



# SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)



## *Department of Mechatronics Engineering*

### Mechanics of Machines

#### Unit – I

#### KINEMATICS OF MECHANISMS

### Double Slider Crank Chain



Prepared by

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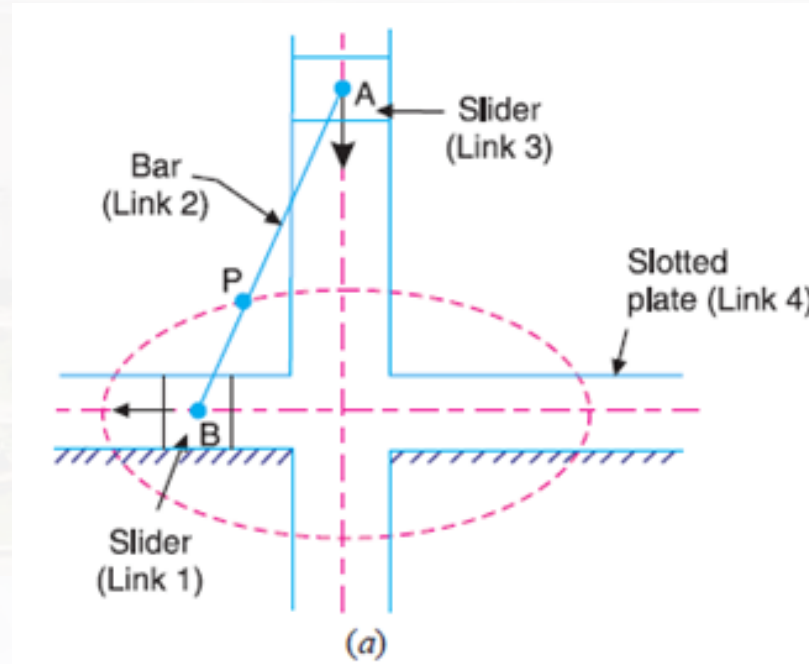
*Source: Autodesk online gallery*



## Introduction – Double Slider Crank Chain Mechanism



- ❑ A kinematic chain which consists of two turning pairs and two sliding pairs is known as *double slider crank chain*
- ❑ From the Figure we can see that the link 2 and link 1 form one turning pair and link 2 and link 3 form the second turning pair.
- ❑ The link 3 and link 4 form one sliding pair and link 1 and link 4 form the second sliding pair



