SHANTILAL SHAH ENGINEERING COLLEGE-BHAVNAGAR

MECHANICAL ENGINEERING DEPARTMENT

QUESTION BANK

SUBJECT CODE: 2142504
SUBJECT: THEORY OF MACHINES
Enrollment No: _____ Batch:_____

Sr. No.	Detail	GTU Year	Marks
	1. Basics of Mechanisms and Machines		
1.	Explain the term Kinematic link. Give the classification of Kinematic link.	Extra	7
2.	What is a Machine? Giving example differentiate between a machine and a structure.	Extra	6
	Differentiate Mechanism and Structure.	Winter -17	4
3.	Explain the types of constrained Motions with neat sketch.	Extra,	6 OR 7,
	OR differentiate between completely constrained and incompletely constrained motion.	Summer- 17	3
4.	Explain different kinds of Kinematic Pairs giving example for each one of them [OR: Classification of kinematic pairs]	Winter-15 + Summer-16	7 OR 3
	Define higher pair mechanism and lower pair mechanism	Winter -17	3
5.	Explain the terms: 1. Lower pair 2. Higher pair 3.Kinematic chain & 4.Inversion 5. Linkage 6. Transmission angle	Extra	6
6.	Explain the Types of Joints in a chain	Extra	6
7.	Define Mechanism and explain the significance of degrees of freedom of a [kinematic chain when it functions as a] mechanism with example.	Extra	6
	Define degree of freedom with example.	Winter -17	3
8.	State the Gruebler's criterion. What is the limitation of it	Winter -17	3
9.	Define Kinematic Chain and enlist the types of the same.	Extra	6
10.	Explain four-bar chain/ quadric cycle chain with neat sketch. Explain inversions of the same.	Extra	7
11.	Explain single slider crank chain with neat sketch. Explain inversions of the same. **OR**	Extra,	7
	Explain inversion of single slider crank chain	Winter -17	7
	OR Sketch & explain any ONE inversion of single slider crank chain	Summer-17	4
12.	Explain double slider crank chain with neat sketch. Explain inversions of the same.	Extra	7

Sr. No.	Detail	GTU Year	Marks
13.	In a four bar chain ABCD, AD is fixed & **145 mm long**. The crank AB is 40 mm long & rotates at 120 rpm clockwise, while the link CD = 80 mm oscillates about D. BC & AD are of equal length. Find the velocity of CD when angle BAD = 60°. **OR**	Summer-17	7
14.	In a four bar chain ABCD, AD is fixed & **150 mm long.** The crank AB is 40 mm long & rotates at 120 rpm clockwise, while the link CD = 80 mm oscillates about D. BC & AD are of equal length. Find the velocity of CD when angle BAD = 60°.	Winter- 17	7
15.	The crank & connecting rod of a theoretical steam engine are 0.5 m & 2 m long respectively. The crank makes 190 rpm in the clockwise direction .When it has turned 45° from the inner dead centre position, determine velocity of piston.	summer-17	7
2. Mechanisms with Lower Pair			
1.	Draw pantograph mechanism with proportions of links shown and state its applications.	Summer-16	4
	Describe Pantograph	Winter -17	3
2.	A double Hook's joint is used to connect two shafts in the same plane and the intermediate shaft is at an angle of 20̊ to both the shafts. If the driving shaft rotates at 300 rpm, find the maximum and minimum speeds of the intermediate and driven shafts.	Summer-16	3
3.	Enlist various straight line mechanisms and prove that Peaucellier mechanism is a straight line mechanism. [OR What are straight line mechanisms? Describe one type of exact straight line motion mechanism with the help of a sketch]	Summer-15+ winter-15+ Summer-17	7
4.	With the help of steering gear mechanism explain the condition for correct steering.	Winter-15	7
5.	Derive the equation of angular velocities of shafts connected by a Hooke's joint.	Summer-15	7
6.	Sketch the Ackermann steering gear with labeling. Give the reason why the Ackermann steering gear, which does not satisfy the condition for correct gearing in all positions, is preferred to the Davis steering gear?	Winter-16(nov-16)	4
	State and explain the Ackerman Steering Mechanism.	Winter-17	4
3. Velocity and Acceleration Analysis of Mechanisms			
1.	Explain the procedure for Velocity diagram.	Winter-17	4
2.	Explain the detail procedure for Acceleration diagram with example	Winter-17	7
3.	What is Coriolis Acceleration ?	Winter-17	3
4.	Write the steps for finding velocity & acceleration of a slider crank mechanism, when crank rotates uniformly, by Klein's construction. Show all expressions for velocity & acceleration of crank,	Summer-16	7

