

**REPUBLIC OF TURKEY**

**THE MINISTRY OF NATIONAL EDUCATION**

**The General Directorate of Technical and Vocational Education**

**13. INTERNATIONAL  
MEB ROBOT CONTEST  
DESIGN & BUILD ROBOT  
CATEGORY RULES**

**2019 - SAMSUN**

## DESIGN & BUILD ROBOT CATEGORY COMPETITION RULES

### CHAPTER 1: COMPETITION RULES

**Article 1 (Objective):** This competition is based on competing professional skills, knowledges and programming experiences of students. A tool box in which there are necessary materials to make a robot will be given to teams and it is requested that teams design their own robots and race them in competition area.

### CHAPTER 2: COMPETITION FORMAT

**Article 2 (Definition):** Teams consist of two competitors. Teams pass successfully the competency exam which will be held on first day are placed their desks according the result of drawing. There will be toolbox in each desk. There are all necessary materials to design robot such as electronic equipments, boards, tools, specification of racing course, tasks for robot etc. in the toolbox.

At the **first part** of competition, teams have **to design** their robots in a specific time and get ready for programming.

At the **second part** of competition, teams have **to program and test** their robots in a specific time and get ready for competition.

When the time is up, judges will collect all robots and give them back at the moment of competition.

Ranking list will be announced by judges at the end of competition.

### CHAPTER 3: EXAMINATION

**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,
- Arduino Shield,
- 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.
- When designing robot, using any kind of module rather than modules given 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 given by organization is not 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 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** Each school/institute can be represented only (one)1 team in this category.

**Article 10** Teams can register until the deadline of application stated in competition calendar.

**Article 11** The software Arduino IDE downloaded from the site : <https://www.arduino.cc/en/ Main/Software> has been installed in competitor's laptop. Competitors will create programs only using this software.

**Article 12** All of the following equipments and tools which are required to design & build robot will be on the work desks before competition.

### **Mainboards:**

Robot will be made by using following products.

Open source microcontroller board

1.1. Arduino Uno

- 1.2. Arduino Screen Shield
- 1.3. Arduino Motor Driver Shield

**Sensors ;**

Inside tool box , there will be only the sensors among the following sensors which are suitable for competition tasks.

Object detection Sensor	3 piece
Line Sensor (8)	1 piece
Colour Sensor	1 piece
Ultrasonic Sensor	3 piece
Acceleration Sensor	1 piece
Encoders	2 piece
Pressure Sensor	1 piece
Mercury Sensor	4 piece
Micro Switch	4 piece

**Batteries;**

7.4V LI-PO Battery	1 piece
Charger	1 piece

**Motors;**

DC Gear Motor	2 piece
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**Others;**

Motor Bracket	2 piece
Wheel	2 piece
Ball Caster	2 piece
Special design body made by flexiglass	1 piece

**Tool Box and Tools;**

Inside tool box , there will be only the tools among the following tools which are suitable for competition tasks.

Tool box 22 inch	1 piece
12V 1A Power supply	1 piece
Bread Board	1 piece
Bread Board Power Supply	1 piece
Digital Multimeter	1 piece
Jumper cables	2 piece
Soldering iron	1 piece
Soldering iron stand	1 piece
Solder	1 piece
Soldering Flux	1 piece
Desoldering pump	1 piece
Mini long nose plier	1 piece
Mini plier	1 piece
Mini diagonal plier	1 piece
Screwdriver set	1 piece
Glue gun	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: Brown – Green – Yellow – silver?

- a) 1 K  $\Omega$       b) 100 K  $\Omega$       c) 150 K  $\Omega$       d) 1 M  $\Omega$

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



S-3) Which one is the decimal equivalence of number  $(1001\ 1100)_2$ ?

- a) 146                      b) 156                      c) 166                      d) 176

S-4) 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-5) Which codes can be used to activate digital output 7 if value of input A0 of Arduino becomes between 300 and 500?

- a)** if(analogRead(A0)>300 || analogRead(A0)<500)  
    digitalWrite(7,HIGH);  
    else  
    digitalWrite(7,LOW);
- b)** if(analogRead(A0)<300 || analogRead(A0)>500)  
    digitalWrite(7,HIGH);  
    else  
    digitalWrite(7,LOW);
- c)** if(analogRead(A0)>300 && analogRead(A0)<500)  
    digitalWrite(7,HIGH);  
    else  
    digitalWrite(7,LOW);
- d)** if(analogRead(A0)<300 && analogRead(A0)>500)  
    digitalWrite(7,HIGH);  
    else  
    digitalWrite(7,LOW);

S-6) 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);
```

S-7) int a = 5; Serial.print(sizeof(a));

When we run the codes above , what can we see on serial port screen?

- a)** 5            b) 1            c) 2            d) 4