RULE BOOK

1. ROBO WARS

TASK

Design and construct a remote-controlled robot capable of fighting a tournament against another robot(s).

DESIGN SPECIFICATIONS

A. Specifications

- There will be no restrictions on the dimensions of the bot(s).
- The weight of the machine should not exceed **8 Kgs (17.64 Lbs.)**, which includes the weight of any pneumatic source/tank. All pneumatic tanks/sources and batteries should be onboard. Only the weight of the remote controller will not be counted.
- A bot can be in a **Cluster Bot** formation. Each bot must meet the requirements described in this problem statement. The total weight of all the bots and the dimensions of the combination of bots must satisfy the above two points.
- Robots with pneumatic or hydraulic mechanisms or electric lifters are **NOT allowed**.
- Both active weapon and inactive (wedge-type) bots are allowed. **Preference will be given to active bots during abstract selection.**

B. Mobility

1. All robots must have easily visible and controlled mobility in order to compete. Methods of mobility include:
    - **Rolling**: Wheels, tracks, or the whole robot.
    - **Non-wheeled**: Non-wheeled robots have no rolling elements in contact with the floor and no continuous rolling or cam-operated motion in contact with the floor, either directly or via a linkage. Motion is "continuous" if continuous operation of the drive motor(s) produces continuous motion of the robot. Linear-actuated legs and novel non-wheeled drive systems are also allowed under this category.
    - **Manually operated jumping and hopping** are allowed. However, the maximum height of any part of the machine should not exceed **6ft** during any stage of its jumping/hopping. Any damage caused due to this mechanism is solely the responsibility of the team.

2. **Mobility methods that are NOT allowed**:

- Flying (using air foil, helium balloons, ornithopters, etc.) is not allowed.
- The robots should not secure themselves on the ring surface by using suction cups, diaphragms, sticky treads, glue, or other such devices.

C. Robot Control Requirements

- The robot must be controlled only through a **wireless remote**, while all power supply must be onboard.
- Control must be exhibited over all of its functions and positions. Although autonomous functions within the bot are acceptable, the controller must be able to remotely disable or override these functions at any time. There must compulsorily be a **manual emergency stop (E-stop)** function that can be controlled from the radio controller in case of emergency.
- There should be binding capability between transmitters and receivers, and they must be able to connect between polycarbonate (20mm), metal bars, and barriers. Only remotes with such functionality will be allowed.
- The team must have at least **four-frequency wireless remote-control circuits** or **two dual control circuits** that can be interchanged before the start of the match to avoid frequency interference with other teams. Interference in the wireless systems will not be considered for rematch or results.
- Remote control systems from toys may be used. Remote control systems available in the market may also be used, while non-standard or self-made remote-control systems can be used only after approval from the organizers.
- The team must pair the wireless remote with the machine before putting it into the arena. No extra time will be provided for this once the machines are put inside the arena. Failure to connect the remote with the machine beforehand may attract a penalty.

D. Battery and Power

- The machine must be powered electrically. Use of an **IC engine** in any form is not allowed. Onboard batteries must be **sealed, immobilized-electrolyte types** (such as gel cells, lithium, NiCad, NiMH, or dry cells).
- The electric voltage between any two points on the machine should not exceed **36V DC** at any point in time. Participants must bring their own converters for standard power supply according to Indian standards.
- Participants must protect battery terminals from direct short circuits to prevent battery fires. Failure to do so will result in direct disqualification.
- Use of damaged, non-leak-proof batteries may lead to disqualification.
- Batteries must be sufficiently protected onboard. Judges will disqualify teams if battery protection is deemed inadequate.
- Battery changes will not be allowed during the match.
- Only bots with onboard batteries will be allowed.
- Teams participating with multiple bots must possess enough batteries to support all bots in the event. Failure to do so may lead to disqualification for delays.

- Teams cannot use the same bot with different names in the same categories by simply modifying certain components.
- The supply from the battery to all weapons and power systems must include the following fail safes:

- A manual disconnect (switch) that can be turned off safely.
- A manual emergency stop triggered via the radio controller.

- Teams are advised to have an extra charged battery ready to avoid delays in the next level. Teams failing to show up during their allotted slot will be disqualified.

E. Weapon Systems

Robots can have magnetic weapons, cutters, flippers, saws, lifting devices, spinning hammers, etc., as weapons, provided they meet the criteria below.

- No liquid projectiles (foam, liquefied gases).

- No inflammable liquids.

- No weapons causing invisible damage (e.g., electrical weapons, RF jamming weapons).

- No weapons causing opponents' weapons (spinners) to entangle (e.g., chains, ropes, or loose fabrics).

- Must come to a full stop within **60 seconds** of power being removed using a self-contained braking system.
- Large springs must not be loaded when the robot is out of the arena or testing area.
- All kinetic energy storing devices must fail to a safe position upon loss of radio contact or power.

GENERAL GUIDELINES:

- A robot is declared victorious if its opponent is immobilized.

- A robot will be declared immobile if it cannot display linear motion of at least **5 inches** in a time period of **10 seconds**. A bot with one side of its drivetrain disabled will not be counted out if it can demonstrate the above-mentioned motion. In case both robots remain mobile after the end of the round, the winner will be decided subjectively.

- A robot that is deemed unsafe by the judges after the match has begun will be disqualified and declared the loser. The match will be immediately halted, and the opponent will be awarded a win.

- If a robot is thrown out of the arena, the match will be stopped immediately, and the robot inside the arena will automatically be declared the winner.

- Robots cannot win by pinning or lifting their opponents. Organizers will allow pinning or lifting for a maximum of **10 seconds** per pin/lift. The attacker robot will then be instructed to release the opponent. If the attacker fails to release after being instructed, their robot may be disqualified. If two or more robots become entangled or a crushing/gripping weapon becomes trapped within another robot, the competitors must

notify the timekeeper. The fight will be stopped, and the robots will be separated by the safest means.

- If a bot gets stuck inside the arena due to the deformity of the arena itself, the timer will not be stopped. The bot can try to free itself, or else the immobilization countdown will start. The start of the immobilization countdown will be decided by judges.

➢ Judging Criteria

- **Aggression**: Judged by the frequency, severity, boldness, and effectiveness of deliberate attacks initiated by the robot against its opponent. Accidental attacks will not be considered.

- **Control**: Judged by the ability to attack an opponent at its weakest point, using weapons effectively, and minimizing damage caused by the opponent.

- **Damage**: Points are awarded if a robot reduces the functionality, effectiveness, or defensibility of its opponent through deliberate action. Self-inflicted damage will not count. Additionally, if a pressure vessel or rapidly spinning device fragments, any resulting damage to the opponent will not be considered "deliberate."