Robo-E-Junk

Rules and regulations:
The following rules and regulations are to be strictly followed:

Introduction:

General Rules:

1.The competition will be played on a knock-out basis.

2.The bot would be checked for its safety before the competition and would be discarded if found unsafe for other participants and spectators.

3.The name of your bot must be prominently displayed on the bot.

4.The organizers reserve the rights to change any or all of the above rules as they deem fit. Change in rules, if any will be highlighted on the website and notified to the registered teams.

5. Violation of any the above rules will lead to disqualification.

6. The maximum time limit for the clash of the combatants inside the arena is 10 mins.

7. If your bot is thrown out of the arena, it is out.

8. A bot will be declared immobile (Out), if it cannot display a linear motion of at least one inch in a timed period of 30 seconds. A Bot with one side of its drive train disabled will not be counted out if it can demonstrate some degree of controlled movement.

9. If any team is not ready at the time specified then it would be considered as a walkover and team will get no point for that combat.

10. One of the fighting teams can take a STO (Strategic Time Out), of 2 min, at any point of the match.

11. The bot will be inspected be safety and will be disqualified if found unsafe by the safety inspector.

12. The bot should start from the starting zone.

13. The bot cannot split into two sub-units. Two parts connected by a flexible cord will also be considered as two different units.

14. Damaging the arena leads to direct disqualification.

15. The participants should have their college id cards with them.

16. Readymade logo kits, car bases and readymade development boards are not allowed. Readymade gear boxes are allowed.

17. Registrations will be online and on spot. For more details on registrations refer to our website.
18. There will be two stages

19. In stage-1, 8 bots will be chosen on basis of points (scoring system).

20. In stage-2, we will have quarterfinal (8 bots), semifinal (4 bots) & final (2 bots)

Judges' decision shall be treated as final and binding on all.

Video and Abstract Submission:

Participants have to submit a portfolio of their bot, consisting of a written abstract of the working model before the competition.

Abstract:

The written abstract should be prepared on the following lines:

It is compulsory to mention all the frequencies the team is going for driving and functioning of the bot and its different mechanisms.

The team has to specify very clearly whether the bots having any autonomous part if it is possessing then its functionality as to be mentioned very clearly.

The weapon systems and power supply method should be explained in detail, along with proper diagrams. Picture(s) showing these should be attached.

Description of any unusual advantageous mechanism used.

The specifications of all the components used, including motors, suspension springs, remote controller, wires, battery etc. have to be mentioned.

The abstract can be attached as a PDF file or the abstract can be submitted on paper.

This will make sure at least the abstract part of your portfolio reaches us before the deadline. A confirmation mail will be sent after we receive your abstract. Each team is allowed to make one submission only. In case of multiple submissions, only the first submission will be used for judging purposes.

Xion'17 is **not responsible** for any postal/courier delays, so participants are encouraged to send their entries well in advance to ensure receipt before the last date.

Xion assures total privacy of the matter submitted to us. The portfolio of your bot will be helpful in future as an evidence of your hard-work along with determining your position for the competition. Hence, please pay adequate attention to it.

The portfolio is meant to assess the efforts put in by participants. Thus even if you are not able to meet the requirements asked in the portfolio, please send us the portfolios based on the current state of your bot before the deadline. That means even if your bot is incomplete, please send the portfolios anyway, instead of not sending them or sending them late.

Criteria for Victory

A bot is declared victorious if its opponent is immobilized or thrown out of the arena.

In case both the robots remain mobile after the end of the round then the winner will be decided under the rules as discussed in the scoring pattern.

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

Points will be given on the basis of the scoring pattern.

Safety Rules:

Compliance with all event rules is mandatory. It is expected that competitors stay within the rules and procedures of their own accord and do not require constant policing.

If you have a bot or weapon design that does not fit within the categories set forth in these rules or is in some way ambiguous or borderline, please contact the event organizers. Safe innovation is always encouraged, but surprising the event staff with your brilliant exploitation of a loophole may cause your bot to be disqualified before it even competes.

Each event has safety inspections. It is at their sole discretion that your botis allowed to compete. As a builder you are obligated to disclose all operating principles and potential dangers to the inspection staff.

Proper activation and deactivation of robots is critical. Robots must only be activated in the arena, testing areas, or with expressed consent of the event coordinators.

All weapons must have a safety cover on any sharp edges.

All participants build and operate robots at their own risk. Combat robotics is inherently dangerous.

There is no amount of regulation that can encompass all the dangers involved. Please take care to not hurt yourself or others when building, testing and competing.

Team Specification:

A team may consist of a maximum of 4 participants, all from the same institute.

Bot specifications:

1. **Size**
The bot should fit in a box of dimension 600 mm x 600 mm x 800 mm (lxbxh) at every given point of the race exceeding this limit may result to direct disqualification. The external device used to control the bot or any external tank is not included in the size constraint.

