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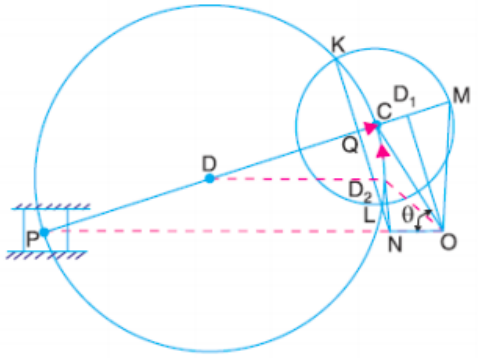
Examination: 2017 SUMMER

Que.No	Question/Problem	marks	Link
Q 1 a)	Question: **Define inversion with example.** **Answer:** **When one of the links is fixed in a kinematic chain, it is called a mechanism. So we can obtain as many mechanisms as the number of links in a kinematic chain by fixing, in turn, different links in a kinematic chain. This method of obtaining different mechanisms by fixing different links in a kinematic chain is known as inversion of the mechanism.**	2	view
Q 1 b)	Question: **List the inversions for double slider crank mechanism.** **Answer:** **Inversions of Double Slider Crank Chain :** **1. Elliptical trammels.** **2. Scotch yoke mechanism.** **3. Oldham's coupling.**	2	view

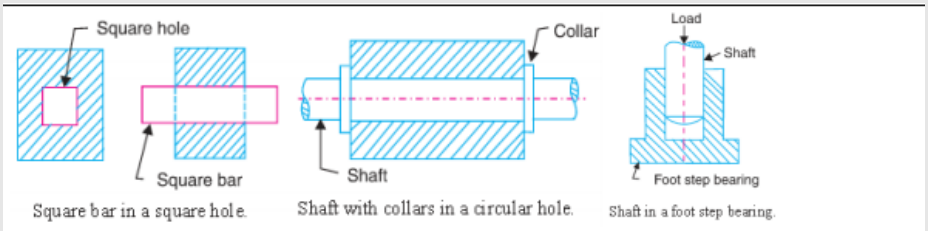
Que.No	Question/Problem	marks	Link
Q 1 c)	Question: **Define sliding pair with example.** **Answer:** **Sliding pair :** **When the two elements of a pair are connected in such a way that one can only slide relative to the other, the pair is known as a sliding pair. The piston and cylinder, cross-head and guides of a reciprocating steam engine, ram and its guides in shaper, tail stock on the lathe bed etc. are the examples of a sliding pair. A little consideration will show that a sliding pair has a completely constrained motion.**	2	view
Q 1 d)	Question: **Define centripetal and tangential acceleration.** **Answer:** **Centripetal acceleration:** **The centripetal acceleration is the rate of change of tangential velocity. When an object is moving with uniform acceleration in circular direction, it is said to be experiencing the centripetal acceleration.** **Tangential acceleration:** **Tangential acceleration is a measure of how the tangential velocity of a point at a certain radius changes with time. Tangential acceleration is just like linear acceleration, but it's particular to the tangential direction, which is relevant to circular motion.**	2	view
Q 1 f)	Question: **Classify the cam.** **Answer:** **Classification of cam:** **1. Radial or disc cam: In radial cams, the follower reciprocates or oscillates in a direction perpendicular to the cam axis. The cams as shown in above Fig. are all radial cams.** **2. Cylindrical cam: In cylindrical cams, the follower reciprocates or oscillates in a direction parallel to the cam axis. The follower rides in a groove at its cylindrical surface. A cylindrical grooved cam with a reciprocating and an oscillating follower is shown in Fig. below (a) and (b) respectively.**	2	view

