Daffodil International University

**Department of Computer Science and Engineering**

Faculty of Science and Information Technology

**Final Examination Semester: FALL 2019**

**Course Code: CSE444 Course Title: Introduction to Robotics**

**Section: ALL Course Teacher: ALL**

**Time: 2 hours** **Full Marks: 40**

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**Question 1:** **10+5+6+5**

Consider the following specification for the design of a robot:

*Robot "RoboSpraySpash" is a special purpose robot with an objective to help the farmer in the paddy field to spray insecticide based on its own intelligence during the day hours. RoboSpraySplash (RSS) is required to carry out the following operations:*

*(i) Move through identification of object or direction across the field in a given measurement*
*(ii) Detect the needs for spray of the insecticide during the navigation of the paddy field*
*(iii) Communicate to agent responsible for insecticide if needs to be filled again*
*(iv) Communicate to the farmer in charge of the RSS about the spary data and time with location*
*(v) Communicate to the cloud to provide data about insecticides*

*Along with the above simplified specification, as Robotic design engineer, you are allowed to do required or necessary assumption subject to the given context.*

*Answer the following:*

(a) Propose a sketch for the design of "*RoboSpraySplash*".
(b) Based on the proposed design in (a), provide list of sensors and actuator required.
(c) Based on the proposed design in (a), provide a operation block diagram of the RSS
(d) What are typical challenges to overcome in the present context of RSS.

**Question 2:** **6+5+3**

(a) What are different component of robotic programming in ROS. How subscriber and receiver works in ROS environment.
(b) What is a node in ROS. How nodes are communicating with each other in ROS.
(c) How topics fuction in ROS. Give an example.

---------- Good Luck ----------