

[Home](#) >

Three masses m_1 , m_2 and m_3 are of 100N, 200N and 150N respectively. The corresponding radii are 0.3 m, 0.15 m and 0.25 m respectively. Angles between masses m_1 and m_2 is 45° and between m_2 and m_3 is 75° and between m_3 and m_1 is 240° . Determi

Given data $m_1 = 100\text{N}$, $m_2 = 200\text{ N}$, $m_3 = 150\text{ N}$, $r_1 = 0.3\text{m}$, $r_2 = 0.15\text{ m}$, $r_3 = 0.25\text{m}$

Radius of rotation = $r = 0.2\text{m}$

Balancing force is equal to resultant force

So, $m \times r = 63$

$m \times 0.2 = 63$

$m = 315\text{ N}$

Measurement $\theta = 60^\circ$

In reciprocating engine the crank is 250 mm long and connecting rod is 1000 mm long. The crank rotates at 150 rpm. Find velocity and acceleration of piston. And angular velocity and angular acceleration of connecting rod when the crank makes an angle of 30°

Explain with neat sketch compound type Gear Train. Derive the equation for velocity ratio of gear train. Write it's application.

Compound Gear Train:

When there are more than one gear on a shaft, as shown in Fig. , it is called a compound

train of gear. In a simple train of gears do not affect the speed ratio of the system. But these gears

are useful in bridging over the space between the driver and the driven.

Gear trains inside a mechanical watch

But whenever the distance between the driver and the driven or follower has to be bridged

over by intermediate gears and at the same time a great (or much less) speed ratio is required,

A cam operates a roller follower, axis passing through the axis of cam. The specifications are Minimum radius of cam = 25 mm Lift of follower = 30 mm Diameter of roller = 15 mm Angle of lift = 120 o with SHM Outer dwell angle = 30 o Angle of

Explain Klein's construction to determine velocity and acceleration of different links in single slider crank

mechanism.

Let OC be the crank and PC the connecting rod of a reciprocating steam engine, as shown in Fig.

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. The Klien's velocity and acceleration diagrams are

drawn as discussed below:

Define following terms (i) (ii) (iii) (iv) (v) (vi) Kinematic link
Kinematic pair Kinematic chain Mechanism Machine
Inversion

(i) Kinematic link: Each part of a machine, which moves relative to some other part, is known as a kinematic link.

(ii) Kinematic pair: The two links or elements of a machine, when in contact with each other, are said to form a pair. If the relative motion between them is completely or successfully constrained (i.e. in a definite direction), the pair is known as kinematic pair.

(iii) Kinematic chain: When the kinematic pairs are coupled in such a way that the last link is joined to the

Draw and explain the turning moment diagram of 4-stroke

I.C. Engine.

A turning moment diagram for a four stroke cycle internal combustion engine is shown. We know that in a four stroke cycle internal combustion engine, there is one working stroke after the crank has turned through two revolutions, i.e. 720° (or 4π radians). Turning moment diagram for a four stroke cycle internal combustion engine. Since the pressure inside the engine cylinder is less than the atmospheric pressure during the suction stroke, therefore a negative loop is formed as shown in Fig. During the compression

Write the classification of follower (i) As per shape (ii) As per motion. Draw sketch of any one follower.

Classification of follower:

i) As per shape:

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Knife-edge follower: When the contacting end of the follower has a sharp knife edge, it is called a knife edge follower.

- Roller follower: When the contacting end of the follower is a roller, it is called a roller follower.

- Flat faced or mushroom follower: When the contacting end of the follower is a perfectly flat face, it is called a flat faced follower and when the flat faced follower is circular, it is then called a

mushroom follower.

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Write any two functions and applications of clutch.

Functions of clutch:

- i) A clutch is a device used to transmit rotary motion of one shaft to the other shaft when desired.
- ii) A clutch is a device used for engaging and disengaging the engine crank shaft instantaneously when desired by the driver.

Differentiate between mechanism and machine.

Difference between Mechanism & machine

Mechanism

Primary function is used to transmit or modify the motion.

It is not used to transmit the force.

A mechanism is a single system to transfer the motion

eg.i) In watch, energy stored on winding the spring is used to move hands.

ii) An indicator is used to draw P-V diagram of engine

Pages

[« first](#)

[< previous](#)

[1](#)

[2](#)

[3](#)

4

[5](#)

[6](#)

[7](#)

[8](#)

[9](#)

...

[next >](#)

[last »](#)