Sr. No.	Detail	GTU Year	Marks
	connecting rod and piston.		
	State the principle of Klein's Construction	Winter-17	3
5.	In four stroke cycle engine, the crank is 100 mm and the obliquity ratio is 4.5. the engine speed is 800 rpm. Determine by klein's construction, the velocity and acceleration of the piston when the crank is 45^0 from i.d.c.	Winter -17	7
6.	Classify & explain instantaneous centers with neat sketches.	Summer-16	3
7.	Derive the expression for the coriolis component of acceleration for any link PQ rotating with an angular velocity ω rad/s about a fixed point O with a point R on it moving along it at a linear velocity v m/s.	Extra	
8.	In a crank and slotted lever mechanism shown in **Figure 1**, the distance between fixed centres O and A is 250 mm. Length of links are as follows: OP = 100 mm, AR = 400 mm, RS = 150 mm and AOP = 120̊. Uniform speed of crank OP is 60 rpm clockwise. Line of stroke of the ram is 450 mm above A and perpendicular to OA. Calculate the velocity of the ram S. Determine acceleration of ram S.	Summer-15	7+7
9.	In the toggle mechanism shown in **Figure 2**, the slider D is constrained to move in a horizontal path the crank OA is rotating in CCW direction at a speed of 180 rpm the dimensions of various links are as follows: OA = 180 mm, CB = 240 mm, AB = 360 mm and BD = 540 mm Find: (i) Velocity of slider, (ii) Angular velocity of links AB, CB and BD using method of Instantaneous centres.	Summer-15	7
10.	The crank & connecting rod of a theoretical steam engine are 0.5m & 2m long respectively. The crank makes 180 rpm in the clockwise direction. When it has turned 45º from the inner dead centre position, determine: 1. Velocity of piston 2. Angular velocity of connecting rod. 3. Velocity of point E on the connecting rod 1.5 m from the gudgeon pin.	Winter-15	7
11.	What do you mean by rubbing velocity? Also find the velocities of rubbing for above problem at the pins of the crankshaft, crank & crosshead when the diameter of their pins is 50 mm, 60 mm & 30 mm respectively.	Winter-15	7
12.	**Figure -3** shows a mechanism in which the crank AB rotates at a uniform speed of 420 rpm in clockwise direction & link AD is fixed. Determine: (i) the velocity of slider E & (ii) the angular velocity of link BE. Dimensions of various links are : AD = 80 mm, AB = 50 mm, BC = 60 mm, CD = 60 mm, BE = 60 mm and angle between links AB & AD is 60̊. Use relative velocity method only.	Summer-16	7
13.	As shown in the **Figure-4**, the crank OA makes 150rpm. Find the given configuration, the velocity of the piston P and Angular velocity of link ABC and CP, OA= 150mm, AB = 375mm, AC =		

