

HYDRO

EVENT DESCRIPTION :

The event aims at making a hydraulically actuated arm, which can pick and place objects and complete the given task in the shortest possible time without the use of electronics.

FORMAT:

The event has two rounds and a bonus round.

Round 1:

It is an eliminating round.

In this round the participants will be given a set of five normal size paper cups with words embedded on it in a jumbled form. The task is to arrange the jumbled letters to form a meaningful word in the shortest possible time.

The top eight teams who have finished the word in the shortest time will be selected for the second round.

Round 2:

This round will decide the winners of the event from those eight teams selected in round 1. It has three stages. Winner of each stage will go to the next stage, in the form of knockouts.

The task is to create a given formation from the given set of coloured blocks with dimensions approx. 2.5*2.5*2.5 inches. Two teams will be given the same formation and the team which finishes the task first wins. First place goes to the finalist, second place to the runner- up team and third place to the winning team of a separate match between semi-finalists who lost.

Bonus round:

You will be given a problem statement on day one of Pragyan which will test your thinking and problem solving skills. It will be completely theoretical and requires just basic physics knowledge. You are required to submit the solution on following day. This is a separate round and in no way linked to actual competition.

RULES :

Pre-Event Rules

- Submit an appropriate abstract describing the design of the arm before **February 18th, 2015**.
- The “mechanical arm” should be setup in the staging area before starting the event.
- No part of the arm should cross the demarcating line before the commencement of event.
- The teams are allowed to start operating the controllers only after the start of timer, when instructed by the organizer.

During the Event

- **In round 1**, the cups with letters printed on them will be placed in Zone B of the arena and they should be picked and placed in the Zone A (elevated platform) in sequence to get the right word.

Timer will be stopped when all the cups have been arranged to form the right word in Zone A.

The question related to the **Bonus round** will be given during round 1, which is to be submitted on round 2.

- **In round 2**, the participants have to pick the coloured blocks from Zone B and place it in Zone A in order to form a given formation before the other team to win the round. No timer will be used, the team which finishes the task first wins the round.
- For the **FIRST** round, each team will be granted only 3 trials. If the task is accomplished in all three trials, the best of three timings will be taken. In case of any failure, etc., that particular trial will be used considered used up.
- In case of failure, the team has a maximum of 20mins to fix the problem.
- For **SECOND** round, no such provision is there. Any failure / inability to perform task will result in disqualification.
- Regarding the **PRACTICE** arena, teams may perform dry runs for a duration of 5mins max. Use of the practice arena is unlimited, but will be monitored to ensure all teams have equal opportunities.

Regulations

- A team can consist up to 4 members
- The arm should have a stable base and must be able to stand by itself at all positions.
- All the joints of the arm must be actuated hydraulically and must be operated with manual controls.
- The controls must not be mounted on the any of the moving parts of the arm. The controls may be placed on the base or any part of the staging area.
- The participants will be allowed to handle only the controls and not the arm or the cups during the event.
- The participants are allowed to use any material (Popsicle sticks, ply wood, etc) to build the arm. Stock arms are not allowed.

Electrical or Electronic components such as motors, batteries should not be used.

Eligibility

- All students with a valid identity card from their respective educational institution are eligible to participate in Hydro.

JUDGING CRITERIA:

- Time taken to finish the given task is the basic criteria.
- Other than that minimum number of people operating the arm and aesthetics of the arm have importance in case of ties.