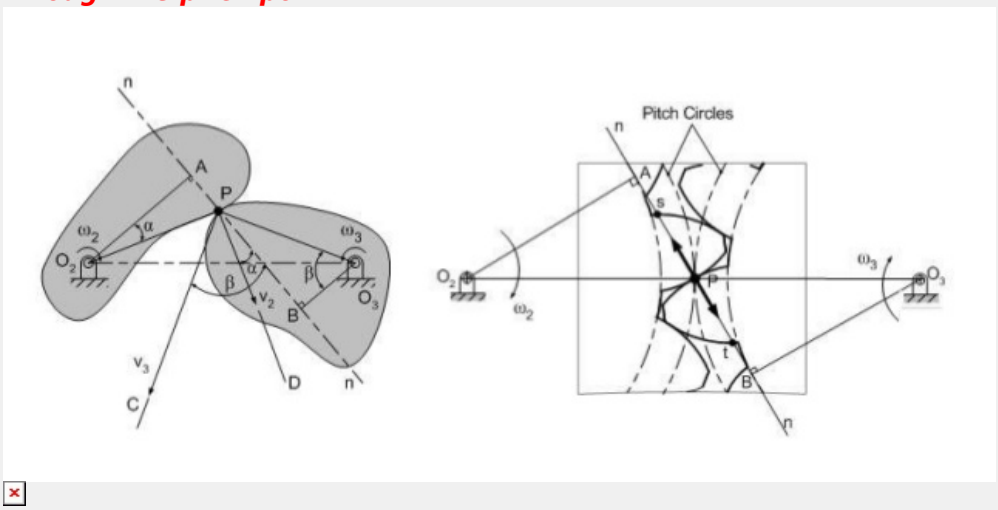
Que.No	Question/Problem	marks	Link
Q 1 g)	Question: **Define following terms with respect to cam and follower :** **(i) Prime circle** **(ii) Pitch circle** **(iii) Pressure angle** **(iv) Trace point** **Answer:** **i. Prime circle: It is the smallest circle that can be drawn from the centre of the cam and tangent to the pitch curve. For a knife edge and a flat face follower, the prime circle and the base circle are identical. For a roller follower, the prime circle is larger than the base circle by the radius of the roller.** **ii. Pitch circle: It is a circle drawn from the centre of the cam through the pitch points.** **iii. Pressure angle: It is the angle between the direction of the follower motion and a normal to the pitch curve. This angle is very important in designing a cam profile. If the pressure angle is too large, a reciprocating follower will jam in its bearings.** **iv. Trace point: It is a reference point on the follower and is used to generate the pitch curve. In case of knife edge follower, the knife edge represents the trace point and the pitch curve corresponds to the cam profile. In a roller follower, the centre of the roller represents the trace point.**	2	view
Q 1 h)	Question: **What are the limitations of knife edge follower ?** **Answer:** **Limitations of knife edge follower are:** **1. Excessive wear due to small area of contact between cam & follower surfaces.** **2. In this follower a considerable thrust exists between the follower and guide.**	2	view
Q 1 i)	Question: **Define self-energizing and self-locking brake.** **Answer:** **Self energizing & Self Locking brake** **Rn x X = PL + μaRn** **Rn = Normal reaction, P = Applied force, L = lever length** **X = Distance of block from hinge, μ= coefficient of friction, a = distance of drum from hinge** **In the above equation when frictional force adds to the breaking torque. In other words, the frictional torque and braking torque are in the same direction its a self locking brake.** **In the above equation when X < μa, P becomes negative** **Hence, P is not required for braking and brake gets applied on its own. It is called as self energizing brake.**	2	view

Que.No	Question/Problem	marks	Link
Q 1 i)	Question: **Write down the formula of length of belt for open belt drive and cross belt drive.** **Answer:** **Formula for length of open belt drive and cross belt drive:** Open belt drive: $L = 2C + \pi(D_2 + D_1)/2 + (D_2 - D_1)^2/4C$ Cross belt drive: $L = 2C + \pi(D_2 + D_1)/2 + (D_2 + D_1)^2/4C$ Where L=length. C=centre distance. D1 = pitch diameter of small pulley. D2 =pitch diameter of large pulley.	2	view
Q 1 i)	Question: **List the methods to reduce the slip in belt and pulley.** **Answer:** **Methods to reduce the slip in belt and pulley:** **1. Vertical belt drive should be avoided.** **2. In horizontal belt drive the upper side should be kept as loose side.**	2	view
Q 1 k)	Question: **Define law of gearing.** **Answer:** **Law of Gearing: The law of gearing states that the angular velocity ratio of all gears of a meshed gear system must remain constant also the common normal at the point of contact must pass through the pitch point.**	2	view
Q 1 m)	Question: **What are the limitations of shoe brake ?** **Answer:** **Limitations of a shoe brake :** **1. Heavy side thrust causes bending of the shaft.** **2. More wear & tear as the contact surface is large.**	2	view
Q 1 n)	Question: **Define uniform wear theory and uniform pressure theory.** **Answer:** **Uniform Wear theory:** **When the product of pressure and area of the contacting surface transmitting load is taken as constant to determine the axial force & torque, it is termed as uniform wear theory as it is assumed that wear along the surface is uniform.**	2	view
Q 1 o)	Question: **State effects of imbalance in machine.** **Answer:** **Effects of imbalance in machine** **1. Imbalance imparts vibratory motion to the frame of the machine.** **2. Produces noise which leads to human discomfort.** **3. Detrimental effects on the machine performance & structural integrity of the machine foundation.**	2	view

Que.No	Question/Problem	marks	Link
Q 2 b)	Question: **Explain with neat sketch how to find the velocity of a slider in slider crank mechanism by Klein's construction.** **Answer:** **Velocity of a slider in a slider crank mechanism by Klein's construction method**  Let *OC* be the crank and *PC* the connecting rod of a reciprocating steam engine, as shown in Fig. below. Let the crank makes an angle θ with the line of stroke *PO* and rotates with uniform angular velocity ω rad/s in a clockwise direction. First of all, draw OM perpendicular to OP; such that it intersects the line PC produced at M. The triangle OCM is known as Klien's velocity diagram. In this triangle OCM, OM may be regarded as a line perpendicular to PO, CM may be regarded as a line parallel to PC, (since it is the same line) and CO may be regarded as a line parallel to CO. op_1 represents v_{PO} (*i.e.* velocity of *P* with respect to *O* or velocity of cross-head or piston *P*) and is perpendicular to *OP*, and c_1p_1 represents v_{PC} (*i.e.* velocity of *P* with respect to *C*) and is parallel to *CP*.	2	view