<table>
<tr><th>Sr. No.</th><th>Detail</th><th>GTU Year</th><th>Marks</th></tr>
<tr><td></td><td>400mm, BC = 62.5mm, BQ = 200mm, CP = 450mm</td><td></td><td></td></tr>
<tr><td colspan="4">4. Kinematic Synthesis of Mechanisms</td></tr>
<tr><td>1.</td><td>Describe a step by step procedure for the synthesis of slider crank mechanism using 3 precision points.</td><td>Summer-15</td><td>7</td></tr>
<tr><td>2.</td><td>Explain following terms in context to kinematic synthesis:
Function Generation (2) Structural Error (3) Precision points</td><td>Summer-15</td><td>6</td></tr>
<tr><td>3.</td><td>Describe the classification of synthesis problem</td><td>Winter -17</td><td>4</td></tr>
<tr><td rowspan="2">4.</td><td>What is kinematic synthesis of mechanisms? Derive Freudenstein’s equation.</td><td>Winter-15+ Winter -17</td><td rowspan="2">7</td></tr>
<tr><td>Derive Freundenstein’s equation for four bar chain mechanism considering displacement analysis.</td><td>Summer-17</td></tr>
<tr><td>5.</td><td>In the context of synthesis differentiate between structural error and mechanical error.</td><td>Summer-17</td><td>3</td></tr>
<tr><td>6.</td><td>What is the difference between function generation and path generation?</td><td>Summer-17</td><td>4</td></tr>
<tr><td>7.</td><td>What are the phases of kinematic synthesis? Explain any one phase. Define structural error for kinematic synthesis.</td><td>Summer-16</td><td>4</td></tr>
<tr><td>8.</td><td>A four bar mechanism is to be designed, by using three precision points to generate the function $y=x^{1.5}$, for the range $1\le x\le 4$. Assuming 30° starting position & 120° finishing position for the input link & 90° starting position & 180° finishing position for the output link, find the values of x & y.</td><td>Winter-15</td><td>7</td></tr>
<tr><td>9.</td><td>Design & draw four bar chain mechanism using Freudenstein’s equations with three accuracy points and Chebyshev spacing so that the input & output angles will be coordinated as follows:
<table><tr><td>Input angle(θ)</td><td>46°</td><td>68°</td><td>85°</td></tr><tr><td>Output</td><td>100°</td><td>110°</td><td>122°</td></tr></table>Use algebraic method for the solution. Draw the mechanism in drawing sheet using calculated dimensions only</td><td>Summer-16</td><td>7</td></tr>
<tr><td colspan="4">5. Friction and Friction Drives</td></tr>
<tr><td>1.</td><td>With the help of neat sketch, explain the concept of “Limiting Friction”</td><td>Summer-17</td><td>3</td></tr>
<tr><td>2.</td><td>Considering Uniform Pressure derive the expression for total frictional torque in flat pivot bearing.</td><td>Summer-17</td><td>4</td></tr>
<tr><td>3.</td><td>Define Laws of Friction.</td><td>Winter -17</td><td>3</td></tr>
<tr><td>4.</td><td>Explain the single plate clutch in terms of elements, working and applications.</td><td>Summer-16</td><td>4</td></tr>
<tr><td>5.</td><td>Establish a formula for the maximum torque transmitted by a single plate clutch of external & internal radii r1 & r2, if the limiting coefficient of friction is μ & the axial spring load is W. Assume that the pressure intensity on the contact surface is uniform.</td><td>Winter-15</td><td>7</td></tr>
</table>

Sr. No.	Detail	GTU Year	Marks
6.	Determine the maximum, minimum & the average pressure in plate clutch when the axial force is 4kN. The inside radius of the contact surface is 50 mm & the outside radius is 100 mm. Assume uniform wear.	Winter-15	7
7.	A single plate friction clutch, with both sides of the plate being effective, is used to transmit power of an engine at 2400 rpm. If has outer and inner radii of 45 mm and 35 mm respectively. The pressure is applied axially by means of spring and has maximum intensity of 78.5 kPa. Determine: total axial force applied by springs and power transmitted. Assume coefficient of friction as 0.3.	Summer-15	6
8.	State different belt materials and their specific applications.	Summer-16	3
9.	What is slip of belt	Winter -17	3
10.	Derive the expression for the exact length of the belt for an open belt drive with usual notations.	Summer-16	7
11.	Derive the equation of belt velocity for maximum power transmission using a belt drive.	Summer-15	8
12.	Two pulleys one 450 mm diameter and other 200 mm diameter are on parallel shafts 1.95 m apart and are connected by a crossed belt. Find (i) the length of belt required and (ii) the angle of contact between the belt & each pulley. (iii) What power can be transmitted by the belt when the larger pulley rotates at 200 rpm, if the maximum permissible tension in the belt is 1000 N and the coefficient between the belt & the pulleys is 0.25?	Summer-16+ Winter-17	7
13.	Derive an expression for total length of belt for a cross belt drive with usual notations.	Winter-16(nov-16)	7
14.	What is centrifugal tension in a belt? How does it affect the power transmitted?	Summer-17	3
15.	A leather belt is required to transmit7.5kW from a pulley 1.2m in diameter, running at 250 rpm. The angle embraced is 165̊ and the coefficient of friction between the belt and the pulley is 0.3. If the safe working stress for the leather belt is1.5MPa, density of leather 1Mg/m3 and thickness of belt 10mm, determine the width of the belt taking centrifugal tension into account.	Winter-16(nov-16)	7
16.	A shaft rotating at 200 rpm drives another shaft at 300 rpm & transmits 6 kW through a belt. The belt is 100 mm wide and 10 mm thick wide. The distance between the shafts is 4m. The smaller pulley is 0.5 m in diameter. Calculate the stress in the belt, if an open belt drive is there. Take $\mu = 0.3$.	Summer-17	7
17.	For the flat belt, prove that $T1/T2 = e^{\mu\theta}$, where T1= Tension in the tight side of the belt, T2 = Tension in the slack side of the belt, μ = Coefficient of friction between the belt & the pulley & θ = angle of contact between the belt & the pulley (in radians).	Winter-15+ Winter-17	7
18.	Find the power transmitted by a belt running over a pulley of a 600 mm diameter at 200 rpm. The coefficient of friction between the belt & the pulley is 0.25, angle of lap 160º and the maximum	Winter-15	7

