Electronics

Complete the following:

1. Know about the programmable physical objects, and list out examples of programmable physical objects used in daily life.

2. Know about the single-board microcontroller, input and output devices and list out examples of input and output devices used in daily life.

3. Understand different logic program structures, such as conditional statements (if, else), loops (for loop, while loop, break), etc.

4. Understand the difference between digital signals and analog signals.

5. Understand the usage and principles of various types of sensors, such as temperature sensors, temperature and humidity sensors, infrared proximity sensors, ultrasound sensors, etc.

6. Understand the concept of Internet of Things and its applications.

7. Complete the following projects:
   (a) Introduce the functions of single-board microcontroller (e.g. Arduino or mirco:bit), breadboard or other electronic components (e.g. LED, resistors, motors, buzzers, various types of sensors, etc.) to the assessor.
   (b) Design a simple program using any of the programming environments (e.g. mBlock, Ardublock or S4A), and build a simple circuit (e.g. LED flashing).
   (c) Build a control circuit (e.g. controlling the LED brightness or motor speed, etc.) using the analogue input and output function (PWM) of a single-board microcontroller.
   (d) Design a circuit using different logic program structures such as conditional statements (if, else), loops (for loop, while loop, break), etc.

(e) Build a circuit for wireless communications and data exchange using a radio module (e.g. Bluetooth, Wi-Fi or Zigbee).

(f) Design and apply a project (e.g. LED display board, electronic alarm, radio, etc.) that can be used in Scouting activities or venues (e.g. Scout room); explain the idea and objective of the product.