

2024 - ERZURUM



REPUBLIC OF TURKIYE  
MINISTRY OF NATIONAL EDUCATION  
The General Directorate  
of Technical and Vocational Education

# 16<sup>th</sup> INTERNATIONAL MoNE ROBOT CONTEST

**DESIGN & BUILD ROBOT (JUNIORS)  
CATEGORY COMPETITION RULES**

INTERNATIONAL  
MoNE  
**ROBOT**  
CONTEST



## DESIGN & BUILD ROBOT (JUNIORS) CATEGORY COMPETITION RULES

### CHAPTER 1: COMPETITION RULES

**Article 1 (Objective):** This competition is based on competing professional skills, knowledges and programming experiences of students. Teams will provide all the products, materials, hand tools and laptops which are announced by the organization in the specifications necessary for robot construction in their province where their schools are located before the competition and will keep them ready with them. No materials will be given to the teams before the competition, only an envelope containing the information of the track where the robot will compete and the rules of the competition will be given and they will be asked to race them in competition area.

### CHAPTER 2: COMPETITION FORMAT

**Article 2 (Definition):** The competition will last for three days. Each team has two competitors.

**First day:** All teams take the competency exam which will be held on first day (morning/afternoon)

**Second day Session-1:** On the second day (morning) of the competition, the teams who successfully passed the qualification exam will be placed on the tables where they will work according to the order of draw. Teams have **to design** their robots in a specific time and get ready for programming. There will be laptops and all materials which brought by the teams in each desk. The specifications of the track/platform where the competition will be held and the robot's tasks will be given to the competing teams in a sealed envelope just before the competition starts.

**Second Day Session-2:** On the second day of the competition (noon), the teams will program the robots they have designed by using the laptops given by organisation and the materials that they brought with them within the specified time and make them ready for the competition by trying them on the test track. At the end of the period, the referee committee will receive the robots from the competitors and will deliver them again on the third day at the time of the final competition. The ranking list will be announced by the referees at the end of the competition.

**\*\*\* Computers will be provided by their own and contestants will not carry any electronic devices such as mobile phones, tablets, USB sticks, external discs, smart watches, etc. with them.**

**Third day:** The final races will be held in the indoor hall in front of the spectators.



**Article 3 (Examination):** Competency exam will be held at first day of competition. All team members will sit the exam at the same time.

Exam will consists of multiple choice questions which are related with the following topics.

- Basic Electric & Electronics,
- Basic Digital Electronics,
- Arduino,
- Basic Arduino Programming.

\*\*\* You can see sample questions at the last page.

Teams will be sorted according to their scores at the end of exam.

If teams have same scores, the team which gives its exam sheet earlier will be listed upper than other.

If teams are still equal, the one has lower average age will be listed upper than other. Only 40 teams from top of list will get right to compete “design” session of the competition at second day.

## CHAPTER 4: ROBOT SPECIFICATION

### Article 4 (Definition of Robot):

- Robot move autonomously.
- While designing robot, using any kind of module except modules announced by organization is not allowed.
- Using any kind of communication modules such as wireless, bluetooth, etc is strictly forbidden.
- Power unit; Using any kind of power supply on robot except LI-PO battery which announced by organization will not be allowed.

## CHAPTER 5: RULES

**Article 5** Principles will be announced to the teams just before starting competition.

## CHAPTER 6: RACING

**Article 6** Teams will be informed of racing rules, how it is carry on and scoring just before starting the competition. Robots which are built will run by the order of drawing.

## CHAPTER 7: ASSESMENT



**Article 7** Assesment criterions will be announced to the teams just before starting competition.

## CHAPTER 8: OTHERS

**Article 8** Organization commitee reserves the right to change the rules in case of necessity without any reason.

**Article 9** The portable computer to be used in the competition will be formatted by the school assigned by the Erzurum Provincial Directorate of National Education and brought to the competition area in a re-installed and working condition.

**Article 10:** The computers that given by the organization will have *the operating system, office application program, pdf reader program and the Arduino IDE program downloaded from <https://www.arduino.cc/en/Main/Software> and the necessary libraries installed.* Programming will only be done using this programme. There will be no different applications and programmes other than these software. It is important for the participants that the computer to be used in the competition is formatted and reinstalled just before coming to Erzurum.