Sr. No.	Detail	GTU Year	Marks
	tension in the belt is 2500 N.		
19.	State different types of rope drives. What are the advantages & limitations of rope drives over other drives?	Winter-16(nov-16)+ Winter-17	4
20.	Classify chains and draw the sketch of each class.	Winter-16(nov-16)	3
21.	State different types of brakes.	Summer-16	3
22.	Differentiate between self energizing brakes and self locking brake.	Summer-17	4
6. Gears and Gear Trains			
1.	State & prove the law of gearing. Show that involute profile satisfies the conditions for correct gearing.	Winter-15	7
2.	Describe the terminology of gears with neat sketch.	Winter-16(nov-16)	3
	Define,1) Pitch circle 2) Addendum 3) Module 4) Circular Pitch	Winter-17	4
3.	With the usual notation prove that product of circular pitch and diametral pitch is π.	Summer-17	4
4.	Classify gears by three major ways of classification (No sketches).	Summer-16	3
5.	Despite of one disadvantage Involute teeth profile is preferred for manufacturing gears above cyclical teeth profile. Why?	Summer-17	3
6.	Classify gear trains with a sketch of each one of them.	Summer-16	4
7.	What are the specific advantages of epicyclic gear trains?	Summer-17	3
8.	In which gear train the motion of the first gear and the last gear is "Like"? Why?	Summer-17	4
9.	Write the advantages & disadvantages of involute gear teeth profile.	Summer-16	3
10	Enlist and explain methods for reducing or eliminating interference in mating gears. Also clearly state disadvantage of each.	Summer-15	7
11	What do you understand by 'gear train'? Discuss any THREE types of gear trains.	Winter-15	7
12	In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D-E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gear B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when the gear B is fixed and the arm A makes 100 rpm clockwise.	Winter-16(nov-16)	7
13	A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 200 pressure angle, 12 mm module and 10 mm addendum. Find (i) the length of path of contact (ii) the length of arc of contact & (iii) the contact ratio.	Winter-16(nov-16)+ Summer-17	7
14	The following data refer to two mating involute gears of 20°	Summer-16	7

Sr. No.	Detail	GTU Year	Marks
	pressure angle: Number of teeth on pinion = 20, Gear ratio = 2, Speed of pinion = 250 rpm & Module = 12 mm. If the addendum on each wheel is such that the path of approach & path of recess on each side are of half the maximum possible length each; find (i) the addendum for pinion & gear wheel (ii) the length of arc of contact (iii) maximum velocity of sliding during recess.		
15	The arm of an epi-cyclic gear train shown in **Figure-5** rotates at 100 rpm in CCW direction. The arm carries two wheels A and B with 36 and 45 teeth respectively. The wheel A is fixed and arm rotates about centre of A. Find the speed and direction of rotation of wheel B. What will be the speed and direction of rotation of wheel B, if wheel A rotates at 200 rpm in CW direction?	Summer-15	6
16	A 6 mm module, 24-tooth pinion is to drive a 36-tooth gear. The gears are cut on the 20° full-depth involute system. Find and tabulate the addendum, dedendum, clearance, circular pitch, base pitch, tooth thickness, base circle radii, length of paths of approach and recess, and contact ratio.	Summer-15	8
17	The number of teeth on each of the two equal spur gears in mesh is 40.The teeth have 20º involutes profile and the module is 6 mm. If the arc of contact is 1.75 times the circular pitch, find the addendum.	Winter-15	7
18	In an epicyclic gear train, an arm carries two gears A & B having 36 & 45 teeth respectively. If the arm rotates at 150 rpm in the anticlockwise direction about the centre of the gear A which is fixed, determine the speed of the gear B. If the gear A instead of being fixed makes 300 rpm in the clockwise direction, what will be the speed of the gear B? (Refer **Figure-6**)	Winter-15+ Summer-17	7
7. Cams			
1.	Describe the terminology of radial a cam with neat sketch. [OR Define each of the following term showing on a sketch]	Winter-16(nov-16)	3
	Define the following terms with reference to cam: (i) Base Circle (ii) Pitch Circle (iii) Pressure Angle (iv) Stroke of the follower	Summer-17	4
2.	State the motions imparted to a follower by a cam and sketch the displacement-time diagrams for each motion type.	Winter-16(nov-16)	4
3.	Give detailed classification of cams with a sketch.	Winter-16(nov-16)	4
	Describe classification of cams. Draw a sketch for each of them.	Winter-17	4
4.	Why a roller follower is preferred over knife –edge follower? OR [Give Classification of followers on various basis with sketch.]	Summer- 17	3
5.	Explain undercutting of the cam. Enlist 4 different types of follower motions stating a typical application of each.	Summer-15	7

