ALPHA COLLEGE OF ENGG & TECH

ODD SEM 2018

ASSIGNMENT 1

SUB : KOM (2131906) 3RD ME A

CH-1 Introduction of Mechanisms and Machines

NO	QUESTION	YEAR	MARKS
1	What is meant by inversions of mechanism? Sketch double slider cranks chain and draws its inversion.	Nov-2010	7
2	Explain mechanisms: (a) Hart Mechanism (b) Roberts Mechanism	June-2011	7
3	Explain Paucellier's Mechanism.	June-2011	7
4	A crank and slotted lever mechanism used in a shaper has a centre distance of 300mm between the centre of oscillation of the slotted lever and the centre of Rotation of the crank. The radius of the cranks is 120mm.Find the ratio of the Time of cutting to the time of return stroke.	June-2013	7
5	Write notes on complete and incomplete constraints motion in lower and Higher Pairs, illustrate your answer with neat sketches.	Jun.-2010	7
6	Define the following terms: 1. Link 2. Locked Chain 3. Higher Pair 4. Ternary Joint 5. Degrees of freedom 6. Constrained Motion 7. Quaternary Link	May-2012, Nov-17	4, 7
7	Sketch and explain any two inversions of double slider crank chain.	Dec-2013	7
8	Describe briefly types of Constrained Motions.	Dec-2013	7
9	Explain degree of freedom with neat sketch. Also explain Grumbler's criterion.	Dec-2010	7
10	Define: Kinematic link, Kinematic pair, Kinematic chain.	Nov-2011, Nov-17	3, 7
11	What are quick return motion mechanisms? Where they are used? Discuss the functioning of any one of them.	Nov-2011	7
12	State and explain Grashof's criterion.	Dec-2010	7
13	Explain various inversion of a slider crank mechanism with the help of examples.	Nov-17	7
14	Explain the types of instantaneous centers.	Nov-17	3
15	Differentiate between Machine and Structure with suitable example.	June-17	4
16	Sketch and explain the various inversions of a Double slider crank chain.	June-17	7
17	Explain Klein's construction method in detail with neat sketch.	June-17	7

18	Draw a neat sketch of following mechanism with proper notation of the links. 1. Four bar crank and lever mechanism. 2. Four bar rocker- rocker mechanism.	June-17	7

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ASSIGNMENT 2

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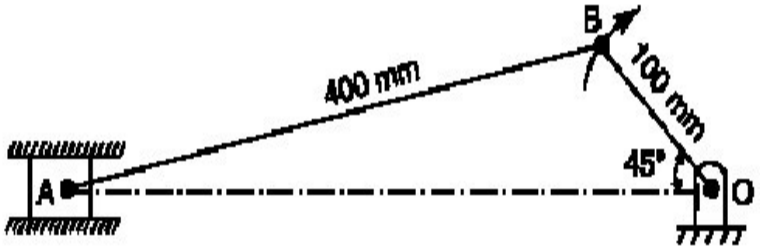
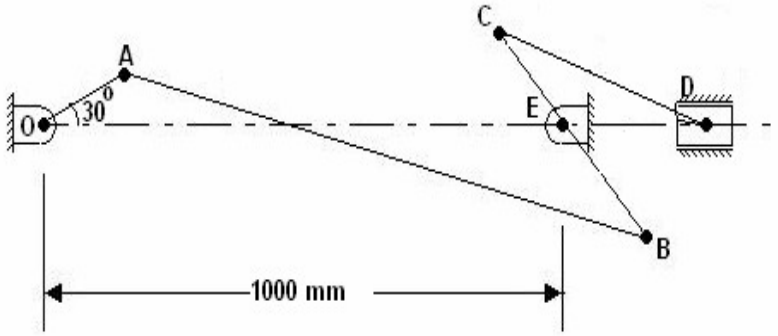
CH-2 Synthesis and Analysis of Mechanisms

NO	QUESTION	YEAR	MARKS
1	What is the condition for correct steering? Sketch and explain any one type of steering gear mechanism with its advantages.	Nov-11, Dec-12, June-13, Dec-13, June-14, Dec-14	7
2	Explain instantaneous centre method for finding out the velocity of a point on link.	Dec-2010	7
3	Describe different types of steering gear mechanism.	Dec-2012, June-17	7
4	Derive the equation for finding out the ratio of angular velocities of two shaft of Hooke's joint.	June-2013, June-17	6, 7
5	Sketch and describe the working of whit-worth Quick return motion mechanism	Jun-2010	7
6	Explain the following : 1. Rubbing Velocity 2. Instantaneous center 3. Kennedy's theorem	May-2012	7
7	Derive the equation of displacement, velocity and acceleration of slider in a slider crank mechanism by analytical method	Jun-2011	7
8	Explain inversion method of synthesis for four bar mechanism using Two point and Three Point.	June-17	6
9	What is steering gear mechanism? Derive the relation for correct steering for Devis steering gear mechanism	June-2013	7
10	Derive analytical expression for the displacement and velocity analysis of a slider crank mechanism.	Dec-2012, June-2014	7
11	With neat sketch, Explain: (i) Peaucellier Mechanism (ii) Hart's Mechanism (iii) Scott Russell's Mechanism.	June-2014, June-17	7
12	What are Straight line motion mechanisms? Explain any three different engine indicators working on this mechanism.	Dec-2012, June-2013, Dec-2013	7
13	Explain Ackerman steering gear mechanism with neat sketch.	Dec-2012, June-2014, June-17	6, 7
14	Derive an expression for the ratio of shafts velocities for Hooke's joint and draw the polar diagram depicting the salient features of driven shaft speed.	June-2013	7