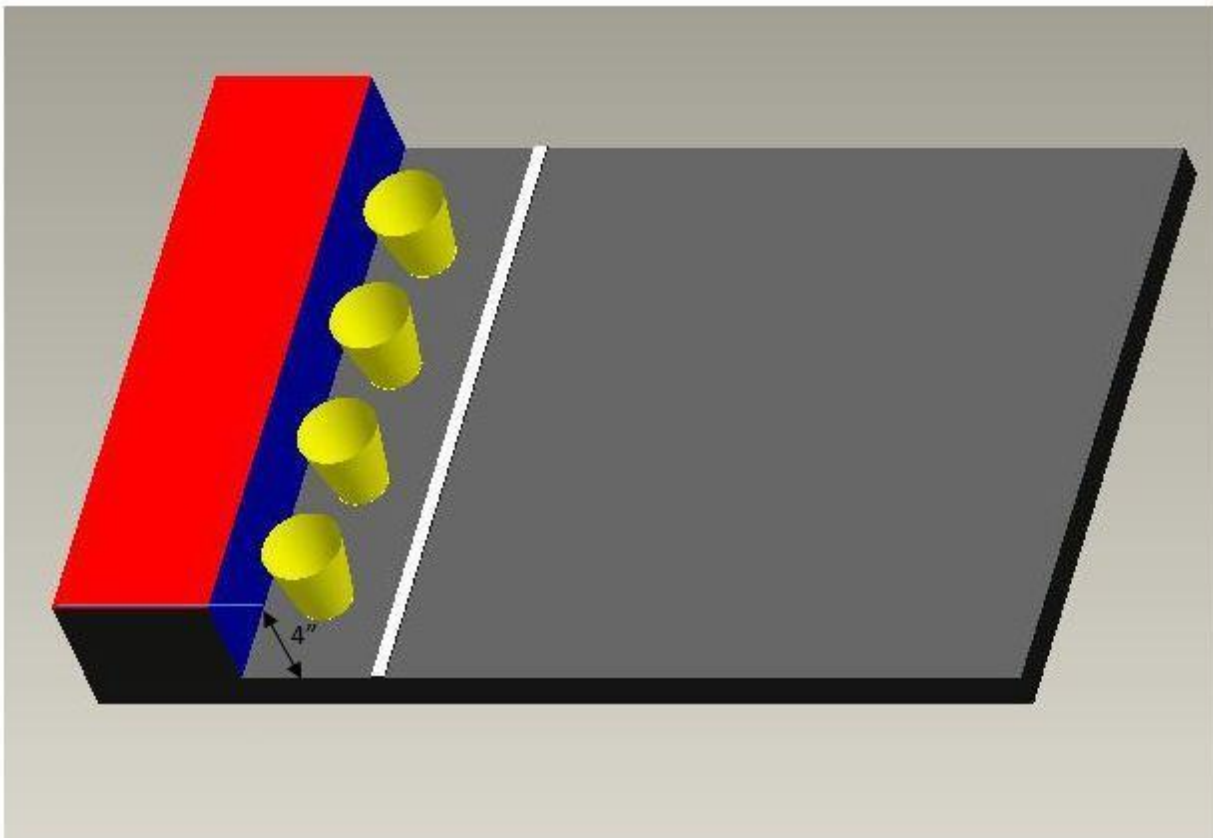
PROBLEM STATEMENT :

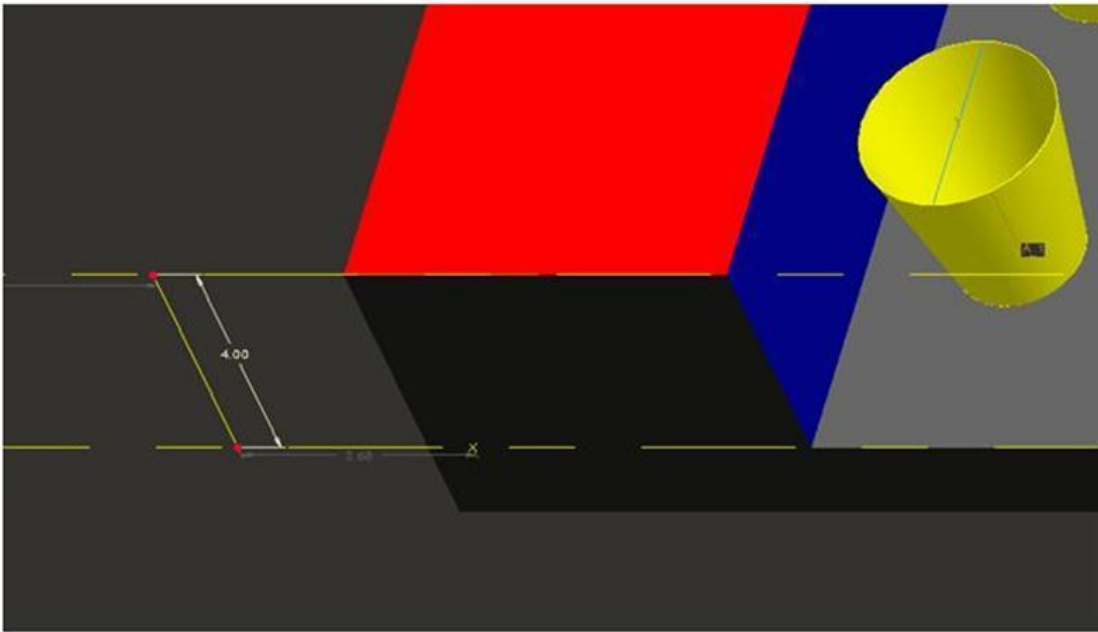
To design and fabricate a hydraulically actuated arm, which can pick and place objects and complete the given task in the shortest possible time.