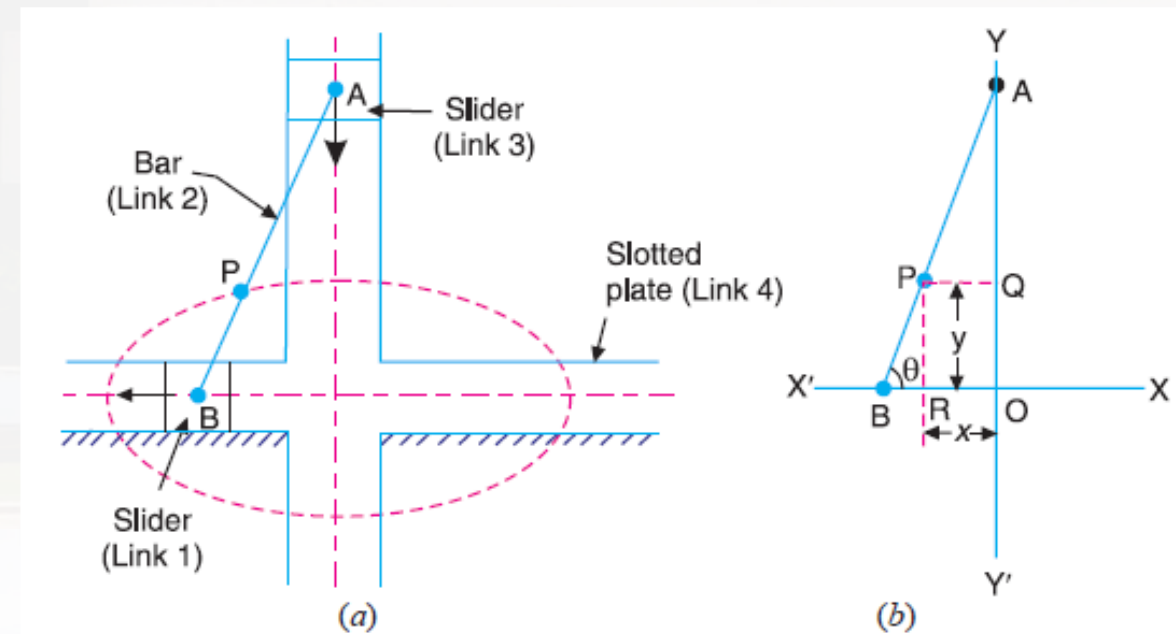
Source: R.S.Khurmi



## Inversions of Double Slider Crank Chain

### 1. *Elliptical trammels*

- It is an instrument used for drawing ellipses
- This inversion is obtained by fixing the slotted plate (link 4), as shown in Figure
- The fixed plate or link 4 has two straight grooves cut in it, at right angles to each other
- The link 1 and link 3, are known as sliders and form sliding pairs with link 4
- The link  $AB$  (link 2) is a bar which forms turning pair with links 1 and 3
- When the links 1 and 3 slide along their respective grooves, any point on the link 2 such as  $P$  traces out an ellipse on the surface of link 4, as shown in figure.



Source: R.S.Khurmi

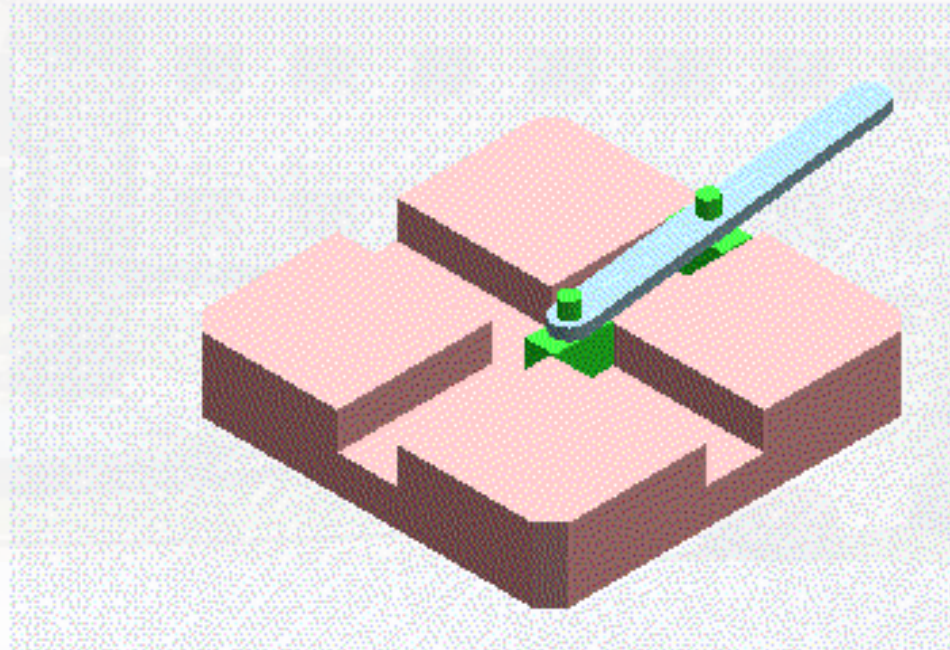
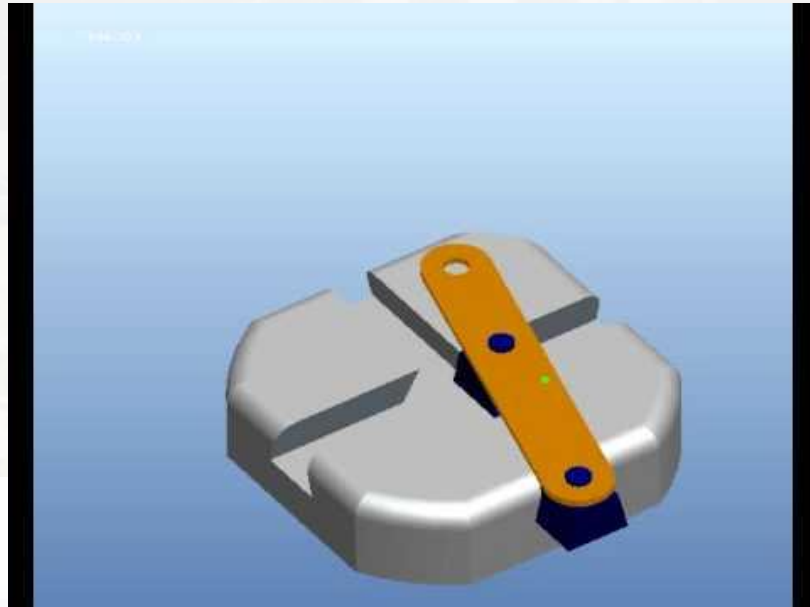