2. Weight Classes.
This event offers the listed weight classes in this section.
The bot should not exceed 40 kg of weight including the weight of pneumatic source/tank. If the tank is external, its weight would be considered 1.5 times its actual weight. Weight of external power source (batteries and adaptors) will not be counted. Weight of wireless wheeled robots will be counted as 0.75 x the actual weight. The robots can be of ***ROLLING OR WALKING*** types.
There is a 100% weight bonus for true walkers. There is no weight bonus for shufflers or other forms of locomotion other than walking - see 3.1.2 for a definition of a walker.)
Other weight class Robots ***may be*** permitted to operate as an exhibition-class demonstration only - at the discretion of the event coordinator based on arena safety, but those robots will not be permitted for taking part in the competition organized competition or prizes will not be offered for those classes.

3. Mobility
3.1. All robots must have **easily visible and controlled mobility** in order to compete.
Methods of mobility include:
3.1.1. Rolling (wheels, tracks or the whole robot)
3.1.2. Walking (linear actuated legs with no rolling or cam operated motion).
Robots are classified as "walker" at the sole discretion of the Event Organizer,
and are not subject to appeal. Contact the Event Organizer if in doubt
3.1.3. Shuffling (rotational cam operated legs)
3.1.4. Ground effect air cushions (hovercrafts)
3.1.5. Jumping and hopping is allowed
3.1.6. Flying (airfoil using, helium balloons, ornithopters, etc.) is not allowed.

4. bot control requirements:
4.1 Bots may be wired or wireless.
4.1. Tele-operated robots must be radio controlled by standard Hobby Radio Control Equipment, or use an approved custom system as described in 4.4.3.
4.2. Tethered control is not allowed.
4.3. Pre 1991 non-narrow band radio systems are not allowed.

4.4. Radio system restrictions for this event with weight and or weapon restrictions:

4.4.1. Radio systems that stop all motion in the bot(drive and weapons), when the transmitter loses power or signal, are ***required*** for all robots with active weapons or any robot. (This may be inherent in the robots electrical system or be part of programmed fail-safes in the radio.)

4.4.2. All bot radio systems must have a way to change frequencies or coded channels to prevent radio conflicts. Having at least **two to four** frequencies or coded channels available is ***recommended***. Lack of extra frequencies may result in a forfeit. Priority for frequency use will be allocated in order of Entry registration.

4.4.3. Non Standard or Home built control systems, must first be approved by this event.

4.4.4. All robots that are either: Larger than 12 Kg's must use a radio systems on the FM band, or an approved custom control system.

4.5. This event recommends, but does not require a separate power switch for the radio.

4.6. It is recommended to use 3 to 4 freqiuencies for your robot.

4.7.For wired bots it should be taken care that there should be no entanglement of wires.

4.8.The power supply should be 15-18 volt.

Autonomous/Semi-Autonomous Robots:

Any botthat moves, seeks a target, or activates weapons without human control is considered autonomous. If your bothas any autonomous features you are required to contact this event before registration.

5.1. Autonomous robots must have a clearly visible light for each autonomous subsystem that indicates whether or not it is in autonomous mode, e.g. if your bothas two autonomous weapons it should have two "autonomous mode" lights (this is separate from any power or radio indicator lights used).

5.2. The autonomous functions of a botmust have the capability of being remotely armed and disarmed. (This does not include sensors, drive gyros, or closed loop motor controls.)

5.2.1. While disarmed, all autonomous functions must be disabled.

5.2.2. When first activated the botmust have no autonomous functions enabled, and all autonomous functions must failsafe to off if there is loss of power or radio signal.

5.2.3. In case of damage to components that remotely disarm the robot, the robots autonomous functions are required to automatically disarm **within one minute of the match length time** after being armed.

6. Batteries and Power

6.1. The only permitted batteries are ones that cannot spill or spray any of their contents when damaged or inverted. This means that standard automotive and motorcycle wet cell batteries are prohibited. Examples of batteries that are permitted: gel cells, Hawkers, NiCads, NiMh, dry cells, AGM, etc.

6.2. All onboard voltages above **48 Volts** require prior approval from this event. (It is understood that a charged battery's initial voltage is above their nominal value)

6.3. All electrical power to weapons and drive systems (systems that could cause potential human bodily injury) must have a manual disconnect that can be activated within **15 seconds** without endangering the person turning it off. (E.g. No body parts in the way of weapons or pinch points.) Shut down must include a **manually** operated mechanical method of disconnecting the main battery power, such as a suitable high current switch (Hella, Whyachi, etc) or removable link. Relays may be used to control power, but there must also be a mechanical disconnect. Please note that complete shut down time is **in under 60 seconds by a manual** disconnect this includes power to drive and weaponry.

6.4. All efforts must be made to protect battery terminals from a direct short and causing a battery fire.

6.5. If your botuses a grounded chassis you must have a switch capable of disconnecting this ground. ICE robots are excepted from this rule if there is no practical way to isolate their grounding components.

7. Pneumatics

7.1. botcan use pressurized non-inflammable gases to actuate pneumatic devices. Maximum allowed outlet nozzle pressure is 8 bar. The storage tank and pressure regulators used by teams need to be certified and teams using pneumatics are required to produce the Safety and Security letters at the Registration Desk at the venue. **.** All pneumatic components within the botmust be rated or certified for AT LEAST the maximum pressure in that part of the system. You may be required to show rating or Certification documentation on ANY component in your system.
Failing to do so will lead to direct disqualification.