Examination: 2017 WINTER

Que.No	Question/Problem	marks	Link
Q 1a)(a)	Question: **Pappu Define kinematic link and kinematic chain.** **Answer:** **a) Kinematic link: Each part of a machine, which moves relative to some other part, is known as a kinematic link (or simply link) or element. Kinematic Chain: When the kinematic pairs are coupled in such a way that the last link is joined to the first link to transmit definite motion (i.e. completely or successfully constrained motion), it is called a kinematic chain.**  	2	view

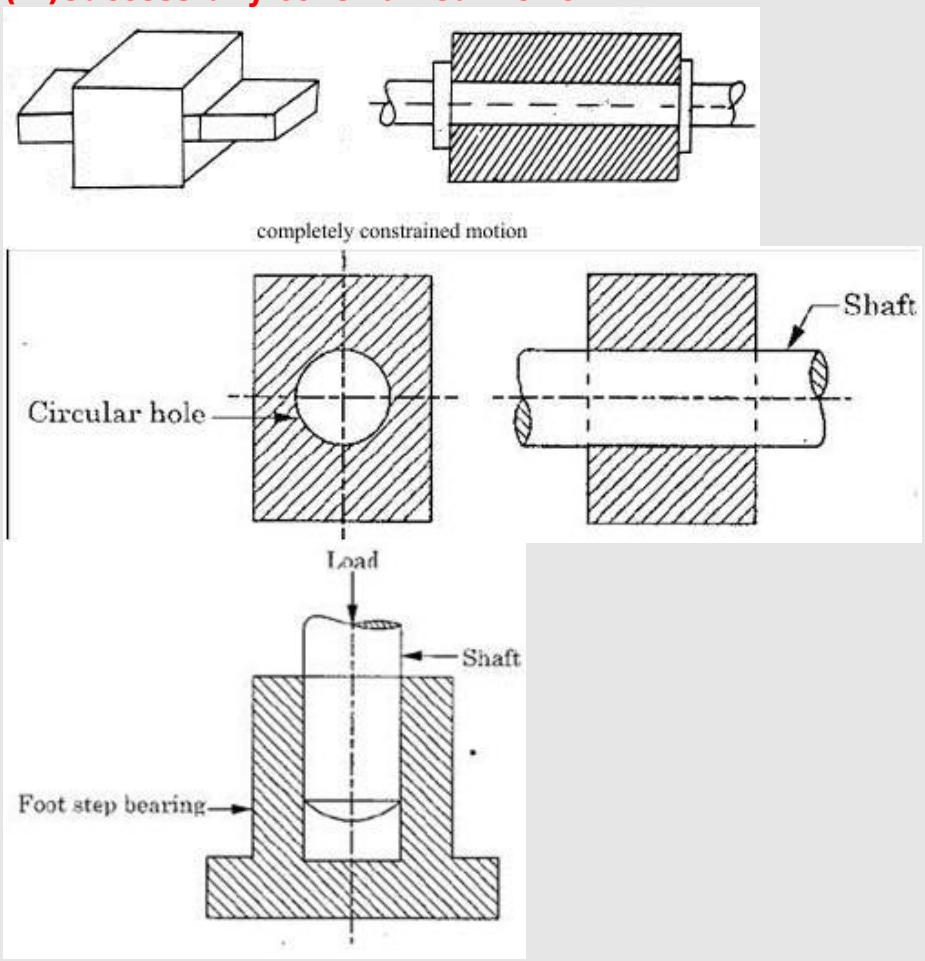
Que.No	Question/Problem	marks	Link
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Q 1a)(b)	Question: **State types of cams.** **Answer:** **b) Types of cam: 1. Radial or disc cam 2. Cylindrical cam**	2	view
Q 1a)(c)	Question: **State law of gearing.** **Answer:** **Gearing law (Law of gearing) :** ***Gearing law states that, "The law of gearing states that the angular velocity ratio of all Gears of a meshed gear system must remain constant also the common normal at the point of contact must pass through the pitch point."***  **Gearing law illustration** **As illustrated in above animation the common normal at the point of contact passes through the pitch point. Gearing law must be followed in order to two gears transmit motion form one to another.** **In order to have a constant angular velocity ratio for all positions of the wheels, it is must that the point P must be the fixed point (called pitch point) for the two wheels. In other words it can be said that , the common normal at the point of contact between a pair of teeth should always pass through the pitch point for proper working.** **This is the fundamental condition which must be satisfied while designing the profiles for the teeth of gear wheels, it is also known as the law of gearing.** **Gearing law explination with diagram**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(d)	Question: **State the types of chains & sprockets.** **Answer:** **Types of Chains & Sprockets: The chains, on the basis of their use, are classified into the following three groups : 1. Hoisting and hauling (or crane) chains, 2. Conveyor (or tractive) chains, and 3. Power transmitting (or driving) chains. Sprockets: 1. Taper lock sprockets 2.Pilot bore sprocket 3.Platewheel sprocket**	2	view
Q 1a)(e)	Question: **State the function of flywheel in I.C. Engine.** **Answer:** **A flywheel used in machines serves as a reservoir, which stores energy during the period when the supply of energy is more than the requirement, and releases it during the period when the requirement of energy is more than the supply. In other words, a flywheel controls the speed variations caused by the fluctuation of the engine turning moment during each cycle of operation.**	2	view
Q 1a)(f)	Question: **State the function of governor.** **Answer:** **The function of a governor is to regulate the mean speed of an engine, when there are variations in the load e.g. when the load on an engine increases, its speed decreases, therefore it becomes necessary to increase the supply of working fluid. On the other hand, when the load on the engine decreases, its speed increases and thus less working fluid is required. The governor automatically controls the supply of working fluid to the engine with the varying load conditions and keeps the mean speed within certain limits**	2	view
Q 1a)(g)	Question: **Compare brakes and dynamometers. (any two points)** **Answer:** **Compare Brakes & Dynamometers: A dynamometer is a mechanical device used to indirectly measure the power output of a prime mover like an engine or a motor. Examples: hydraulic brake dynamometer, eddy current dynamometer, prony brake dynamometer. A brake is a mechanical device usually found in automobiles that helps in decelerating a vehicle and brings it to a complete stop. Examples: internal expanding shoe brake, single and double shoe brake, simple and differential band brake.**	2	view
Q 1a)(h)	Question: **Why is balancing of rotating parts necessary for high speed engines ?** **Answer:** **Reasons for balancing of rotating elements of machine: The balancing of the moving parts both rotating and reciprocating of such machine is having greater importance. Because, if these parts are not balanced properly then the unbalanced dynamic forces can cause serious consequences, which are harmful to the life of the machinery itself, the human beings and all the property around them. These unbalanced forces not only increase the load on the bearings and stresses in various members, but also produces unpleasant and dangerous vibrations in them.**	2	view