15	Two shafts with an included angle of 160° are connected by a Hook's joint. The driving shaft runs at uniform speed of 1500 rpm. The driven shaft carries a flywheel of mass 12 kg and 100 mm radius of gyration. Find the maximum angular acceleration of the driven shaft and the maximum torque required.	June-2015	7
16	Locate all the instantaneous centres of the slider crank mechanism.The lengths of crank OB and connecting rod AB are 100 mm and 400 mm respectively.If the crank rotates clockwise with an angular velocity of 10 rad/s, find: 1. Velocity of the slider A,and 2. Angular velocity of the connecting rod AB. 	Dec-2013, June-2015	7
17	PQRS is a four bar chain with link PS fixed. The lengths of the links are PQ=62.5 mm; QR=175 mm; RS=112.5 mm; and PS=200 mm. The crank PQ rotates at 10 rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS=60° and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS.	June-2015	7
18	Explain Types of Instantaneous Centres and also state Aronhold Kennedy (or Three Centres in Line) Theorem	Dec-2013	7
19	For the mechanism shown in Fig. crank OA rotates at 150 rpm clockwise. Using Instantaneous Center Method determine the linear velocity of the points B,C and D and angular velocities of links AB,BC and CD. OA = 100 mm, AB = 580 mm, BC= 300 mm, CD = 350 mm and BE= 200 mm. 	Dec-2012	7
20	Explain Relative pole method of synthesis for slider crank mechanism using Two point and Three Point.	June-17	6

21	Explain chebyshev spacing method for location precision point position in four bar chain mechanism.	Jan-17	7

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ASSIGNMENT 3

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CH-3 Gears and Gear Trains

NO	QUESTION	YEAR	MARKS
1	Explain any five terminology of gear tooth with neat sketch.	Dec-2013	7
2	Explain what is meant by the term “Interference” as related to toothed gears having profile? Discuss various methods used to avoid interference.	Nov-2011, Jun-2017	7
3	Explain epicyclic gear train with the help of neat sketch. Write its merits and demerits as compared to reverted and compound gear trains.	Dec-2012	7
4	Explain any five terminology of gear tooth with neat sketch.	Dec-2013	7
5	Enlist different types of gear train. Explain compound gear train with neat sketch. Also derive the equation of the velocity ratio for compound gear train.	Jun-2011	7
6	What is gear train? Give classification of it and Explain epicyclic gear train in detail.	Jun-2017	7
7	Differentiate between involute and cycloidal profile of gear teeth.	Jun-2017	7
8	Derive the expression for the length of path of contact and length of arc of contact.	Jun-2017	7
9	Derive the empirical relation for minimum number of teeth to avoid interference in gears.	Jun-2017	5
10	If the number of teeth in the gears 1 and 2 are 60 and 40, the module pitch =3mm, the pressure angle 20º and the addendum = 0.318 of circular pitch determine the velocity of sliding when the contact is at the tip of the tooth of gear 2 and the gear 2 rotates at 800 rpm.	Jun-2017	9
11	Determine the velocity ratio of differential gear box	Jun-2017	5
12	Comparison between Involute and Cycloidal tooth profile.	Jan-17	3
13	Fundamental Law of Gearing.	Jan-17	4
14	State any three application of Gear Train.	Jan-17	3

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ASSIGNMENT 4

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CH-4 Cams and Followers

NO	QUESTION	YEAR	MARKS
1	Construct cam profile for a knife edge follower. Minimum radius of cam = 30mm, Stroke of follower = 24mm, Angle of rise = 900, Dwell after rise = 600, Angle of return = 1200, Dwell after return for rest of the period. Follower to move outwards with uniform velocity and return back with simple harmonic motion. The follower is offset to right by 15mm. The cam is to rotate in anticlockwise direction.	June-2011	7
2	Classify followers and explain with neat sketch.	Jun-2011, Nov-16	7
3	Define a Cam and a Follower. Sketch different types of follower and mention specific characteristic of each.	May-2012	7
4	Explain with sketches the different types of cams and followers.	Dec-2013	7
5	Explain the following terms as applied to cam. 1. Base circle 2. Pitch circle 3. Pressure angle 4. Stroke of follower.	June-17	7
6	A cam rotating clockwise at a uniform speed of 1000 r.p.m. is required to give a roller follower the motion defined below. 1. Follower to move outwards through 50 mm during 120° of cam rotation, 2. Follower to dwell for next 60° of cam rotation 3. Follower to return to its starting position during next 90° of cam rotation 4. Follower to dwell for the rest of the cam rotation. The minimum radius of the cam is 50 mm and the diameter of roller is 10 mm. the line of stroke of the follower is off-set by 20 mm from the axis of the cam shaft. If the displacement of the follower takes place with uniform and equal accelerations and retardation on both the outward and return strokes, draw profile of the cam.	June-17	7
7	State the relation for Displacement, Velocity and Acceleration for following motion of follower 1. Uniform velocity, 2. Simple harmonic motion	June-17	4
8	A cam with 30 mm as minimum diameter is rotating clockwise as a uniform speed of 1200 rpm and has to give the motion to the roller follower 10 mm diameter as defined below: 1. Outward stroke of 25 mm during 120º of cam rotation with equal uniform acceleration and retardation 2. Dwell for 60º cam rotation	June-17	10

	3. Return to its initial position during 90º of cam rotation with equal uniform acceleration and retardation 4. Dwell for the remaining 90º cam rotation Layout the cam profile when the roller axis is offset to right by 5 mm.		
9	Types of Cam with sketch	Jan-17	4
10	Types of follower with sketch	Jan-17	4

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