Note: The arm should be capable of stacking at least 5 blocks one above another.

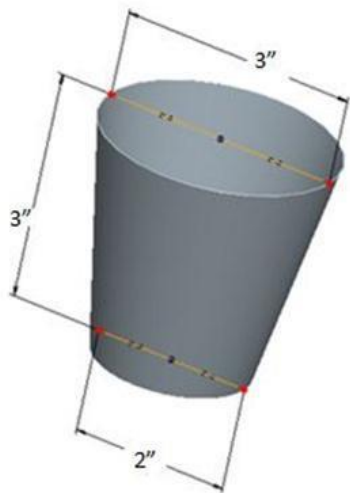
Conversion: 1 inch=2.54 cm

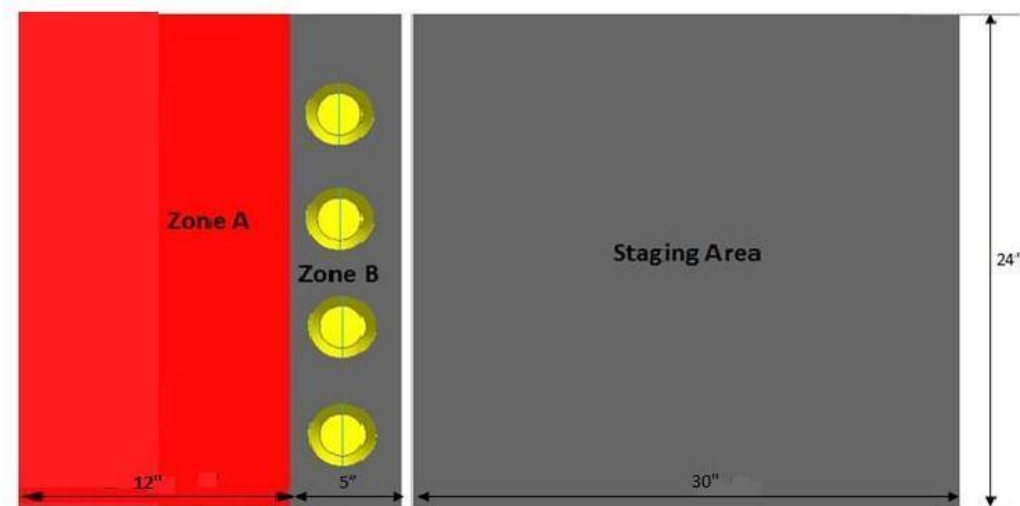
Arena:





Cup





FAQ :

1. Who can participate ?

Students from any college or university can participate in this competition. You can check out the links given if you need technical help regarding the event.

2. How many members can be there in a team?

Minimum number of participants=2

Maximum number of participants=4.

3. I have graduated from college and am not currently a student. Can I participate in the competition ?

No. Only those participants who have a valid Pragyan id can participate. Pragyan IDs will be issued only to students.

4. Is this event open only for mechanical engineers?

No. This event is open for all branches of engineering and technology because it is a pure science initiative.

5. Do we have to pay registration fee for the event?

No. Registration for this event is free of cost.

6. Do we get certificate for participation?

Yes.

7. Can I participate in the bonus round even if I didn't pass the elimination round?

Yes. The bonus round tests your theoretical skills in the subject and is in no way related to the main event.

8. Is there any size limit for the abstract to be submitted?

Abstract file size should be less than 1 MB. Also include your team member's names.

RESOURCES :

<http://www.explainthatstuff.com/hydraulics.html>

https://www.youtube.com/watch?v=wHMHxO9Ys_0

http://www.grc.nasa.gov/WWW/k-12/WindTunnel/Activities/Pascals_principle.html

<http://www.brighthubengineering.com/hydraulics-civil-engineering/43171-what-are-the-basic-principles-of-hydraulics/>

http://www.hydraulicmania.com/hydraulic_cylinders.htm

<http://www.scienceguy.org/Articles/SyringeHydraulics.aspx>

<http://science.howstuffworks.com/transport/engines-equipment/hydraulic.htm>

https://www.youtube.com/watch?v=wTM6Zik_tww

PRIZE MONEY: Worth INR 22,000

WWW.PRAGYAN.ORG
LET'S CELEBRATE TECHNOLOGY

CONTACTS: Ashish Asokan: +917845743474

Nirmal K Dhananjayan: +919489784939

hydro@pragyan.org