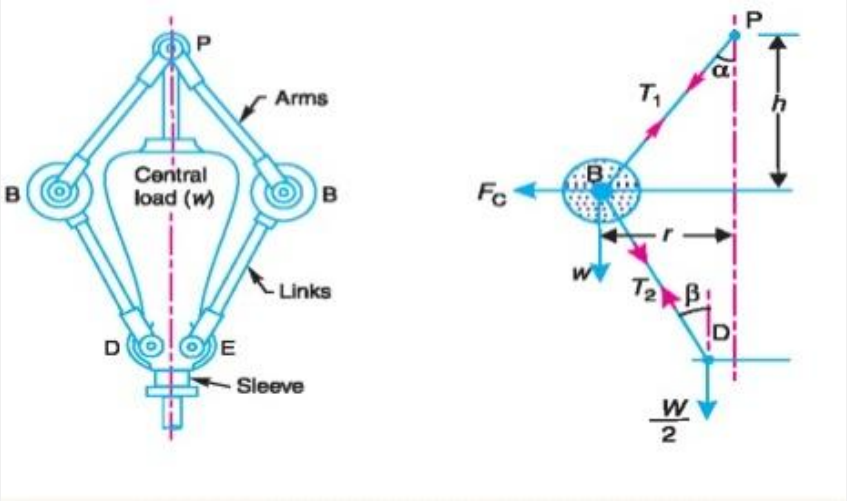
Que.No	Question/Problem	marks	Link
Q 1a)(i)	Question: **(a) Define : (i) Spherical pair (ii) Higher pair** **Answer:** **a) Single plate clutch b) Multi plate clutch c) Cone clutch d) Centrifugal clutch** **ii) Classification of follower:**	2	view
Q 1 b)	Question: **(b) Define :** **(i) Radial follower (ii) Off-set follower** **Answer:** **1. According to the surface in contact: Knife-edge follower Roller follower Flat faced or mushroom follower Spherical follower 2. According to the motion of the follower: Reciprocating or translating follower Oscillating or rotating follower 3. According to the path of motion of follower:** **Radial follower Off-set followe**	2	view
Q 1 c)	Question: **What do you mean by crowning of pulleys in flat belt drive ? State its use.** **Answer:** **1. As no slip takes place, hence, perfect velocity ratio is obtained (Positive drive). 2. Chain drive gives high transmission efficiency (up to 98 %). 3. Chain drive may be used when the distance between the shafts is less. 4. Chain is made up of metal which would occupy less space as compared with belt or rope drive. 5. Ability to transmit power to several shafts by one chain. 6. Load on the shaft is less and long life.**	2	view
Q 1 d)	Question: **Define initial tension in belt drive & state its effect.** **Answer:** **1. Manufacturing cost of chains is relatively high 2. The chain drive needs accurate mounting and careful maintenance 3. High velocity fluctuations especially when unduly stretched 4. Chain operations are noisy as compared to belts.**	2	view
Q 1 e)	Question: **Define fluctuation of speed and fluctuation of energy in case of flywheel.** **Answer:** **Fluctuation of speed: It is the difference between the maximum and minimum speed of Flywheel. Fluctuation of speed = (N1 – N2) rpm N1 - maximum speed, N2 -- minimum speed Fluctuation of energy: It is the difference between the maximum and minimum energy of Flywheel. Maximum energy of Flywheel I ω1 2 Minimum energy of Flywheel = I ω2 2 Fluctuation of energy = I (ω1 2 - ω2 2) in N-m or J I - moment of inertia of flywheel = mk2 where, m - mass of the flywheel, kg and k - radius of gyration of flywheel, m2 ω1 – Maximum Angular velocity, rad/sec ω2 – Minimum Angular velocity, rad/sec**	2	view