# Inversions of Double Slider Crank Chain



## 1. *Elliptical trammels*



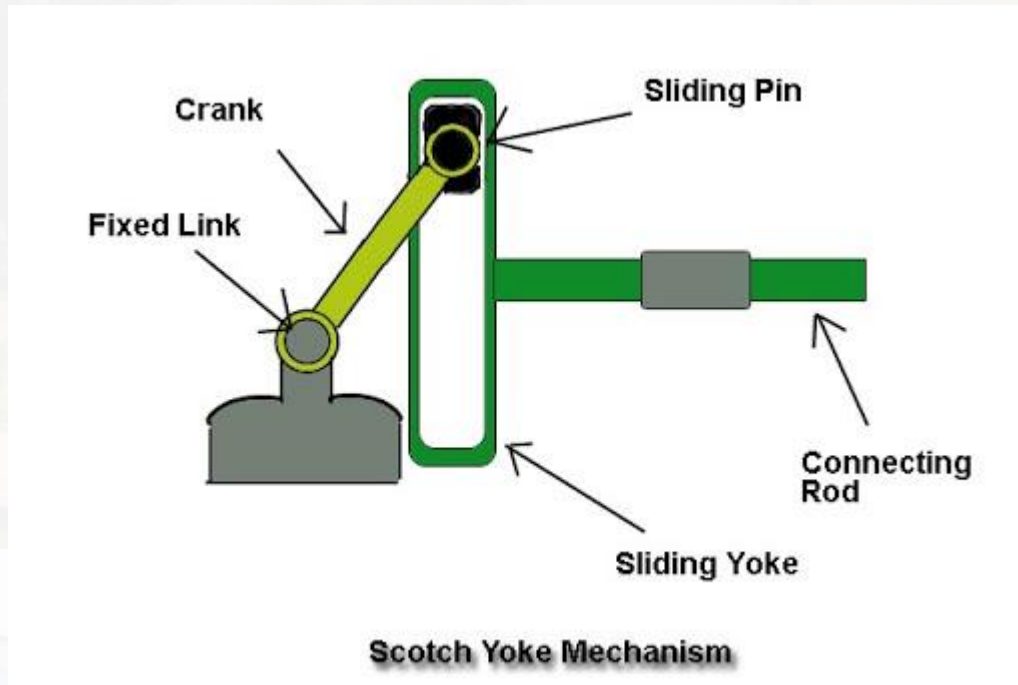
*Source: Grabcad*



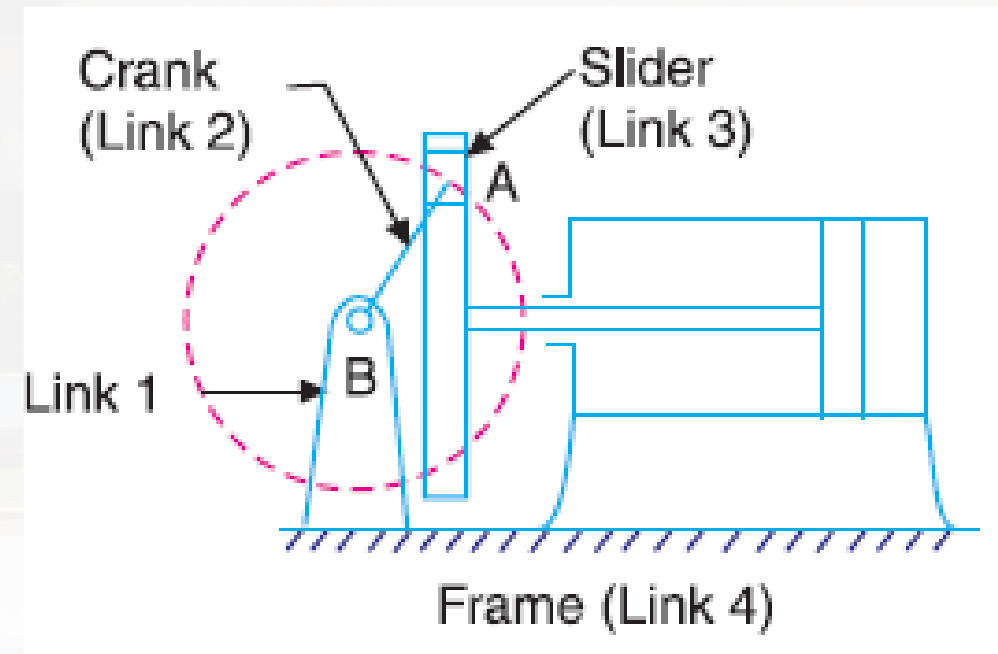
## Inversions of Double Slider Crank Chain



