

SHRI MATA VAISHNO DEVI UNIVERSITY
Department of Mechanical Engineering
Faculty of Engineering

Minor I Examination B. Tech 3rd Semester

Course Code: MEL 2015

Max. Marks: 20

Course: KOM

Date: -09.09.17

Max. Time: 01 Hr.

Q1. Sketch and explain any two inversions of a double slider crank chain. (4 marks)

Q2. Define Grashof's law State how is it helpful in classifying the four-link mechanisms into Different types. (4 marks)

Q3. A leather belt transmits 10 kW from a motor running at 600 rpm by an open-belt drive. The diameter of the driving pulley of the motor is 350 mm, centre distance between the pulleys is 4 m and speed of the driving pulley is 180 rpm. The belt weighs 1100 kg/m^3 and the maximum allowable tension in the belt is 2.5 N/mm^2 . $\mu = 0.25$. Find the width of the belt assuming the thickness to be 10 mm. Neglect the belt thickness to calculate the velocities. (6 marks)

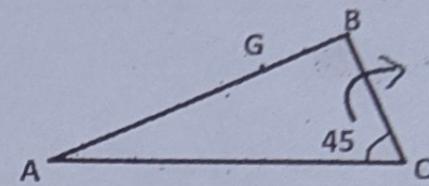


Fig 1

Q4. The engine mechanism shown in fig 1 has crank $OB=50\text{mm}$ & length of connecting rod $AB=225\text{mm}$. The centre of gravity of the rod is at G which is 75mm from B . The engine speed is 200 r.p.m. For the position shown, in which OB is turned 45° from OA , Find 1.the velocity of G & the angular velocity of AB , and 2. the acceleration of G & angular acceleration of AB . **(6 marks)**

SHRI MATA VAISHNO DEVI UNIVERSITY
Department of Mechanical Engineering
Faculty of Engineering

Minor II Examination B.Tech. 3rd Semester

Course Code: MEL 2015

Max. Marks: 20

Course: KOM

Max. Time: 01 Hr.

Q1. How are the cams classified? Describe in detail.

(4 marks)

Q2. Use the following data in drawing the profile of a cam in which a knife-edged follower is raised with uniform acceleration & deceleration and is lowered with simple harmonic motion: Least radius of cam=60mm, lift of follower=45mm, angle of ascent=60°, angle of dwell between ascent & descent=40°, angle of descent=75°. If the cam rotates at 180 rpm, determine the maximum velocity & acceleration during ascent & descent.

(7 marks)

Turn Over...

- Q3. Explain the working of a multi-plate clutch with the help of a neat sketch. (4 marks)**
- Q4. Discuss the effectiveness of a band brake under various conditions. (5 marks)**

Course Outcomes

- CO1. Get an exposure to various methods of analysis. Learn the fundamentals of Kinematic design of mechanisms for specific requirement in industrial application and or to bring the comfort of human being. Understand Velocity and Acceleration diagrams.
CO2. Understand basic working of Belts, Ropes and Chains.
CO3. Understand basic working of cam and follower.
CO4. Understand basic Concepts of Frictions and Wear Related to Bearings and Clutches.
Learn concept of braking.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1,3,4	16	34
CO2	2	04	34
CO3	-	-	34
CO4	-	-	34

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Mechanical Engineering

B. Tech. (ME) Minor I Examination (Even) 2018-19

Entry No: 17bme021

Date:

Total Number of Pages: [02]

Total Number of Questions: [07]

Course Title: Kinematics of Machines

Course Code: MEL 2015

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions / NOTE

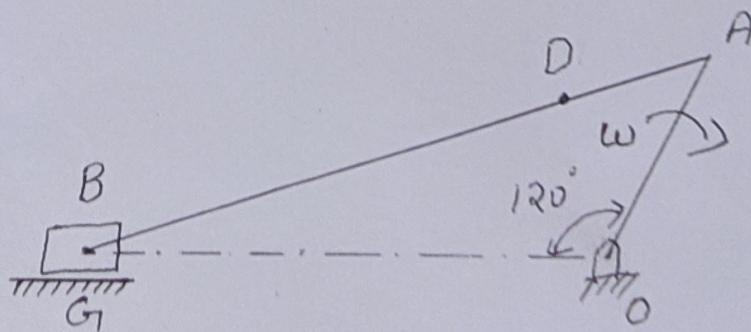
- Attempt All Questions.
- Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Section - A

Q1.	Define Grashof's law State how is it helpful in classifying the four-link mechanisms into Different types.	[03]	CO1
Q2.	Write a short note on Belts, Ropes and chains	[04]	CO2

Section - B

Q3.	In a pin jointed four bar mechanism as shown in fig. 1, 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.	[05]	CO1
Q4.	Figure shows configuration of an engine mechanism. The dimensions are the following: Crank OA=200mm, Connecting rod AB=600mm, distance of centre of mass from crank end,AD=200mm. At the instant, the crank has an angular velocity of 50 rad/s clockwise and an angular acceleration of 800 rad/s ² . Calculate the (i) velocity of D and angular velocity of AB, (ii) acceleration of D and angular acceleration of AB, (iii) point on the connecting rod which has zero acceleration at this instant.	[08]	CO1



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

Entry No: **17bme021**
Date:

Total Number of Pages: [01]
Total Number of Questions: [04]

Course Title: Kinematics of Machines
Course Code: MEL 2015

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions / NOTE

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

Section - A		
Q1.	Discuss on what basis cams & followers are being classified.	[05]
Section – B		
Q2.	A belt having a cross section of 100 by 10 mm transmits maximum power with an angle of lap 160° on the smaller pulley. The density of the belt material is 1000 kg/m^3 and the coefficient of friction is 0.25. The permissible tension in the belt is 1.5 N/mm^2 . Determine the maximum power transmitted by the belt.	[05]
Q3.	A V-belt weighting 1.6 kg/m run has an area of cross-section of 750 mm^2 . The angle of lap is 165° on the smaller pulley which has a groove angle of 40° . The coefficient of friction is 0.12. The maximum safe stress in the belt is 9.5 N/mm^2 . What is the power transmitted that can be transmitted by the belt at a speed of 20 m/s ?	[05]
Q4.	A rope drive uses ropes weighing 1.6 kg/m length. The diameter of the pulley is 3.2 m and has 12 grooves of 40° angle. The coefficient of friction between the ropes and the grooves sides is 0.3 and the angle of contact is 165° . The permissible tension in the ropes is 870 N . Determine the speed of the pulley and the power transmitted.	[05]

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

Entry No: 1 8 B M E 0 2 9

Course Title: Kinematics of Machines

Time Allowed: 1.5 Hours

Instructions / NOTE

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

	Total Number of Pages: [01]
	Course Code: MEL 2015
	Max Marks: [30]
Q1.	What are centripetal and tangential components of acceleration? When do they occur? How are they determined? [05]
Q2.	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]
Q3.	Explain in detail all the inversions of the single & double slider-crank chain. [04]
Q4.	Explain with the help of diagram steering gear mechanisms. [05]
Q5.	Tabulate the materials used for the belts & ropes transmission drives. [03]
Q6.	Define Grashof's law State how is it helpful in classifying the four-link mechanisms into different types. [03]
Q7.	In a pin jointed four bar mechanism, PQ=300 mm, QR=RS= 360mm and PS=600mm. The angle QPS=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]

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]

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)**