Que.No	Question/Problem	marks	Link
Q 1 f)	Question: **Define the sensitivity in relation to governer. State its significance.** **Answer:** **The function of governor is to regulate the mean speed of the engine, when there are variations in the load. Governor automatically adjusts and controls the supply of fuel / working fluid to the engine with the varying load conditions and keeps the mean speed within the certain desired limits. e.g. When the load on an engine increases, its speed decreases, therefore it becomes necessary to increase the supply of fuel or working fluid. The configuration of the governor changes and valve is moved to increase the supply of working fluid. Conversely, when the load on the engine**	2	view
Q 1 h)	Question: **State the adverse effect of imbalance of rotating elements of machine.** **Answer:** **The process of providing the second mass in order to counter act the effect of the centrifugal force of the disturbing mass is called balancing. In order to prevent the bad effect of centrifugal force of disturbing mass, another mass (balancing) is attached to the opposite side of the shaft at such a position, so as to balance the effect of centrifugal force of disturbing mass. This is done in such a way that the centrifugal forces of both the masses are made equal and opposite. Methods of balancing: Balancing of rotating masses 1) Balancing of a single rotating mass by a single rotating mass in the same plane 2) Balancing of a single rotating mass by two masses rotating in the different planes * Disturbing mass lies in a plane between the planes of balancing masses * Disturbing mass lies in a plane on one end of the planes of balancing masses 3) Balancing of different masses rotating in the same plane 4) Balancing of different masses rotating in the different planes Balancing of reciprocating masses**	2	view

Examination: 2016 SUMMER

Que.No	Question/Problem	marks	Link
Q 1a)(i)	Question: **Enlist the types of constrained motion. Draw a label sketch of any one** **Answer:** **Types of constrained motion:** **(i)Completely constrained motion.** **(ii)Incompletely constrained motion.** **(iii)Successfully constrained motion.** 	2	view
Q 1a)(ii)	Question: **Define (i) Pressure angle (ii) Pitch point related to cam.** **Answer:** **(i) Pressure angle: It is the angle between the direction of the follower motion and a normal to the pitch curve. This angle is very important in designing a cam profile. If the pressure angel is too large, a reciprocating follower will jam in its bearing.** **(ii) Pitch point: It is point on pitch curve having the maximum pressure angle.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(iii)	Question: **How are drives classified?** **Answer:** **Classification of drives:** **(i) Belt drives.** **(ii) Chain drives.** **(iii) Rope.** **(iv) Gear drives.**	2	view
Q 1a)(iv)	Question: **Define:** **(i) Coefficient of fluctuation of speed.** **(ii) Coefficient of fluctuation of energy.** **Answer:** **(i) Coefficient of fluctuation of speed: Coefficient of fluctuation of speed is defined as the ratio of the maximum fluctuation of speed to the mean speed. It is denoted by C s.** **Mathematically,** **C s = (N 1 – N 2) /N** **Where, N 1 = maximum speed in rpm;** **N 2 =minimum speed in rpm; N = mean speed in rpm** **(ii) Coefficient of fluctuation of energy: Coefficient of fluctuation of energy may be defined as the ratio of the maximum fluctuation of energy to the work done per cycle. It is denoted by Ce.** **Mathematically,** **Ce = Maximum fluctuation of energy/ Work done per cycle.**	2	view
Q 1a)(v)	Question: **Write any two disadvantages of chain drive.** **Answer:** **Disadvantages of chain drives:** **1. Manufacturing cost of chains is relatively high.** **2. The chain drive needs accurate mounting and careful maintenance.** **3. High velocity fluctuations especially when unduly stretched.** **4. Chain operations are noisy as compared to belts.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(vi)	Question: **Draw line diagram of porter governor** **Answer:** 	2	view
Q 1a)(vii)	Question: **State the application of (i) Disc brake (ii) Internal expanding brake** **Answer:** **(i) Disc brake: Used in two wheelers as well as in four wheelers.** **(ii) Internal expanding brake: Used in motor cars, light trucks, two wheelers etc.**	2	view
Q 1a)(viii)	Question: **Why is balancing of rotating parts necessary for high speed engines?** **Answer:** **The high speed of engines and other machines is a common phenomenon now-a-days. It is, therefore, very essential that all the rotating and reciprocating parts should be completely balanced as far as possible. If these parts are not properly balanced, the dynamic forces are set up. These forces not only increase the loads on bearings and stresses in the various members, but also produce unpleasant and even dangerous vibrations. The balancing of unbalanced forces is caused by rotating masses, in order to minimize pressure on the main bearings when an engine is running.**	2	view

