**TEXEPHYR’19**

**PROPOSED EVENTS**

**(Mechanical Department)**

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**1.CONTRAPTION**

# Max. No. Of Participants: 4

# No. of Rounds: 1

**INTRODUCTION:**

For those of us, who are tired of straightforward algorithms- put on your thinking hats, and come up with all the bizarre and uncanny ideas you can think of to accomplish the most common tasks. A CONTRAPTION machine is a deliberately over-engineered machine that performs a very simple task in a very complex fashion, usually including a chain reaction. Instead of just “solving” the problem, team have to make the solution as complicated and as convoluted as possible. So go ahead, break the rules, defy all logic, and make life tougher!

**AREA:**

* The area allotted to each team will be 3m x 3m.

**EVENT GUIDELINES:**

* The arrangement should complete the contraption in a minimum of 5 steps.
* A Step is defined as the action that results in another action working towards the final aim of the contraption/machine.
* Each team will be given 2 trials to show their working arrangement. A setup time of 10 minutes will be given for the second trial.
* A setup time of 2 hours will be given to every team before their first attempt.
* The working time of the arrangement should be less than 3 minutes.
* All energy conversions are allowed to drive the contraption (including potential, chemical, electrical, kinetic etc.)
* Once initiated, manual intervention is allowed only when the contraption comes to an unexpected halt. Maximum times the manual intervention allowed is 3.

**JUDGEMENT CRITERIA:**

* Each unique step carries 10 points.
* Each unique Energy conversion carries 50 points. Thereafter if the energy conversion is repeated the points allotted would be half the initial points i.e. 25 for the first same conversion and 12.5 for the further repetitions.
* Each manual intervention made reduces the final score by 15.
* Completion of the final task gives 100 points to the team.
* In case of a tie the winner between the two teams will be decided by the time taken by the contraption to complete.

Problem statement will be displayed 20 days prior the competition on the event website. (Link - www.texephyr.com)

**2. BRIDGE MAKING**

**No. of Participants:** Max 2 per team.

**A. Objective**  
To build the bridge within our specifications that has the highest payload to weight ratio. The bridge must be constructed of approved materials.  
  
**B. Apparatus**  
Building Materials: (All materials provided)   
Popsicle sticks.   
Paper.   
Wood glue.   
Dimensions:   
Min Span Length - 60 cm - min. There will be a 60 centimetre "gap" which must be spanned by the bridge.  
Max Span Width - 15 cm - min.   
Min Span Height - 15 cm - min. There must be 15 centimetres between the table surface and the lowest point on the bridge span.  
  
The bridge must be able to stand on its own.   
The bridge must be able to support the load at the loading points. There will be two loading points, each one will be at the "deck" level, 20 centimetres from the centre of the span.

**C. The Competition:**   
Teams must submit their bridge 1/2 hour before the competition for inspection. Teams will be given 15 minutes to modify bridges which do not pass inspection.  
Inspection will test that the construction rules were followed and will record the mass of the bridge.  
Certified bridges will be placed over "Crusher Canyon" by the team members, who may make final adjustments in its position. The canyon will consist of a 60 cm space between two flat desktops. Nothing will be provided to keep the base of the bridge in place during loading.  
Once the bridge is in position, the loading tray will be attached in the position indicated above. The load will hang below the bridge, supported by two bars which rest on the deck of the bridge, 20 centimetres from each end.  
Bridges will then be subjected to loading. Bridge failure will be considered the point at which the bridge breaks or the point at which the loading tray drops more than 5 centimetres from the unloaded position.

**D. Judging and Scoring**:   
The greatest load prior to failure will be a bridge's capacity.  
The capacity divided by the bridge mass will be the bridge's score.  
The bridge with the highest score wins the event.

In the case of a tie, bridge with the lowest mass wins.

**3. DESIGNER PRO**

**Max. No. Of Team members**: 1

**No. of Rounds**: 3

**INTRODUCTION:**

Hand drafting?! Nah! Here’s something more exciting. If you like working with a software for designing (modeling), this event is the right choice. One can work with either SOLIDWORKS or AUTOCAD. The event will be conducted in 3 rounds.

**EVENT FORMAT:**

**Round 1 (Elimination Round):**

* It will consist of 50 Multiple Choice Questions on SOLIDWORKS/AUTOCAD software and drafting basics. Time allotted for this round will be 30 minutes.

**Round 2 (Part Modeling):**

* Participants will be evaluated for following things-

1. Number of parts successfully modelled.
2. Dimensional accuracy of parts modelled.
3. Appropriateness of the features used for part modelling

**Round 3 (Assembly Modeling):**

* Participants will be evaluated for following things-

1. Number of parts successfully modelled and assembled.
2. Constraining of parts in the assembly.
3. Whether sub-assemblies were used and why.
4. Appropriateness of the constraints used for assembly.