7.1.1. Example diagrams of typical pneumatic systems in robots:
CO2 based systems.
http://www.botleague.com/pdf/GeneralPneumaticsCO2.pdf

7.1.2. High Pressure Air (HPA) based systems
http://www.botleague.com/pdf/GeneralPneumaticsHPA.pdf

7.2. Participants must be able to indicate the used pressure with integrated or temporarily fitted pressure gauge. Also there should be provision to check the cylinder pressure on the bot.

7.3. The maximum pressure in cylinder should not exceed the rated pressure at any point of time.

7.4. You must have a safe way of refilling the system and determining the pressure.

7.5. All components must be used within the specs provided by the manufacturer or supplier. If the specifications aren't available or reliable, then it will be up to the EO to decide if the component is being used in a sufficiently safe manner.

7.6. You must have a safe and secure method of refilling your pneumatic system.

7.7. Pneumatic systems on board the botmust only employ non-flammable, non-reactive gases (CO2, Nitrogen and air are most common). Particular attention
must be made to pressure vessel mounting and armor to ensure that if ruptured it will not escape the robot. (The terms 'pressure vessel, bottle, and source tank' are used
interchangeably).

7.8. Please note that some pneumatic systems with very low pressures (below 100 total PSI on board), small volumes (12-16g CO2 cartridges), single firing applications, or pneumatics used for internal actuation (as opposed to external weaponry) may not need to comply with all the rules above. You are required to contact this event if you would like an exception.

8.Hydraulics

1. bot can use non-inflammable liquid to actuate hydraulic devices e.g. cylinders.

2. All hydraulic components on-board a bottommost be securely mounted. Particular attention must be made to pump, accumulator mounting and armor to ensure that if ruptured direct fluid streams will not escape the robot.

3. All hydraulic liquids are required to be non corrosive and your device should be leak proof.

4. Maximum allowed pressure is 8 bars. Participant must be able to indicate the used pressure with integrated or temporarily fitted pressure gauge.

9. Internal Combustion Engines (ICE) / liquid fuels.

9.1. Fuel and Fuel Lines

9.1.1. All commercially available grades of automobile or RC hobby fuel are allowed. Alcohol, Nitro-methane, jet fuel and other specialty fuels require prior approval by the Event.

9.1.2. Fuel lines and tanks must be made of high quality materials and all ends must be
clamped securely.

9.1.3. All fuel tanks and lines must be well protected and armored from all sides including moving parts and heat sources inside the robot.
9.2. Fuel tank volume, on any robot, shall not be greater than the amount required to operate the engine for more than **1 minute longer than the match time** at combat power plus a reasonable pre-match warm-up period.
9.3. The output of any engines connected to weapons or drive systems must be coupled through a clutch which will decouple the motor when it is at idle. (This does not include motors used for generators and hydraulic pumps.)
9.4. All engines must turn off or return to idle at loss of **radio signal** and turn off at loss of radio **receiver power**.
9.5. All engines must have a method of remotely shutting off.
9.6. Any bot with liquid fuel and oil must be designed not to leak when inverted. (Minor oil leakage may be tolerated, however if it affects the other botor becomes a large cleanup issue you may be called and the leaking bot will forfeit.)
9.7. Use of engines other than standard piston engines (i.e. turbines etc.) require prior approval at this event.

10. Rotational weapons or full body spinning robots
10.1. Spinning weapons that can contact the outer arena walls during normal operation must be pre-approved by the event. (Contact with an inner arena curb, or containment wall is allowed and does not require prior permission.)
10.2. Spinning weapons must come to a full stop within **60 seconds** of the power being removed using a self-contained braking system.

11. Springs and flywheels
11.1. Any large springs used for drive or weapon power must have a way of loading and actuating the spring remotely under the robots power.
11.1.1. Under no circumstances must a large spring be loaded when the bot is out of the arena or testing area.
11.1.2. Small springs like those used within switches or other small internal operations are excepted from this rule.
11.3. Any flywheel or similar kinetic energy storing device must not be spinning or storing energy in any way unless inside the arena or testing area.
11.3.1. There must be a way of generating and dissipating the energy from the device remotely under the robots power.
11.4. All springs, flywheels, and similar kinetic energy storing devices must fail to a safe position on loss of radio contact or power.}

Weapons Systems
Robots can have any kind of magnetic weapons, cutters, flippers, saws, lifting devices, spinners and hammers etc. as weapons with following exceptions and limitations:
1. Liquid projectiles.

2. Any kind of inflammable liquid.

3. Flame-based weapons.

4. Any kind of explosive or intentionally ignited solid or potentially ignitable solid.
Nets, tape, glue, or any other entanglement device.

5. High power magnets or electromagnets.

6. Radio jamming, Tasers, tesla coils, or any other high-voltage device.

7.Tethered or un-tethered projectiles.

8.Spinning weapons which do not come in contact with the arena at no point of time are allowed.

In no case should the arena be damaged by any bot.

The competition will be played on a knock-out basis.