Examination: 2016 WINTER

Que.No	Question/Problem	marks	Link
Q 1a)(i)	Question: **Define Kinematic link with one example.** **Answer:** **Kinematic link --Each part of a machine, which moves relative to some other part, is known as a 'kinematic link (or simply link) or element. Example – any one Example of machine element, (e.g. shaft, spindle, gear, crank, belt, pulley, key etc.)**	2	view
Q 1a)(ii)	Question: **Name different mechanisms generated from a single slider crank chain.** **Answer:** **Different mechanism generated by single slider crank chain mechanism.** **a) Reciprocating engine, Reciprocating compressor** **b) Whitworth quick return mechanism, Rotary engine,** **c) Slotted crank mechanism, Oscillatory engine** **d) Hand pump, pendulum pump or Bull engine**	2	view
Q 1a)(iii)	Question: **State the advantages of roller follower over knife edge follower.** **Answer:** **Advantages of roller follower over knife edge follower a) Roller follower has less wear and tear than knife edge follower. b) Power required for driving the cam is less due to less frictional force between cam and follower.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(iv)	Question: **Define slip and creep in case of belt drive.** **Answer:** **Slip --- Slip is defined as insufficient frictional grip between pulley (driver/driven) and belt. Slip is the difference between the linear velocities of pulley (driver/driven) and belt.** **Creep ----- Uneven extensions and contractions of the belt when it passes from tight side to slack side. There is relative motion between belt and pulley surface, this phenomenon is called creep of belt.**	2	view
Q 1a)(v)	Question: **Give four advantages of chain drive over belt drive.** **Answer:** **Advantages of chain drive over belt drive** **a) No slip takes place in chain drive as in belt drive there is slip.** **b) Occupy less space as compare to belt drive.** **c) High transmission efficiency.** **d) More power transmission than belts drive.** **e) Operated at adverse temperature and atmospheric conditions.** **f) Higher velocity ratio. g) Used for both long as well as short distances**	2	view
Q 1a)(vi)	Question: **State the effect of centrifugal tension on power transmission.** **Answer:** **Effect of centrifugal tension on power transmission:** **As the belt passes over the pulley with high velocity, centrifugal force is produced on the belt, which tends to act on the belt. This force tries to move the belt away from the pulley.** **This force is given by,** **$T_c = m \times V^2$** **There is no effect of centrifugal tension on power transmitted.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(vii)	Question: **Define fluctuation of energy and coefficient of fluctuation of energy.** **Answer:** **a) Fluctuation of energy -- The difference of maximum and minimum kinetic energy of flywheel is known as Fluctuation of energy** **b) Coefficient of fluctuation of energy -- - It is defined as the ratio of the maximum fluctuation of energy to the work done per cycle. It is denoted by ke = (E1 - E2)/work done per cycle**	2	view
Q 1a)(viii)	Question: **State the adverse effect of imbalance of rotating elements of machine.** **Answer:** **Adverse effect of imbalance of rotating elements:** **a) Vibration, noise and discomfort,** **b) Machine accuracy get disturbed,** **c) Power losses,** **d) More maintenance**	2	view

