


REPUBLIC OF TURKEY

THE MINISTRY OF NATIONAL EDUCATION

The General Directorate of Technical and Vocational Education



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

2020 - SANLIURFA

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): Competition consists of three sessions. Each team has two competitors.

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

Second Session: Teams passed successfully the competency exam are placed their desks according the result of drawing on first day afternoon. Teams have **to design** their robots in a specific time and get ready for programming. 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.

Third session: Teams have **to program and test** their robots in a specific time and get ready for competition on second day (morning).

Each team has to bring one laptop computer to use during the competition. In case of necessary , judges may change team's computers each other by drawing lot before programming session.

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

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 max. two teams on condition that different advisors.

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

Article 11 Operating system, Office software , The software Arduino IDE downloaded from the site : <https://www.arduino.cc/en/ Main/Software> , pdf reader have been installed in competitor's laptop. Competitors will create

programs only using this software. No any other software installed in computers. Before the competition, computers should be formatted recently. Judges will check team's computers.

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 (original)
- 1.2. Arduino Step motor driver (DRV8825)
- 1.3. Arduino DC Motor Driver Shield (L298)

Sensors ;

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

6 axes acceleration and Gyro sensor (MPU6050)	1 piece
Object detection Sensor(MZ80)	3 pieces
Line Sensor (8) (QTR-8A - QTR-8RC)	1 piece
Colour Sensor (TCS34725 RGB)	1 piece
Ultrasonic Sensor (HC-SR04)	3 pieces

Batteries;

LI-PO Battery	1 piece
Charger	1 piece

Motors;

Nema 17 step Motor (HS4401)	2 pieces
DC Gear Motor	2 pieces
Mini servo motor	2 pieces

Others;

Motor Bracket	2 pieces
Wheel	2 pieces
Ball Caster 3/8"	2 pieces
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 Ω b) 100 K Ω c) 150 K Ω d) 1 M Ω

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