### *2. Scotch yoke mechanism*



*Source: mechanicalwalkins*



*Source: R.S.Khurmi*

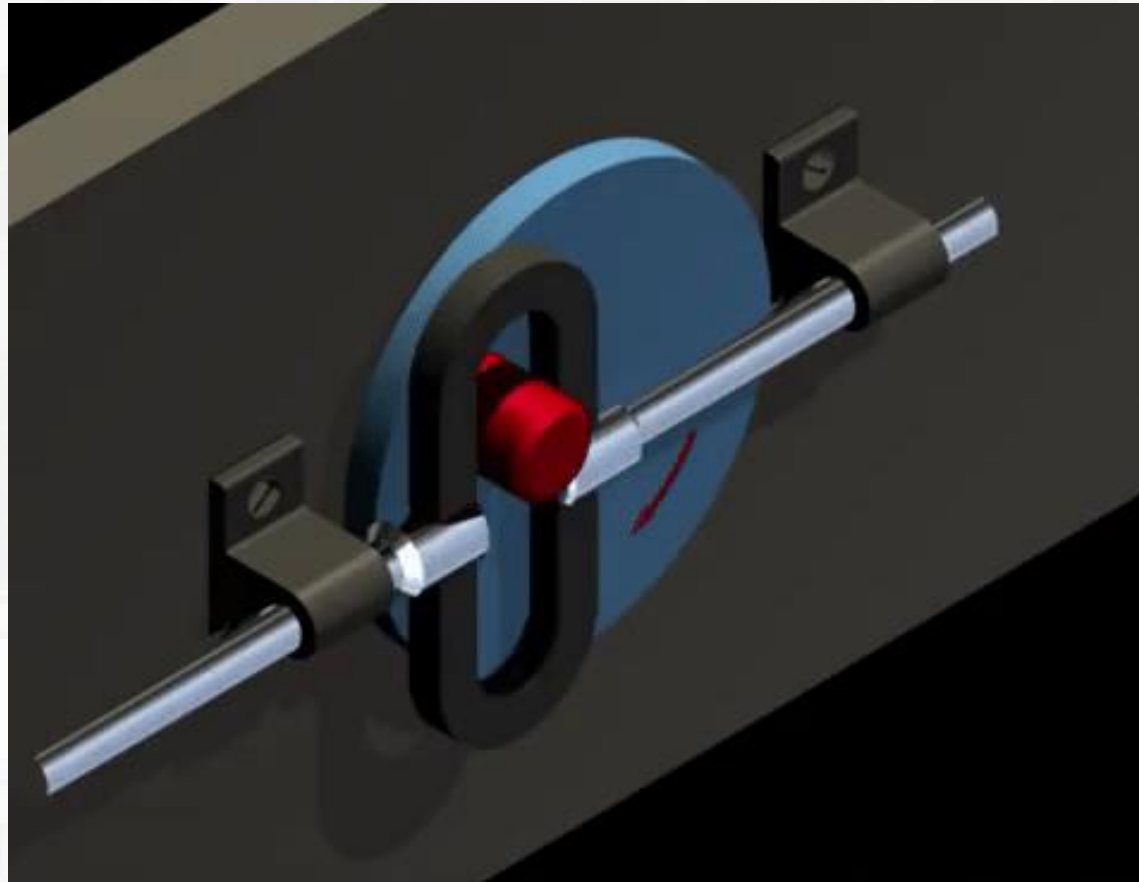
**BOARD USAGE ALSO**



## Inversions of Double Slider Crank Chain



### *2. Scotch yoke mechanism*

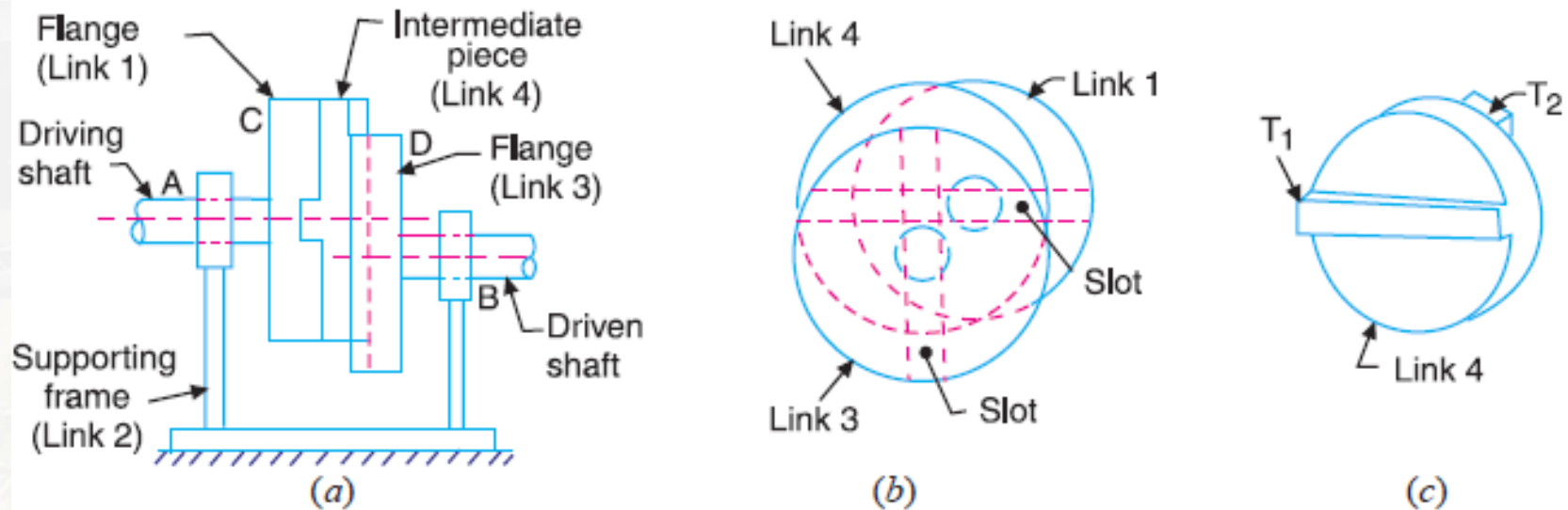


*Source: gfyat*



## Inversions of Double Slider Crank Chain

### 3. Oldham's coupling



Source: R.S.Khurmi

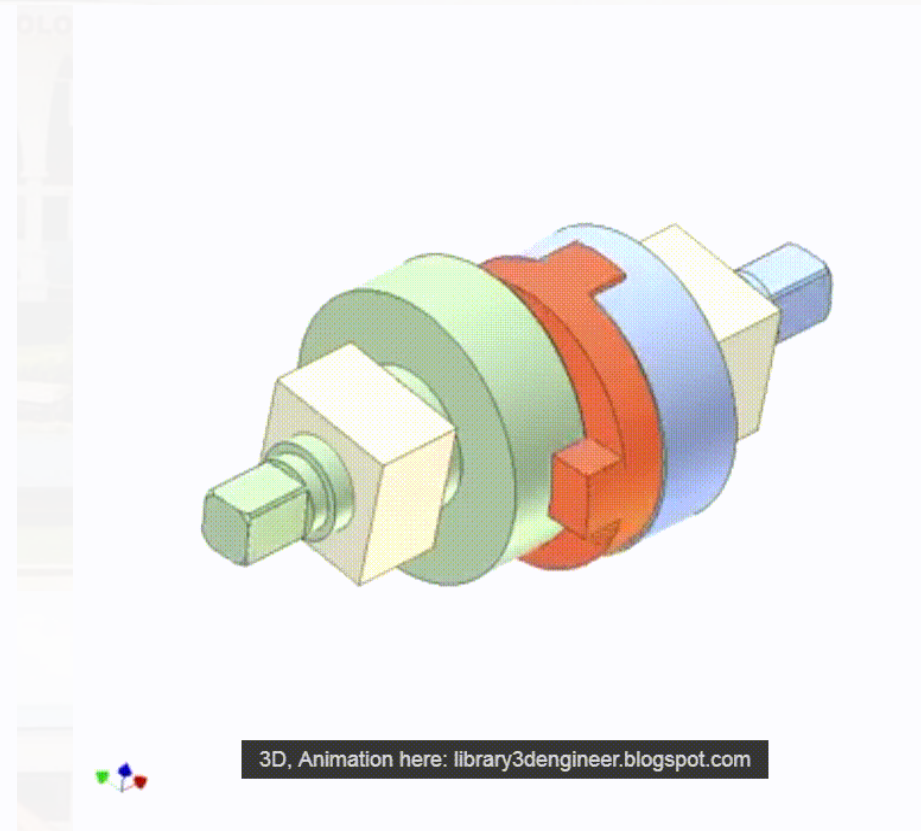
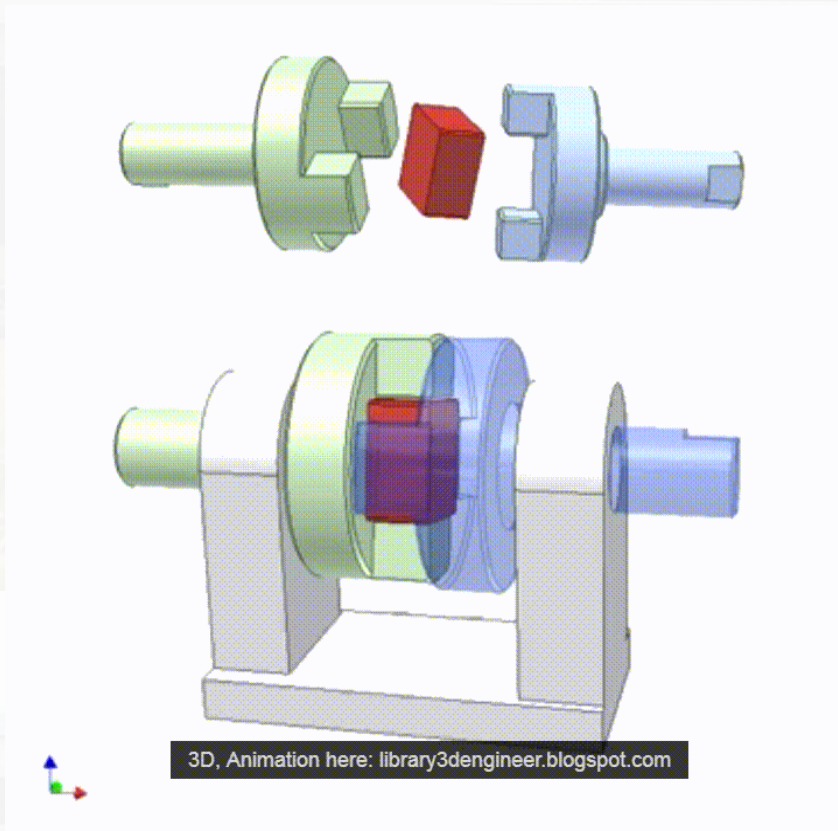




## Inversions of Double Slider Crank Chain



### *3. Oldham's coupling*



*Source: [library3dengineer.blogspot.com](http://library3dengineer.blogspot.com)*





