friction.

State True or False

8. The centrifugal tension on the belt has no effect on the power transmitted.
9. The cam and follower is an example of higher pair.
10. The linear acceleration of a rotating body is given by the relation $a = r\alpha$.

II Write short notes on ANY FIVE of the following

(5x2=10)

1. List the inversion of single slider cranks mechanism.
2. Define rubbing velocity at a pin joint. What will be the rubbing velocity at pin joint when the two links?
3. How to avoid interference?
4. Applications of Flywheels.
5. Explain phenomena of Creep of Belt drive.
6. What is hunting of a governor?
7. Write the importance of balancing?

III Answer ANY FIVE of the following

(5x4=20)

1. The crank of a slider crank mechanism rotates clockwise at a constant speed of 300 r.p.m. The crank is 150 mm and the connecting rod is 600 mm long. Determine:
(a) linear velocity and acceleration of the midpoint of the connecting rod, and
(b) angular velocity and angular acceleration of the connecting rod, at a crank angle of 45° from inner dead centre position.
2. A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio.
3. The turning moment diagram for a petrol engine is drawn to the following scales: Turning moment, 1 mm = 5 N-m; crank angle, 1 mm = 1° . The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm². The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.

4. For a flat belt, prove that $\frac{T_1}{T_2} = e^{\mu\theta}$.
5. A Porter governor has equal arms each 250 mm long and pivoted on the axis of rotation. Each ball has a mass of 5 kg and the mass of the central load on the sleeve is 25 kg. The radius of rotation of the ball is 150 mm when the governor begins to lift and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of speed of the governor.
6. Explain the any one method of balancing of different masses revolving in the same plane.
7. Briefly explain the types of Constrained Motions.

IV

Write an essay on ANY ONE of the following

(1x10=10)

1. Single Disc or Plate Clutch
2. Terms Used in Gears