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6.	Draw the profile of a cam to raise a valve with SHM through 40 mm in 90̊, keep it fully open for 36̊ and to lower it with uniform & equal acceleration & retardation in 60̊ revolutions of cam. The valve remains closed during the rest of the cam revolution. The diameter of roller of the valve is 20 mm and the minimum radius of cam is 40 mm. The axis of the valve passes through the axis of cam shaft. Also determine the maximum velocity during outstroke and maximum acceleration during return stroke of the valve respectively if the crank shaft rotates at 360 rpm.	Summer-16	7
7.	In a tangent cam operating a roller follower has base circle radius of 15 mm and roller radius is 10 mm. the angle of ascent is 75̊ and the total lift of follower is 17.5 mm. The speed of the cam shaft is 600 rpm. Calculate: (i) the main dimensions of the cam (ii) the acceleration of follower at the beginning of the lift.	Summer-16	4
8.	A cam with a minimum radius of 25 mm is to be designed for a knife-edge follower. Information available is as follows : (a) Rise of the follower through 35 mm during 60̊ of cam rotation, (b) Dwell for next 40̊ of the cam rotation (c) Descending of the follower during the next 90̊ of cam rotation (d) Dwell during rest of the cam rotation. Draw the profile of the cam, if the ascending and descending of the cam is with simple harmonic motion and the line of stroke of the follower is offset by 10 mm from the axis of the cam shaft.	Summer-15	7
9.	A cam, with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a roller follower, at the end of a valve rod, motion described below: 1. To raise the valve through 50 mm during 120° rotation of the cam; 2. To keep the valve fully raised through next 30°. 3. To lower the valve during next 60°; and 4. To keep the valve closed during rest of revolution i.e.150°; 5. The diameter of the roller is 20 mm & the diameter of the cam shaft is 25 mm. Draw the profile of the cam when: (a)the line of the stroke of the valve rod passes through the axis of the cam shaft, and (b)the line of the stroke is offset 15 mm from the axis of the cam shaft. The displacement of the valve, while being raised & lowered, is to take place with simple harmonic motion. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 rpm. Draw the displacement, the velocity diagrams & the acceleration diagrams for one complete revolution of the cam.	Winter-15	14

Sr. No.	Detail	GTU Year	Marks
10	A cam is to be designed for a knife edge follower with the following data: 1.Cam lift = 40 mm during 90° of cam rotation with SHM 2.Dwell for the next 30° 3.During the next 60° of cam rotation, the follower returns to its original position with SHM. 4.Dwell during remaining 180° **Draw the profile of the cam** when the line of stroke of the follower passes through the axis of the cam shaft. The radius of the base circle of the cam is 40 mm. **[OR Determine the maximum velocity and acceleration** of follower during its ascent and descent, if the cam rotate at 240 r.p.m]	Summer-17+ winter-17	7

Figures of the questions with sketch in above question bank are given below.

