

QUESTION BANK

INTRODUCTION (SYNTHESIS OF MECHANISM)

1. What is meant by inversions of mechanism? Sketch double slider cranks chain and draws its inversion.
2. Explain mechanisms: (a) Hart Mechanism (b) Roberts Mechanism.
3. Explain Paucellier's Mechanism.
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.
5. Write notes on complete and incomplete constraints motion in lower and Higher Pairs, illustrate your answer with neat sketches.
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
7. Sketch and explain any two inversions of double slider crank chain.
8. Describe briefly types of Constrained Motions.
9. Explain degree of freedom with neat sketch. Also explain Grumbler's criterion.
10. Define: Kinematic link, Kinematic pair, Kinematic chain
11. What are quick return motion mechanisms? Where they are used? Discuss the functioning of any one of them.
12. State and explain Grashof's criterion.
13. Explain various inversion of a slider crank mechanism with the help of examples.
14. Explain the types of instantaneous centers.
15. Differentiate between Machine and Structure with suitable example.
16. Sketch and explain the various inversions of a Double slider crank chain
17. Explain Klein's construction method in detail with neat sketch.
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

VELOCITY AND ACCELARATION ANALYSIS

1. What is the condition for correct steering? Sketch and explain any one type of steering gear mechanism with its advantages.
2. Explain instantaneous Centre method for finding out the velocity of a point on link.
3. Describe different types of steering gear mechanism.
4. Derive the equation for finding out the ratio of angular velocities of two shaft of Hooke's joint.
5. Sketch and describe the working of Whitworth Quick return motion mechanism
6. Explain the following : 1. Rubbing Velocity 2. Instantaneous center 3. Kennedy's theorem
7. Derive the equation of displacement, velocity and acceleration of slider in a slider crank mechanism by analytical method
8. Explain inversion method of synthesis for four bar mechanism using Two point and Three Point.
9. What is steering gear mechanism? Derive the relation for correct steering for Devi's steering gear mechanism
10. Derive analytical expression for the displacement and velocity analysis of a slider crank mechanism.
11. With neat sketch, Explain: (i) Peaucellier Mechanism (ii) Hart's Mechanism (iii) Scott Russell's Mechanism.
12. What are Straight line motion mechanisms? Explain any three different engine indicators working on this mechanism.
13. Explain Ackerman steering gear mechanism with neat sketch
14. Explain Types of Instantaneous Centre and also state Aronhold Kennedy (or Three Centre in Line) Theorem.

GEAR AND GEAR TRAIN

1. Explain any five terminology of gear tooth with neat sketch.
2. Explain what is meant by the term “Interference” as related to toothed gears having profile? Discuss various methods used to avoid interference.
3. Explain epicyclic gear train with the help of neat sketch. Write its merits and demerits as compared to reverted and compound gear trains.
4. Explain any five terminology of gear tooth with neat sketch.
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.
6. What is gear train? Give classification of it and Explain epicyclic gear train in detail.
7. Differentiate between involute and cycloidal profile of gear teeth.
8. Determine the velocity ratio of differential gear box
9. Comparison between Involute and Cycloidal tooth profile.
10. Fundamental Law of Gearing.

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CAM AND FOLLOWER

1. What is cam and follower? give the classification of cam and follower with neat sketch.
2. Explain the terminology of cam and follower.
3. State the relation for Displacement, Velocity and Acceleration for following motion of follower 1. Uniform velocity, 2. Simple harmonic motion
4. 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.

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BELT ROPE CHAIN DRIVE

1. Give the classification of belt drive and chain drive.
2. Determine an equation of length of belt drive for open belt drive.
3. Determine an equation of length of belt drive for close belt drive.
4. Define and explain term slip and creep in belt.
5. Give the advantages of chain drive over belt drive.

