

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Mechanical Engineering
B. Tech. Mid-term Minor (RE) Examination (Even) 2019

Entry No:

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Total Number of Pages: [01]

Course Title: Kinematics of Machines

Course Code: MEL 2015

Time Allowed: 1.5 Hours

Max Marks: [30]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.

Q1.	Define Grashof's law State how is it helpful in classifying the four-link mechanisms into Different types.	[05]
Q2.	In a pin jointed four bar mechanism, AD is fixed, AB=300 mm, BC=CD= 360mm and AD=600mm. The angle BAD=60°. The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC.	[07]
Q3.	Explain and classify Steering gear mechanism.	[05]
Q4.	Sketch and explain all inversions of a single slider crank chain.	[05]
Q5.	A belt drive transmits 8 kW of power from a shaft rotating at 240 rpm to another shaft rotating at 160 rpm. The belt is 8 mm thick. The diameter of the smaller pulley is 400 mm and the shafts are 4 m apart. The coefficient of friction is 0.25. If the maximum stress in the belt is limited to 3 N/mm ² , find the width of the belt for (i) an open belt drive, and (ii) a cross-belt drive.	[08]

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 School of Mechanical Engineering
 B. Tech. Mid-term Minor Examination (~~Even~~) 2019

Entry No:

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odd

Total Number of Pages: [101]

Course Code: MEL 2015

Max Marks: [30]

Course Title: Kinematics of Machines

Time Allowed: 1.5 Hours

Instructions / NOTE

- Attempt All Questions.
- Support your answer with neat freehand sketches/diagrams, wherever appropriate.

What are centripetal and tangential components of acceleration? When do they occur? How are they determined? [05]

(Q1) A shaft rotating at 200 r.p.m. drives another shaft at 300 r.p.m., and transmits 6 kW through a belt. The belt is 10 cm wide and 1 cm thick. The distance between the shafts is 4 m. The smaller pulley is 50 cm in diameter. Calculate the stress in (i) open-belt, & (ii) crossed-belt. Take $\mu = 0.3$. Neglect centrifugal tension. [06]

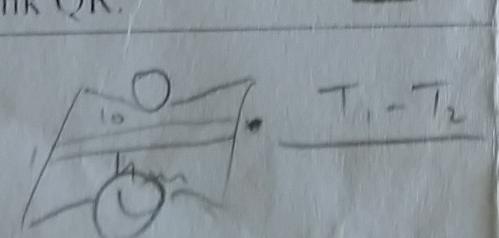
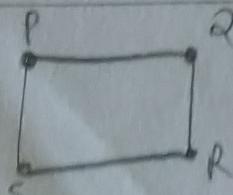
(Q2) Explain in detail all the inversions of the single & double slider-crank chain. [04]

(Q3) Explain with the help of diagram steering gear mechanisms. [05]

(Q4) Tabulate the materials used for the belts & ropes transmission drives. [03]

(Q5) Define Grashof's law State how is it helpful in classifying the four-link mechanisms into different types. [03]

(Q6) In a pin jointed four bar mechanism, PQ=300 mm, QR=RS= 360mm and PS=600mm. The angle QRS=60°. The crank PQ rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link QR. [04]



$$\omega^0$$

$$\omega = \frac{n \times 2\pi}{60}$$

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Mechanical Engineering
B. Tech. (ME) Major Examination (Even) 2018-19

Entry No:

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Total Number of Pages: [01]

Date:

Total Number of Questions: [07]

Course Title: Kinematics of Machines

Course Code: MEL 2015

Time Allowed: 03 Hours

Max Marks: [50]

Instructions / NOTE:

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
Assume an appropriate data / information, wherever necessary / missing.

Q1. Describe the working of a band and block brake with the help of neat sketch. What is the difference between a brake and a clutch? **(7 marks)**

Q2. A cone clutch with asbestos friction lining transmits 30 Kw power at 500 rpm. The coefficient of friction is 0.2 & the permissible intensity of pressure is 0.35 N/mm^2 . The semi-cone angle α is 12.5° . The outer diameter is fixed as 300 mm. Assuming uniform wear theory, calculate (i) inner diameter, (ii) Face width of the friction lining (iii) force required to engage the clutch. **(9 marks)**

Q3. Explain the function of a governor with the help of neat sketch? **(4 marks)**

- Q4. Explain in detail all the inversions of the slider-crank chain. **(4 marks)**
- Q5. Draw the profile of a cam that gives a lift of 40mm to a rod carrying a 20mm diameter roller. The axis of the roller passes through the centre of the cam. The least radius of the cam is 50mm. The rod is to be lifted with simple harmonic motion in a quarter revolution and is to be dropped suddenly at half revolution. Determine the maximum velocity and maximum acceleration during the lifting. The cam rotates at 60 rpm. **(9 marks)**
- Q6. The pulleys of two parallel shafts 8 m apart are 600 mm and 800 mm in diameters and are connected by a crossed belt. It is needed to change the direction of rotation of the driven shafts by adopting the open-belt drive. Calculate the change in length of the belt. **(9 marks)**
- Q7. A centrifugal clutch transmitting 255 Nm torque consists of 4 shoes with $\mu = 0.35$. The inner diameter of the drum is 330 mm and the radial distance of shoes C.G. point from shaft axis is 140 mm. The transmitting power speed is 80 rad/sec. and clutch engage speed is 60 rad/sec. Find the mass of each shoe. **(8marks)**