## Objective Questions



- Which of the following is an inversion of double-slider crank chain?
  - a) Whitworth quick-return mechanism
  - b) Reciprocating compressor
  - c) Scotch yoke
  - d) Rotary engine
  
- Oldham's coupling is used to connect two shafts which are
  - a) Intersecting
  - b) parallel
  - c) Perpendicular
  - d) Co-axial
  
- Oldham's coupling is an inversion of kinematic chain also used in
  - a) Universal joint
  - b) Elliptical trammel
  - c) Hand pump
  - d) Rotary engine

*Source: R.S.Khurmi*

***BOARD USAGE ALSO***



## Objective Questions

- Which of the following is an inversion of single-slider crank chain?
  - a) Elliptical trammel
  - b) Hand pump
  - c) Scotch yoke
  - d) Oldham's coupling
- Which of the following mechanism is obtained if the slider of a single slider crank chain is fixed?
  - a) Quick return mechanism
  - b) Oscillating cylinder
  - c) Rotary engine
  - d) Hand pump
- Inversion of a mechanism means
  - a) Turning it upside down
  - b) Fixing different links in a kinematic chain
  - c) Changing higher pair to lower pair
  - d) Changing the input link and the output links

*Source: R.S.Khurmi*

*BOARD USAGE ALSO*