

**e-Yantra Robotics Competition 2016**

**Theme - Launch a Module**

**Theme and Implementation Analysis**

**<Team ID>**

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

**Arena Setup (5) Q1. Insert pictures of the fully assembled arena as instructed in the Rulebook.**

< Prepare the arena as per instructions given in Section 3 of Rulebook. Refer to the Sample\_Arena\_Configuration.pdf provided with this document and set up the arena according to the configuration. You must insert two images: (i) image of the arena with all the Objects, Obstacles and Color Markers clearly visible and (ii) image of the Overhead Camera Setup (you may refer to the sample image Figure 8, in the rulebook). Insert the images below. >

**Scope (5) Q2. State the scope of the theme assigned to you.**

< Teams should briefly explain the assigned theme in their own words. 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)**

**Q3. Identify the major components required for designing the robotic system for the solution of the theme assigned to you.**

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

Answer format: Bulleted form

1. Component 1

2. Component 2

3. Component ….etc.

**Actuators (15)**

**Q4. List all the actuators present on Firebird V robot. Besides the existing actuators, please mention any additional actuators that may be required for designing the robot system in your theme. Mention and justify the use of additional components. (5)**

< Team should list all types of actuators they will need for making the complete system. Teams have to mention: (i) actuators that are already present on Firebird V robot and (ii) actuators that they need to interface with the Firebird V robot.

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

Answer format: Bulleted form

1. Actuator1

2. Actuator2

3. Actuator3…. etc.

>

**Q5. Explain the design and working of the mechanism used to pick up Objects and how it is mounted on the Robot. (10)**

<

Explain and draw figure(s) of your mechanism and show how you are planning to mount the mechanism on the robot.

>

**Testing your knowledge (related to rule-book) (10)**

**Q6. What is the difference between an Object and an Obstacle? (5)**

< Please explain the answer in your own words. The answers copied directly from rulebook will not be considered for evaluation. You can also draw some diagrams/figures to illustrate your answer.

Answer format: Text/Bullets

Word-limit: 50 words

>

**Q7. What will the robot do (according to your algorithm) if a {Red, Square, Large} colour marker is present in the Door Area and two {Red, Square, Large} Objects are present in the Working Area.(5)**

< Please explain the answer in your own words. You can also draw some diagrams/figures to illustrate your answer.

Answer format: Text/Bullets

Word-limit: 100 words

>

**Camera and Image Processing (15)**

**Q8. How will you detect the Position and Orientation of the robot in the arena using the Overhead Camera? What kind of Image processing technique would you use? (10)**

<

Explain in detail the process you will adopt in order to detect the position and orientation of robot. You can also draw some diagrams/figures to illustrate your answer.

Answer format: Text/Bullets

Word-limit: 150 words

>

**Q9. How will you differentiate between an Obstacle and a Red coloured Object ? (5)**

<

Explain in detail the process you will adopt in order to differentiate between the two. You can also draw some diagrams/figures to illustrate your answer.

Answer format: Text/Bullets

Word-limit: 100 words

>

**Navigation Scheme (5)**

**Q10. How will you navigate the robot in the arena using the Overhead Camera? (5)**

<

Explain in detail the process you will adopt for navigating the robot in the arena. You can also draw some diagrams/figures/flowcharts to illustrate your answer.

Answer format: Text/Bullets

Word-limit: 100 words

>

**Communication (5)**

**Q11. Describe how you plan to implement communication between the computer and the robot. Will this communication be uni-directional or bi-directional ? Justify your answer. (5)**

<

Mention the kind of data you will be transmitting to the robot to/from the computer.

Answer format: Text/Bullets

Word-limit: 100 words

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**Algorithm Analysis**   **(25)**

**Q12. Draw a flowchart to explain the algorithm you propose to use to complete the given task. (25)**

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

Follow the standard pictorial representation used to draw the flowchart.

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**Challenges (10)**

**Q13. What are the major challenges that you anticipate in addressing this theme? How do you plan to overcome these challenges? (10)**

< Answer format: Bulleted form

1. Challenge 1

2. Challenge 2

3. Challenge 3, etc.