

**e-Yantra Robotics Competition 2016**

**Theme - Navigate a Terrain**

**Theme and Implementation Analysis**

**<Team ID>**

|  |  |
| --- | --- |
| **Team leader name** |  |
| **College** |  |
| **Email** |  |
| **Theme assigned** |  |
| **Date** |  |

**Scope (5)**

**Q1. State the scope of the theme assigned to you.**

< Teams should briefly explain in their own words the theme assigned. What in your opinion is the purpose of such an application? You may use figures / diagrams to support your answer.

Answer format: Text - limit: 50-100 words>

**Building Modules (5)**

**Q2. Identify the major components required for designing the robotic systems for the solution of the theme assigned to you.**

< Teams should classify the components into the following categories: mechanical systems, electronic systems, etc. Mention how these systems will be used in the theme. You may draw diagrams/figures to illustrate your answer.

Answer format: Bulleted form

Base Station:

1. Component 1

2. Component 2

3. Component ….etc.

Rover:

1. Component 1

2. Component 2

3. Component ….etc.

**Camera (20)**

**Q3. Explain how you will detect the laser being projected on the arena using the USB Camera provided to you in the kit? (10)**

<You can draw some diagrams/figures to illustrate your answer.

Answer format: Text / Bulleted Points

>

**Q4. How will you detect the colour of each Checkpoint with your Rover? (10)**

< Explain the image processing techniques that you will employ in order to distinguish between the different coloured Checkpoints.

Answer format: Text / Bulleted Points

>

**Actuators (10)**

**Q5. How will you design the mechanism for Base Station using the actuators provided to you in the kit? Please mention any additional actuators that may be required to design the Base Station and how you will use them.**

< Team should list all types of actuators they will need for making the complete system.

You can also draw some diagrams/figures to illustrate your answer.

Answer format: Bulleted form

>

**Electronics and Hardware Components (5)**

**Q6. The Node\_MCU provided to you works on logic level of 3.3V. Whereas servos work at a logic level of 5V. How will you provide PWM input required to drive the servos from the Node\_MCU ?**

<

Answer format: Text

Word-limit: 100 words

>

**Navigation and Communication (10)**

**Q7. Consider the following scenario. Initially the Rover is following the laser and at some point it loses sight of the laser. What is the protocol to be followed in order to recover from such a situation?**

<

Teams should explain in their own words how the Rover will communicate with the Base Station in this situation and the how the Base Station will respond.

Answer format: Text

>

**Testing your knowledge (Based on theme and rulebook) (15)**

**Q8. How will you detect the position of Checkpoints in the Map? How will you correlate the position of Checkpoints on the Map with the angle of the spotter in the arena? (10)**

<Teams should briefly explain in their own words the technique they will use to identify the Checkpoints. You may use figures / diagrams to support your answer.

Answer format: Text - limit: 50-100 words>

**Q9. What will the Rover do when it encounters a Checkpoint on the Arena? (According to the algorithm used). (5)**

<Teams should briefly explain in their own words what their next course of action will be on encountering a Checkpoint. You may use figures / diagrams to support your answer.

Answer format: Text - limit: 50-100 words>

**Algorithm Analysis (20)**

**Q10. Draw a flowchart to explain the algorithm you propose to use to complete the given task.**

< The flowchart should elaborate the major functions that will be used for completing the assigned theme.

Follow the standard pictorial representation used to draw the flowchart.

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**Challenges (10)**

**Q11. What are the major challenges that you can anticipate in addressing this theme?**

<Answer format: Bulleted form

1. Challenge 1

2. Challenge 2

3. Challenge 3, etc.

Word-limit: 200 words

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