Figure-1

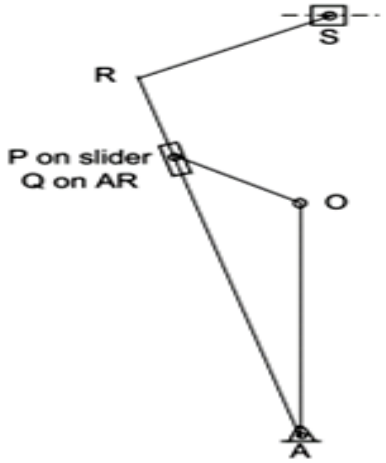


Figure-2

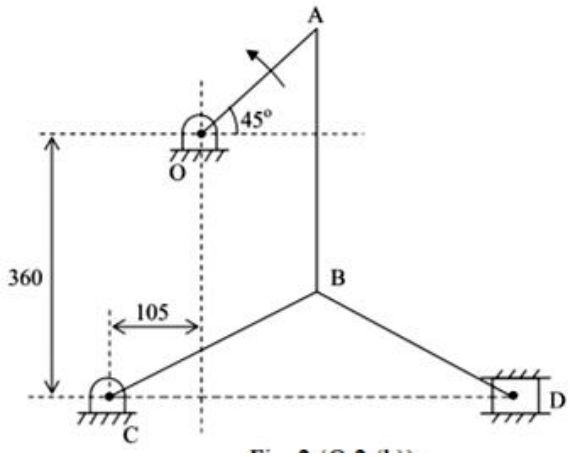


Figure-3

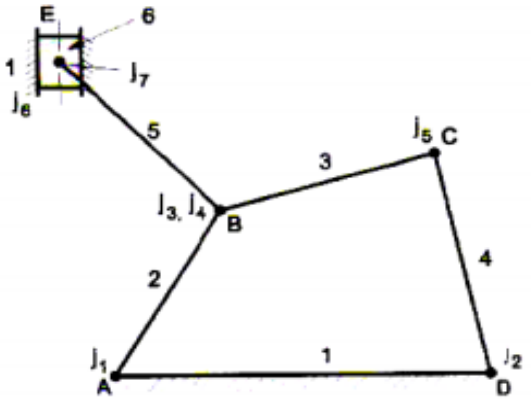


Figure-4

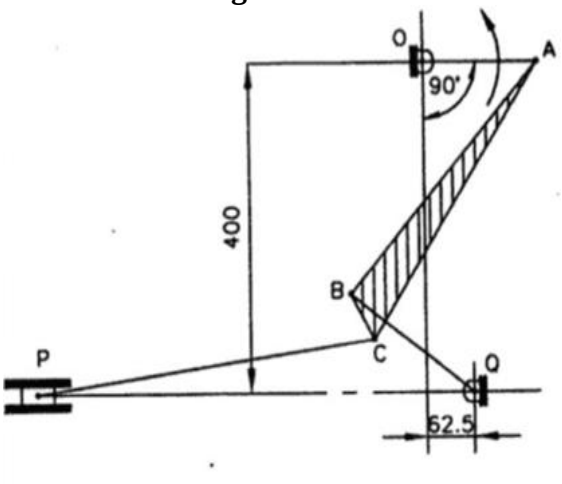


Figure - 5

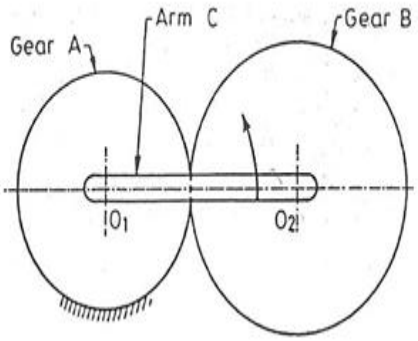
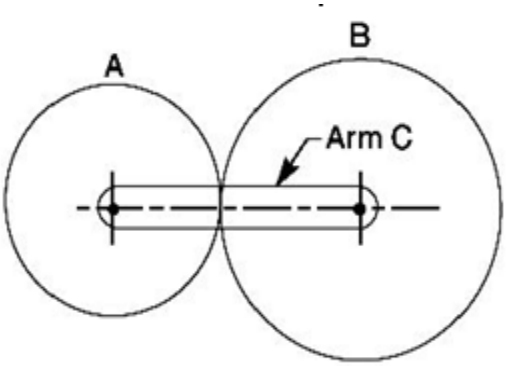