Examination: 2015 SUMMER

Que.No	Question/Problem	marks	Link
Q 1a)(a)	Question: **Define kinematic link and kinematic chain.** **Answer:** **Each part of a machine, which moves relative to some other part, is known as a kinematic link.** **When the kinematic pairs are coupled in such a way that the last link is joined to the first link to transmit definite motion (i.e. completely or successfully constrained motion), it is called a kinematic chain.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(b)	Question: **Enlist the different type of follower motion.** **Answer:** **Motion of the Follower :** **1. Uniform velocity,** **2. Simple harmonic motion,** **3. Uniform acceleration and retardation, and** **4. Cycloidal motion.**	2	view
Q 1a)(c)	Question: **Define angle of lap and slip in belt drive.** **Answer:** **Slip of belt : The motion of belts and shafts assuming a firm frictional grip between the belts and the shafts. But sometimes, the frictional grip becomes insufficient. This may cause some forward motion of the driver without carrying the belt with it. This may also cause some forward motion of the belt without carrying the driven pulley with it. This is called slip of the belt and is generally expressed as a percentage.** **Angle of Lap : The angle of lap is defined as the angle subtended by the portion of the belt which is in contact at the pulley surface of the pulley.**	2	view
Q 1a)(d)	Question: **State four conditions under which the 'V' belt drive is selected.** **Answer:** **Conditions for 'V' Belt drive selection :** **1. Great amount of Power to be transmitted,** **2. Requirement of the high velocity ratio (maximum 10).** **3. Small Centre distance between the shafts** **4. Positive drive requirement** **5. Compact Space**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(e)	Question: **State the function of Governor in an I.C. engine.** **Answer:** **The function of a governor is to regulate the mean speed of an engine, when there are variations in the load e.g. when the load on an engine increases, its speed decreases, therefore it becomes necessary to increase the supply of working fluid. On the other hand, when the load on the engine decreases, its speed increases and thus less working fluid is required. The governor automatically controls the supply of working fluid to the engine with the varying load conditions and keeps the mean speed within certain limits.**	2	view
Q 1a)(f)	Question: **State four applications of flywheel.** **Answer:** **Applications of flywheel : Used in Internal combustion engines, press machines, mills, punching machines.**	2	view
Q 1a)(g)	Question: **Give the classification of dynamometer. State the function of it.** **Answer:** **Function of dynamometer: A dynamometer is a brake but in addition it has a device to measure the frictional resistance. Knowing the frictional resistance, we may obtain the torque transmitted and hence the power of the engine.** **Absorption type dynamometers:** **1. Prony brake dynamometer, and 2. Rope brake dynamometer.** **Transmission type dynamometers** **1. Epicyclic-train dynamometer, 2. Belt transmission dynamometer, and 3. Torsion dynamometer.**	2	view

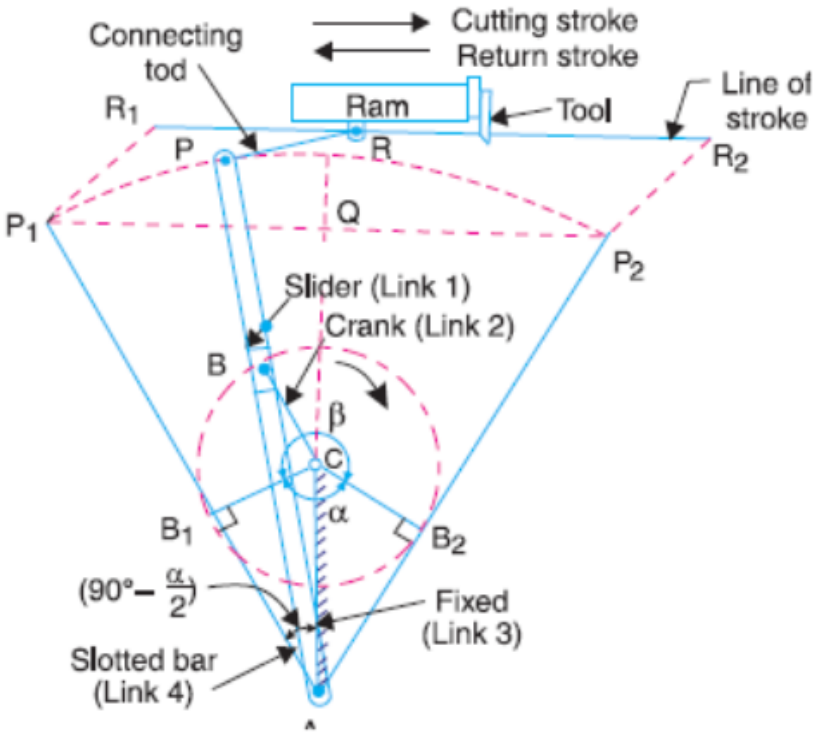
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Q 1a)(h)	Question: **Why is balancing of rotating parts necessary for high speed engines ?** **Answer:** **The high speed of engines and other machines is a common phenomenon now-a-days. It is, therefore, very essential that all the rotating and reciprocating parts should be completely balanced as far as possible. If these parts are not properly balanced, the dynamic forces are set up.** **These forces not only increase the loads on bearings and stresses in the various members, but also produce unpleasant and even dangerous vibrations. The balancing of unbalanced forces is caused by rotating masses, in order to minimize pressure on the main bearings when an engine is running.**	2	view

