KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agrl. Engg.) 2021 Admission
II Semester Final Examination – September 2022

Fpme.1202 **Theory of Machines (2+0)** **Marks: 50**
Time: 2 hours

I **Fill in the blanks** **(10x1=10)**

1. The total number of instantaneous centres for a mechanism consisting of 'n' links is given by .....
2. ..... is imaginary circle which by pure rolling action, would give the samemotion as the actual gear.
3. ..... is the vertical distance which the sleeve travels due to change in equilibrium speed.
4. The size of a gear is usually specified by .....
5. The flywheel of 50 cm diameter rotates at an angular velocity of 44 radians/second. The peripheral velocity (m/s) will be .....

Match the following

	A		B
6.	Angular acceleration	a.	rad/s^2
7.	Flywheel	b.	N-m/s
8.	Sensitiveness of a governor	c.	Self closed pair
9.	Cam & Follower	d.	$(\omega_2 - \omega_1)/\omega_{mean}$
10.	Power	e.	storing kinetic energy

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

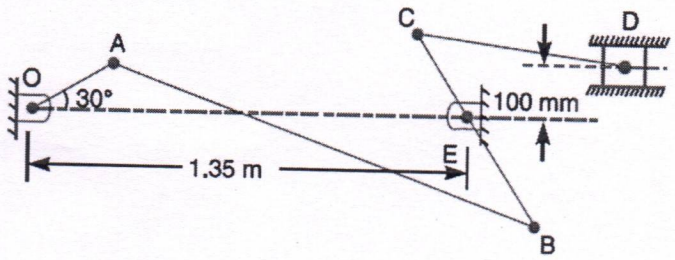
1. Differentiate between higher pair and lower pair.
2. Differentiate between Simple gear train and compound gear train.
3. What is effort and power of governor?
4. Mention the factors considered for selection of belt drives.
5. Define sensitiveness, hunting, stability and iso-chronism of governor.
6. State the laws of static friction.
7. What is potential energy and strain energy?

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

1. Discuss the classification of toothed gears.
2. Explain the significance of degrees of freedom of a kinematic chain when it functions as a mechanism. Give examples.
3. Mention the rules used in locating the instantaneous centers in a mechanism.
4. What is the function of a flywheel? How does it differ from that of a governor?
5. Explain the construction of Watt governor.
6. Discuss the classification of chains.
7. A leather belt is required to transmit 7.5 kW from a pulley 1.2 m in diameter, running at 250 r.p.m. The angle embraced is 165° and the coefficient of friction between the belt and the pulley is 0.3. If the safe working stress for the leather belt is 1.5 MPa, density of leather 1 Mg/m^3 and thickness of belt 10 mm, determine the width of the belt taking centrifugal tension into account.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Explain the different types of belt drives with neat sketches.
2. A mechanism, as shown in figure below, has the following dimensions: OA = 200 mm; AB = 1.5 m; BC = 600 mm; CD = 500 mm and BE = 400 mm. Locate all relevant instantaneous centres. If crank OA rotates uniformly at 120 r.p.m. clockwise, find the velocity of point D.



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