Figure-6



SHORT QUESTIONS

Sr. No.	Detail	GTU Year
1.	A ball & socket joint forms a _____ (a) turning pair (b)rolling pair(c)spherical pair (d)sliding pair	Winter-2016
2.	In a Pantograph, all the pairs are_____. a) turning pairs b)sliding pairs c)spherical pairs d)self-closed pairs	Winter-2016
3.	The cam follower generally used in automobile engines is_____ (a)Roller follower (b)spherical faced follower (c)flat faced follower (d)knife edge follower	Winter-2016
4.	The type of gears used to connect two non-parallel non-intersecting shafts is_____. (a) spur gears(b)helical gears(c)spiral gears(d)none of these	Winter-2016
5.	Name four approximate straight line motion mechanisms.	Winter-2016
6.	The frictional torque transmitted by a cone clutch is same as that of_____ (a)flat pivot bearing (b)flat collar bearing (c)conical pivot bearing (d) trapezoidal pivot bearing	Winter-2016
7.	Which of the following is an inversion of double slider crank chain? (a) Coupling rod of a locomotive (b) Pendulum pump (c)Elliptical trammel (d) Oscillating cylinder engine	Winter-2016
8.	The train value of a gear train is_____. (a) equal to velocity ratio of a gear train (b) reciprocal of velocity ratio of a gear train (c)always greater than unity (d)always less than unity	Winter-2016
9.	Offset is provided to a cam follower mechanism to_____ (a) minimize the side thrust (b)accelerate (c)avoid jerk(d) make it strong(e)none of these	Winter-2016
10.	The radius of a friction circle for a shaft of radius 'r' rotating inside a bearing is _____. a)rsinØ b) rcosØ c) rtanØ	Winter-2016
11.	The direction of linear velocity of any point on a link with respect to another point on the same link is_____. a) parallel to the link joining the points b)perpendicular to the link joining the points c)at $45^0$to the link joining the points d) None of these	Winter-2016
12.	The coriolis component of acceleration is taken into account for_____ (a) slider crank mechanism (b)four bar chain mechanism (c)quick return motion mechanism (d)double slider mechanism	Winter-2016
13.	What is meant by type synthesis?	Winter-2016
14.	The motion of a piston in the cylinder of a steam engine is an example of : a) completely constrained motion b) incompletely constrained motion	Summer -17

Sr. No.	Detail	GTU Year
	c) successfully constrained motion d) none of these	
15.	The component of the acceleration, parallel to the velocity of the particle, at the given instant is called (a) radial component (b) tangential component (c) coriolis component (d) none of these.	Summer -17
16.	The Direction of linear velocity of any point on a link with respect to another point on the same link is (a) Parallel (b) Perpendicular (c) 45° (d) none	Summer -17
17.	The coriolis component of acceleration is taken into account for : (a) slider crank mechanism (b) four bar chain mechanism (c) quick return mechanism (d) none of these	Summer -17
18.	In a pantograph, all the pairs are (a) turning pairs (b) sliding pairs (c) spherical pairs (d) self closed pairs	Summer -17
19.	The frictional torque transmitted by a disc or plate clutch is same as that of (a) flat pivot bearing (b) flat collar bearing (c) conical pivot bearing (d) trapezoidal pivot bearing	Summer -17
20.	The velocity ratio of two pulleys connected by an open belt or crossed belt is : (a) directly proportional to their diameters (b) inversely proportional to their diameters (c) directly proportional to the square of the diameters (d) inversely proportional to the square of their diameters	Summer -17
21.	The type of gears used to connect two non-parallel non-intersecting shafts are (a) spur gear (b) helical gear (c) spiral gears (d) none of these	Summer -17
22.	In a simple gear train, if the number of idle gears is odd, then the motion of driven gear will : (a) be same as that of driving gear (b) be opposite as that of driving gear (c) depend upon the number of teeth on the driving gear (d) none of the above	Summer -17
23.	The angle between the direction of the follower motion & a normal to pitch curve is called (a) pitch angle (b) prime angle (c) base angle (d) pressure angle	Summer -17
24.	The synthesis in a mechanism deals with: a) the determination of output & input angles of mechanism b) the determination of dimensions of the links in a mechanism c) the determination of displacement, velocity & acceleration of links in a mechanism d) none of the above	Summer -17
25.	A circle drawn with centre as the cam centre and radius equal to the distance between the cam centre and the point on the pitch curve at which the pressure angel is maximum, is called : (a) base circle (b) pitch circle (c) prime circle (d) none of these	Summer -17
26.	When the axes of first and last gear are co-axial, then gear train is known as (a) simple gear train (b) compound gear train (c) reverted gear train (d) epicyclic gear train	Summer -17

Sr. No.	Detail	GTU Year
27.	The module is the reciprocal of (a) diametral pitch (b) circular pitch (c) pitch diameter (d) none of these	Summer -17