

# Mechanism Design

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## **INTRODUCTION:**

Linkages, gears, cams, hinges etc. are important components of machines and tools. You come across hundreds of examples where linkages have major role to play like windshield wiper, the bicycle suspension, piston cylinder assembly of an engine and many more. Seeing such a vast range of their application you might now want to try your hands in making some of them and getting them work.

## **Problem Statement:**

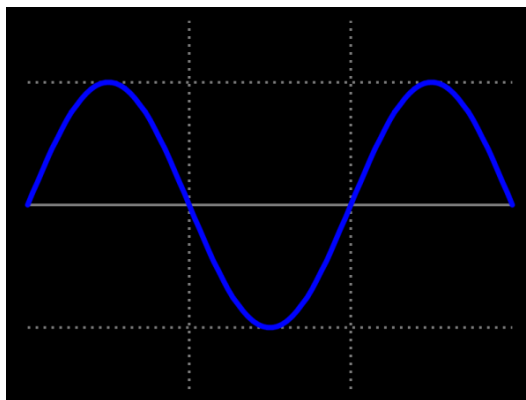
Design and fabricate separate mechanisms with manual input that utilizes it to:

- Generate a sine wave,  $\sin(\theta)$
- An ellipse
- A circle

on a plane sheet of paper

## **Rules:**

- No electrical actuators can be used.
- No source of energy can be used other than human power.
- Team distribution
  - Maximum team size : 4 members
  - Only 1 member from Y11 can be in the team.
  - Rest all the members can only be of Y12.
- This is a team event, no restriction on number of teams per pool.
- The sine wave has to be clearly drawn over a period of  $3\pi$ , waveforms should be clearly drawn and not be intersecting .i.e



- There should be a distance of at least two mechanical linkages between user input and point tracing out the curve.
- The minimum amplitude of sine wave, the radius of the circle and the minor axis of the ellipse is 5 cms.
- Eccentricity of the ellipse, frequency of the wave can be anything.

## **Judging Criteria:**

**Violation of intent of rules is also a violation and can lead to disqualification**

### **Prelims:**

- Preliminary designs will be submitted from the submitting teams on 25th.
- There is no cap on number of teams for the finals but a design submission is must for moving to the final round.
- The design submissions should contain technical drawings of their proposed mechanism and a write up on it. A short video explaining it will be helpful but is not a necessity.
- No points will be awarded in this round, but if a team fails to submit its drawings it will be disqualified.
- Changes can be made in these drawings after submission.

### **Finals:**

- The distribution of points is:
  - o Sine wave: 40
  - o Ellipse: 50
  - o Circle: 10

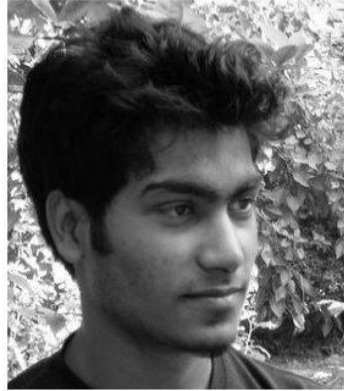
For every figure 40% of the total points allotted are for innovation; 40% would take into account the working, fabrication and how you defend your design in front of the judges. 20% of marks distribution as above will be for simulations or calculations of their designs. Simulation can be done in any software.

- A penalty up to a maximum of 40% on the total allotted points can be levied on the basis of accuracy and deviation from decided parameters which will be subjective to the judges.
- Judging will be done on the accuracy with which the figure is traced out on paper.
- The judges will question you on your designs and the design philosophy behind them. The combined score will be tallied for a team.
- There is no restriction on the number of gears.
- Innovative mechanisms will be fetching extra points.
- In case of multiple pool entries, their designs should not be same; this will lead to disqualification of one of the teams

## CONTACTS



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