**4. RALLY MANIA**

# Max. No. Of Team Members: 4

**No. of Rounds**: 2

**INTRODUCTION:**

For all those who believe in setting the place on fire! Here’s a live experience of a racing tournament. Build your own remote controlled IC engine car and come on board! The operator will be given a ramp to stand on, giving visibility of the track and another team member will be allowed to assist him during the operation.

**ARENA:**

* The arena will be **displayed later on the website**.
* Rough patches, slopes, obstacles, speed-breakers will be there on the race track.

**SPECIFICATIONS of RC CARS:**

* The participants must use the vehicle of frequency of 2.4 GHz
* The machine must not be made from readymade kits like LEGO or Mechano sets or any other kits available in the market.
* However remote controls can be used from various model cars or toys or even those purchased from the market.
* The machine may be roughly classified into structural and functional parts:

1. **FUNCTIONAL PARTS** – Gears, differential gear shift, engine with clutch, pulley and pulley belt, springs, motors and servos (non propulsion purposes only), batteries, wheels and suspensions are allowed to be used as available in the market.
2. **STRUCTURAL PARTS** - Chassis, body and body cover, steering mechanism have to be built by the participants themselves. Judging for the same will be strict and the participant will be immediately disqualified if any of the above structural components is found to be ready made.

* The team must design the braking mechanism and the mounting suspension system. The body cover should be detachable so that the interior can be inspected. Note that the decision of the judges will be final and binding and any team found guilty of using ready made parts mentioned in this point will be disqualified.
* The machine must be propelled forward using IC engines (**Max power** of 4 CC). But use of any other chemicals, compressed gas, rocket powered systems, DC motors or any other means as found dangerous by the organizers will not be allowed.
* Start control mechanism: The start control mechanism must not provide any thrust to the vehicle along direction of motion of track. Those participants using IC engines must note that their starting mechanism must be removable and not interfere with the race.
* The vehicle will be inspected beforehand and will be disqualified if found dangerous by the judges.
* **The participants may add some innovative mechanisms (Reverse Mechanism) in their car so as to get bonus points.**

**GENERAL RULES:**

* The participants must place their RC cars at the start line before start of the race. Any RC car starting beforehand will be given a warning and will be allowed to restart. However if they repeat the false start again then the run will be disqualified.
* Only the operator shall stand on the controlling ramp.
* Only One Member/Team shall be present in the arena.
* Every time the vehicle needs to be lifted or reset either due to it stalling, tumbling or running off the track, it shall be placed at nearest previous checkpoint. The team will be disqualified if any damage to the track is observed.
* The vehicle cannot be touched for any other reason barring those stated above.
* The vehicle must remain intact throughout the race.
* Teams will have to deposit their wireless remote controllers with the management while reporting every morning.
* **No power supply will be given on the track.**
* Teams are not allowed to purposefully damage the machine of the opponent’s team. If doing so on track (while racing), the concerned team will get disqualified. Any team that is not competing in the right spirit and indulging in misbehavior will be disqualified. Execution of this rule will be subjective and relies completely on judge's discretion.
* If the timelines are not strictly followed, the organizers shall decide the consequences and the decision shall be final and binding to all teams.
* **THE ORGANIZERS RESERVE THE RIGHTS TO CHANGE ANY OF THE ABOVE MENTIONED RULES AS THEY DEEM FIT.**

**ELIGIBILITY CRITERIA:**

* Any student with valid ID card of their educational institute can participate.
* Each participant can be a part of one team only. If same participant is found as a member of more than one team, will lead to disqualification of both teams.

**5. REVERSE ENGINEERING**

**INTRODUCTION:** In this competition the participant has to prove his understanding of fundamental concepts as an engineer. It requires them to have a systematic approach to analysing and reasoning the engineering design of devices and systems.

**Max. No. Of Team members**: 4

**Event Rules:**

**Round 1**:

1. An online quiz based on aptitude, automobile and basic mechanical knowledge.

**Round 2**:

1. The teams will be given a mechanical device (Declared on the spot) which they are required to disassemble to the smallest components, note down the Specifications of each component.
2. The teams qualifying will be selected on the basis of time taken during the process and the accuracy of the job.

**Round 3**:

1. The teams will then divide themselves in 2 pairs. One pair will perform a CAD model and the other will reassemble the device.
2. CAD design for the assembly should be done using the specifications gathered earlier.
3. You cannot reassemble the device unless there is a proper CAD model ready for the device.
4. Assessment of this round will be based on the time taken and accuracy of both the CAD model as well as the physical assembly.