Examination: 2015 WINTER

Que.No	Question/Problem	marks	Link
Q 1a)(i)	Question: **Define - 1. Mechanism 2.Inversion** **Answer:** **1. Mechanism : When one of the links of a kinematic chain is fixed, the chain is known as mechanism.** **2. Inversion of mechanism The method of obtaining different mechanisms by fixing different links in a kinematic chain, is known as inversion of the mechanism. So we can obtain as many mechanisms as the number of links in a kinematic chain by fixing, in turn, different links in a kinematic chain.**	2	view
Q 1a)(ii)	Question: **State any two types of motion of the follower.** **Answer:** **The follower during its travel may have one of the following motions.** **1. Uniform velocity,** **2. Simple harmonic motion,** **3. Uniform acceleration and retardation,** **4. Cycloidal motion.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(iii)	Question: **Define slip and creep in the belt.** **Answer:** **Slip : When the frictional grip becomes insufficient. This may cause some forward motion of the driver without carrying the belt with it. This may also cause some forward motion of the belt without carrying the driven pulley with it. This is called slip of the belt and is generally expressed as a percentage. Creep : When the belt passes from the slack side to the tight side, a certain portion of the belt extends and it contracts again when the belt passes from the tight side to slack side. Due to these changes of length, there is a relative motion between the belt and the pulley surfaces. This relative motion is termed as creep.**	2	view
Q 1a)(iv)	Question: **State any two advantages of V belt drive over flat belt drive.** **Answer:** **Advantages -1. The V-belt drive gives compactness due to the small distance between the centres of pulleys.** **2. The drive is positive, because the slip between the belt and the pulley groove is negligible.** **3. Since the V-belts are made endless and there is no joint trouble, therefore the drive is smooth.** **4. It provides longer life of 3 to 5 years.** **5. It can be easily installed and removed.** **6. The operation of the belt and pulley is quiet.** **7. The belts have the ability to cushion the shock when machines are started.** **8. The high velocity ratio (maximum 10) may be obtained.** **9. The wedging action of the belt in the groove gives high value of limiting ratio of tensions. Therefore the power transmitted by V-belts is more than flat belts for the same coefficient of friction, arc of contact and allowable tension in the belts.** **10. The V-belt may be operated in either direction with tight side of the belt at the top or bottom. The centre line may be horizontal, vertical or inclined.**	2	view
Q 1a)(v)	Question: **State the function of flywheel in IC engine.** **Answer:** **A flywheel controls the speed variations caused by the fluctuation of the engine turning moment during each cycle of operation.** **A flywheel used in machines serves as a reservoir, which stores energy during the period when the supply of energy is more than the requirement, and releases it during the period when the requirement of energy is more than the supply.**	2	view

Que.No	Question/Problem	marks	Link
Q 1a)(vi)	Question: **Define stability and hunting of governor.** **Answer:** **Stability of governor :** **A governor is said to be stable when for every speed within the working range there is a definite configuration i.e. there is only one radius of rotation of the governor balls at which the governor is in equilibrium. For a stable governor, if the equilibrium speed increases, the radius of governor balls must also increase.** **Hunting of governor :** **A governor is said to be hunt if the speed of the engine fluctuates continuously above and below the mean speed. This is caused by a too sensitive governor which changes the fuel supply by a large amount when a small change in the speed of rotation takes place.**	2	view
Q 1a)(vii)	Question: **Compare brakes and dynamometers (two points).** **Answer:** **Brakes : A brake is a device by means of which artificial frictional resistance is applied to a moving machine member, in order to retard or stop the motion of a machine.** **Types : Hydraulic brakes** **1.Electric brakes 2.Mechanical brakes.** **The brake absorbs either kinetic energy of the moving member or potential energy given up by objects being lowered by hoists, elevators etc.** **The energy absorbed by brakes is dissipated in the form of heat.** **This heat is dissipated in the surrounding air (or water which is circulated through the passages in the brake drum) so that excessive heating of the brake lining does not take place.** **Dynamometers : A dynamometer is a brake but in addition it has a device to measure the frictional resistance.** **Knowing the frictional resistance, we may obtain the torque transmitted and hence the power of the engine.** **Types : 1. Absorption dynamometers, and 2. Transmission dynamometers**	2	view
Q 1a)(viii)	Question: **State any two adverse effects of imbalance.** **Answer:** **All the rotating and reciprocating parts should be completely balanced as far as possible. If these parts are not properly balanced,** **The dynamic forces are set up.** **These forces increase the loads on bearings and stresses in the various members.** **Also produce unpleasant and even dangerous vibrations.**	2	view

Que.No	Question/Problem	marks	Link
Q 1b)(i)	Question: **Draw neat labeled sketch of crank and slotted lever mechanism. Label all parts.** **Answer:**  **Crank and slotted lever mechanism**	2	view

Que.No	Question/Problem	marks	Link
Q 1b)(ii)	Question: **What is the necessity of clutch? State its types.** **Answer:** **Necessity: A clutch is necessary for the transmission of power of shafts and machines which must be started and stopped frequently. Its application is also found in cases in which power is to be delivered to machines partially or fully loaded. The force of friction is used to start the driven shaft from rest and gradually brings it up to the proper speed without excessive slipping of the friction surfaces. In automobiles, friction clutch is used to connect the engine to the driven shaft. It may be noted that -** **1. The contact surfaces should develop a frictional force that may pick up and hold the load with reasonably low pressure between the contact surfaces.** **2. The heat of friction should be rapidly dissipated and tendency to grab should be at a minimum.** **3. The surfaces should be backed by a material stiff enough to ensure a reasonably uniform distribution of pressure.** **Types :** **1. Disc or plate clutches (single disc or multiple disc clutch),** **2. Cone clutches, and** **3. Centrifugal clutches.**	2	view