The computers will be examined by the judging committee before the competition.

**Article 11:** Before the start of the competition, the following products and materials to be used in robot construction will be available on the work tables and the robot will be built using the defined product groups.

### Mainboards:

Open source microcontroller board  
DC motor driver shield (double motor driver board)

### Sensors ;

Inside tool box, there will be the following sensors.

Line Sensor (8 sensor)	1 piece Analog Signal
4-Line Sensor	1 piece
Infrared sensor for color sensing	8 pieces measuring range:1,27mm
Ultrasonic Sensor	3 pieces, 2-450cm ultrasonic distance sensor
Micro switch	4 pieces, middle size, long palet micro switch

### Batteries;

LI-PO Battery	1 piece 7,4V LiPo 2200mAh, 8C-2s
Charger	1 piece 20W 1600mAh

### Motors;

DC Gear Motor	2 pieces 6V 250rpm yellow colored
---------------	-----------------------------------



**Others;**

Motor Bracket	2 pieces
Wheel	2 pieces yellow colored, compatible with 6V 250rpm motor
Ball Caster 3/8"	2 pieces, metal
Robot body	1 piece 170mm,105mm,3mm made by flexiglass

**Tool Box and Tools;**

Inside tool box, there will be the following tools.

Tool box 15 inch	1 piece
Bread Board	1 piece
Jumper cables	2 piece, male-male, female-male 40 pin, 100mm
Mini plier	1 piece
Screwdriver set (31 pcs)	1 piece
Screw-Nut set	1 piece, M2,enough number of YHB screw, nut and washer
USB Cable ( 1meter)	1 piece, compatible with board
Double sided tape	1 piece

**Notice:**

*\*\*\* Bringing any kind of electronic boards or equipments to the competition desks is strictly forbidden.*



### SAMPLE QUESTIONS;

S-1) What is the value of resistance which has following color code: Red – Green – Yellow – Silver?

- a) 2 K  $\Omega$     b) 200 K  $\Omega$     c) 250 K  $\Omega$     d) 2 M  $\Omega$

S-2) Which one is the symbol of diode?



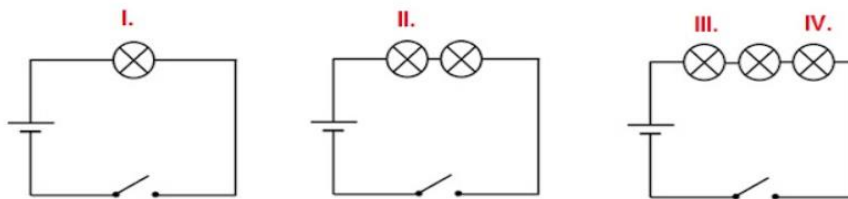
S-3) Which one is not present in a simple electric circuit?

- a) Battery    b) Cable    c) Bulb    d) Fuse

S-4) Task of which of following circuit component is incorrect?

- a) Battery generates electric energy  
b) The connection cable prevents the passage of electrical energy.  
c) The light bulb converts electrical energy into light energy.  
d) The switch controls the passage of electrical energy.

S-5) Below are simple electrical circuits with identical batteries and lamps.



When switch is turned on, which of lamp gives the brightest light?

- a) I    b) II    c) III    d) IV

S-6) Which one is correct statement to activate output pin 3 of Arduino?

- a) `digitalWrite(3,LOW);`    b) `digitalWrite(3,SET);`  
c) `digitalWrite(3,HIGH);`    d) `digitalWrite(3,high);`

S-7) Which script can be used to define all pins of Arduino from 3 to 9 as output?

- a) `for(int i=0;i<10;i++)`    b) `for(int i=0;i<10;i++)`  
    `pinMode(i,output);`              `pinMode(i,OUTPUT);`  
c) `for(int i=3;i<10;i++)`    d) `for(int i=3;i<10;i++)`  
    `pinMode(i,output);`              `pinMode(i,OUTPUT);`